

Science at the Environment Agency

Science underpins the work of the Environment Agency. It provides an up-to-date understanding of the world about us and helps us to develop monitoring tools and techniques to manage our environment as efficiently and effectively as possible.

The work of the Environment Agency's Science Group is a key ingredient in the partnership between research, policy and operations that enables the Environment Agency to protect and restore our environment.

The science programme focuses on five main areas of activity:

- **Setting the agenda**, by identifying where strategic science can inform our evidence-based policies, advisory and regulatory roles;
- **Funding science**, by supporting programmes, projects and people in response to long-term strategic needs, medium-term policy priorities and shorter-term operational requirements;
- **Managing science**, by ensuring that our programmes and projects are fit for purpose and executed according to international scientific standards;
- **Carrying out science**, by undertaking research – either by contracting it out to research organisations and consultancies or by doing it ourselves;
- **Delivering information, advice, tools and techniques**, by making appropriate products available to our policy and operations staff.



Steve Killeen

Head of Science

Executive summary

Background

The research reported here forms Part 5 of a larger project 'Managing the Social Aspects of Floods' (science reports SC040033/SR1–SR6 and SC02061/SR1).

Aim

The main aim of this research was to review options for improving the contribution of social science to the Environment Agency's Flood Risk Management (FRM) science programme.

This report presents the collation and review of relevant research and practice both in terms of the role of social science and also in terms of FRM social science research and other relevant Environment Agency social science research carried out between 1999 and 2005. Both the FRM social science research and the Environment Agency social science research were examined in terms of social science approach and methods. In addition, relevant social science projects and programmes both from within the Environment Agency and externally were collated. Fourteen formal interviews were carried out with people from the following groups: Environment Agency and Defra policy staff, Environment Agency regional/operations staff, Environment Agency and Defra social scientists, other government department social scientists, academics/researchers working in FRM, academics/researchers working on the role of science in policy making and other practitioners in FRM.

Results and conclusions

There is a wide range of social science projects being carried out both within the Defra/Environment Agency FRM research programme and outside that programme. Although there is a clear process by which the overall Defra/Environment Agency FRM research programme is developed, it is not clear that there is an overall strategy for why those social science projects have been commissioned, either within the Defra/Environment Agency programme or within the Environment Agency social science programme. An exception is that of the Flood Forecasting and Warning (FFW) theme. The scoping report carried out in 2000 (Environment Agency 2000) provided a clear social science research programme and the projects that were prioritised have been carried out.

While some of the FRM research projects are closely linked to and have a clear impact on business issues, a number do not have clear links to a business objective (either operational or policy). This means that immediate use of the research can often be perceived as limited. The notion of 'good use' is one that is debated, but from the interviews it emerged that there is a perception among many FRM staff that 'good use' should follow a fairly linear model from research through to application, and if it does not then the research might be regarded as not useful. Certainly, clarity on the objectives of research is to be welcomed, but it might also be useful to consider what constitutes 'good use' and how that might best be achieved given the complexity of the Environment Agency.

While there is a sense that social science is useful for FRM, especially as technological solutions are seen to be failing, it is clear that many staff have low levels of knowledge of

social science research, methods and practice. This leaves social science open to meaning different things to different people. There is a key issue in terms of social science capacity building within the Environment Agency.

Finally, it is clear there is no clear process by which potential users of the social science research (e.g. operational staff) can engage with that research either as it is being carried out or once it has been finished. Internal dissemination seems to be a fairly static process of sending out documents to a list of interested members of staff.

Recommendations

R1: Develop a clear vision of the role of social science research for the Environment Agency within the Social Policy Team. This might include:

- consideration of what constitutes social science research evidence;
- clarity on the relationship between social policy development and social science research;
- outlining the benefits of social science research for the Environment Agency;
- demonstrating how social science research can provide solutions to specific issues;
- considering what kinds of organisational structures and resources might exist that could support the vision, and what gaps there are;
- understanding the context of the Environment Agency and realistically assessing where the opportunities for input might be;
- understanding how social science information is currently disseminated/diffused through the organisation and developing mechanisms for that dissemination/diffusion;
- developing a network of champions for social science.

R2: Develop an approach to embedding social research within the organisation perhaps using FRM as an 'early adopter' function. This might include:

- having a dedicated FRM social science person who has a watching brief and understanding across all the projects internally and externally and who links back to the Social Policy Team. This person should also be clearly linked into the Defra/Environment Agency programme;
- ensuring that there is adequate social science representation when planning the R&D programme;
- developing a network of champions both 'up stream' and 'down stream';
- investing time and effort in staff development with training in social research, etc.;
- developing mechanisms for linking operations with research such that research can be closely tied to business issues where appropriate;
- understanding the range of ways in which research can influence the 'business' of FRM and using those different models to facilitate the influence of social science research in changing the FRM culture from a 'technoeconomic' one to a 'sociotechnical' one.

R3: Engage systematically with academics, policy makers and practitioners of FRM by setting up a forum for discussion and debate about the key issues for FRM, making this an interdisciplinary forum so that a new language for FRM can be developed, but run it using good practice facilitation and dialogue.

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1 Introduction

1.1 Objectives of the research

The objectives of this research were to review options for improving the contribution of social science to the Environment Agency's Flood Risk Management (FRM) science programme. In doing that, it was specified that the researchers should:

- liaise with relevant stakeholders and draw on current knowledge and research to review and understand the role of social science approaches across government and particularly in Defra in the context of evidence-based policy making;
- liaise with relevant stakeholders and draw on current knowledge and research to review and understand the role of social science approaches across the Environment Agency and particularly in relation to the Defra/Environment Agency FRM science programme in the context of evidence-based policy making;
- make recommendations for future Defra/Environment Agency FRM research, policy and process development and for the Environment Agency's social science programme.

The research reported here forms Part 5 of a larger project 'Managing the Social Aspects of Floods'. There are six parts to the project:

- Part 1 – Understanding the impacts of flooding on urban and rural communities and the policy context for addressing these (SC040033/SR1).
- Part 2 – Understanding the relationship between flood risk and vulnerable and deprived groups (SC020061/SR1).

Parts 1 and 2 focus on impacts of flooding, and aim to provide some understanding of how impacts may differentially affect specific groups and communities.

- Part 3 – Understanding the relationship between stakeholder engagement and effectiveness and efficiency in flood risk management decision making and delivery (SC040033/SR2).
- Part 4 – Understanding the relationship between community and citizen engagement and effectiveness and efficiency in FRM decision making, delivery and flood response (SC040033/SR3).

Parts 3 and 4 focus on understanding how engagement with stakeholders, communities and citizens can be effective with respect to FRM decision making.

- Part 5 reviews options for improving the contribution of social science to the FRM science programme. It aims to provide insight into the role of social science for FRM and to put it into the wider context of current progress around multi- and inter-disciplinary research (SC040033/SR5).
- Part 6 is a synthesis of the other five parts of the project and provides a summary of the key findings and a discussion of how the different parts relate to each other together with key recommendations (SC040033/SR6).

In addition, a further related study was commissioned examining the role of stakeholder engagement in Catchment Flood Management Planning and that forms report number SC040033/SR4 'Aire and Calder CFMP Scoping Study'.

The work on this report was carried out before the review of the Joint Defra/Environment Agency Flood and Coastal Defence (FCD) research programme had been published. In addition, the work was carried out while the business of flood risk management within the Environment Agency was undergoing a period of change (Incident and Flood Risk Management Change, IFRM).

1.2 Research approach

The research has taken the following approach:

- Collating and reviewing relevant research and practice both in terms of the role of social science and also in terms of recording social science and FRM research that has been carried out. The research has been examined in terms of its social science approach and methods.

As well as desk-based research, formal interviews were carried out with participants from the following groups:

- Environment Agency policy staff working in FRM;
- Environment Agency regional/operations FRM staff;
- Defra FRM policy staff and other government staff;
- academics/researchers working in FRM and community participation;
- other practitioners including a professional facilitator, a chairperson of a local community group, National Flood Forum (NFF) staff and local council officers.

Contact with these five groups took the form of formally arranged interviews (ranging from 40 minutes to 2 hours). Nineteen interviews were carried out in total across Parts 1, 4 and 5 of the project. These were with: Environment Agency policy staff (2); Environment Agency operations staff (6); Defra and other government staff (3); academics (5); and other practitioners (3) – the interviewees are listed in Appendix 2. Seven interviews were carried out face to face, and twelve by telephone. This sample partly reflects the numbers of relevant individuals in the various groups but also the practicalities of arranging formal interviews in the timescale available. In addition, less formal contacts were made by email and/or telephone calls to gather as much further information as possible. Not every participant was able to contribute to all parts of the project. For this part of the project, 14 of the participants' interviews were analysed.

The interview schedule was designed to address a range of areas that were adapted for the different participant groups (see Appendix 1). The questions under Section 5 relate to Part 5.

Notes were taken during the interviews and these were afterwards transcribed and in most cases returned to the interviewees for amendments and additional comments. The amended transcripts were analysed and categorised into key themes.

1.3 Definition of social science

Throughout this report, 'social science' is taken to mean research carried out using frameworks, theories and practices from the following disciplines: sociology, psychology, human geography, political science, social policy research and social anthropology (after Warburton *et al.* 2005). At the outset of the project we debated to what extent the project should also examine economic research and it was decided that it would not be a focus. However, as the work has progressed it has become important to consider a single approach to social science, so, while this report does not provide an exhaustive review of economic studies that have been carried out by and for the Environment Agency in FRM, it does note those projects where there are clear overlaps.

It was agreed that the project should examine the role of social science in terms of method and approach. Methods were defined as quantitative (large questionnaires that can be statistically analysed) and/or qualitative (interviews, focus groups), while approach could be 'positivist' (following the traditional scientific approach of hypothesis testing and deduction) or 'constructionist'/'interpretative' (following an approach of description of experience and inductive theory generation).

2 Social science and flood risk management: key issues

2.1 Introduction

The aim of this section is to provide some context for the rest of the report around current thinking about the role of science in general, and social science in particular with respect to environmental decision-making. In addition, this section will provide some information from key stakeholders on the role of social science in policy from both academic and government perspectives.

2.2 Current policy context with respect to science and evidence

Since 1997, there has been a strong emphasis on what is called ‘evidence-based policy making’. There has been notable change in the use of research and evidence within government. Defra (2005) suggests that evidence-based policy making is needed because:

‘The 1999 Modernising Government White Paper notes that Government “must produce policies that really deal with problems, that are forward-looking and shaped by the evidence rather than a response to short-term pressures; that tackle causes not symptoms”.

The Cabinet Office’s *Better Policy Making* (Bullock *et al.* 2001) identifies an evidence-based approach to policy as one which “reviews existing research, commissions new research, consults relevant experts and/or uses internal and external consultants and considers a range of properly costed and appraised options” (Defra 2005).

In addition, the Defra report goes on to say that evidence is ‘any information that helps turn our strategic goals into something concrete, manageable and achievable’. This does put research evidence as just one source of many, and that is something that would be useful to bear in mind with respect to FRM.

There is a wealth of advice and research now on evidence-based policy making, an example being the Economic and Social Research Council (ESRC) UK Centre for Evidence-Based Policy, which aims to provide social science information in such a way as to help develop policy. In addition, it provides resources and papers on both specific types of evidence and the role and effectiveness of evidence in policy making (e.g. Davies *et al.* 2000). There is also the Research Unit for Research Utilisation, based in St Andrews University, which considers how research is used.

Evidence-based policy making is not new to the Environment Agency; indeed, as the Science Strategy says: ‘Our credibility depends on demonstrating that our decision-

making is evidence-based and supported by science that stands up to scrutiny' (Environment Agency 2004a, p. 10).

This whole area of evidence-based policy making is not unproblematic, and a recent paper by Coote *et al.* (2004) reports a project that investigated to what extent a range of new social programmes were really evidence based. One of the findings, not surprisingly, was the following: 'There is a gap between the rhetoric of evidence-based policy and what happens on the ground, which is a great deal more complicated.' (p. 3).

It is fair to say, however, that the role of evidence and research is now firmly embedded within government rhetoric and practice and it is important for FRM to consider its position and practice in that context.

2.3 Current research on science and policy

While government policy might now be firmly wedded to an evidence-based approach, perhaps the somewhat all-encompassing description of what constitutes evidence reveals the change that has happened with respect to the place of science and research in public life.

2.3.1 Challenges to 'sound science' and the role of social science

Over the past decade there has been much debate about the role of science within policy and in general within public life. For a number of reasons, science has come under attack and we live now in what has been termed the 'risk society' (Beck 1992). This suggests that the balance between those risks associated with nature ('internal risks') and those risks resulting from human intervention ('external risks') has changed, such that society is increasingly dominated by risks of its own making. Beck (1992) goes on to suggest that old methods of managing risks via specific institutions and through science are no longer appropriate. People are wary of evidence, and knowledge is no longer considered uncritically.

Funtowicz and Ravetz (1993) have discussed a response to these and other factors in their consideration of 'post-normal science'. As they put it: 'This emerging science fosters a new methodology. In this, uncertainty is not banished but is managed, and values are not presupposed but are made explicit. The model for scientific argument is not a formalised deduction but an interactive dialogue' (1993, p. 740). This quote reflects a long-standing debate within social science disciplines, which is summarised by Gilbert (1993), who reflects on how it has been played out within sociology:

'A split between what we might want to call, on the one hand, a "positive" tradition, begun at the very inception of sociology by August Comte, and, on the other, an interpretative tradition, largely associated with the work of Max Weber. The word "positive" is used here to connote a view of sociology as a progressive, cumulative, explanatory, "scientific" project ... This positive tradition posits that society can be explained "scientifically", according to laws and rational logics ... The second tradition, the "interpretative" tradition, seeks not so much explanations and predictions of social events as understanding what meaning and what significance the social world has for the people who live in it.' (p. 7)

Essentially, Funtowicz and Ravetz (1993) are suggesting that traditional science has begun to acknowledge the role of the 'interpretative' tradition, and in doing so is examining new ways of 'doing science'.

So, what might this mean for the use of science in general, and social science in particular, in policy and practice?

The Environment Agency has had an interest in this area over a number of years and there are some research reports and papers that are worth mentioning here which bring out some of the main issues.

Some of these issues, most specifically the decline of an uncritical acceptance of science, have partially been examined through the use of innovative approaches to stakeholder engagement around complex 'science' issues. The opening up and management of engagement in science has been considered one way of combining the rigour of the scientific process with the scrutiny of deliberation.

The development of these new approaches has been led by social science, as an understanding of processes of engagement, perceptions of risk, communication of risk, trust in science and values in science have all been topics for social science research for some time (see, for example, Fischhoff 1995, Irwin 1995). However, what perhaps has changed, and acted in some areas as a catalyst for engagement in more traditionally technical issues, is a realisation by physical or chemical scientists that their solutions in some part were no longer effective. Risk assessment and nuclear waste, both areas that the Environment Agency has been involved with, provide good examples of this.

It was recognised that risk assessments needed to be opened up to interrogation, and that the science underpinning arguments and decisions was contested. In response to this, the Participatory Risk Assessment Project (Petts *et al.* 2003a) was carried out in order to see how the process could be opened up to improve its legitimacy. This project involved a literature review, a needs analysis, characterisation of the Environment Agency's regulatory context for decisions and a simulation exercise to test a possible method for participatory risk assessment. It suggested that 'a staged process that optimises participation at key stages in the assessment process – i.e. problem definition and framing, assessment and evaluation – is favoured by potential stakeholders and reflects developing international best practice' (Petts *et al.* 2003b, p. 1). This work made progress in developing an approach that integrates both participation and analysis within an assessment process.

The siting of a nuclear waste repository was a further area where it was recognised that physical science alone would not be able to provide an answer. In 1996 Nirex failed to get permission for a rock characterisation facility. The company then examined their actions and culture and, understanding the need to develop trust and transparency, underwent quite a dramatic culture change. They understood that the source of information and science had to be trusted and regarded as credible if the information itself was to be listened to and trusted. Generally, there have been attempts by the nuclear community to understand the lay perspective on nuclear waste and this has taken a number of forms of stakeholder engagement processes including the Consensus Conference in 1998 (UK CEED 1999) and the RISCUM projects (RISCUM 2003). The Environment Agency played a large role in both of these.

The above examples focus on areas where social science has helped illuminate and provide solutions for ‘problems’ that have in the past been dominated by technical solutions. Essentially, the change can be thought of as a reframing of problems. As noted by Petts *et al.* (2003a), there are tensions between ‘those who interpret risk assessment as a technocratic process which has to feed results into the risk management decision, and those who believe that risk assessment is part of the whole risk management process, itself subject to social, political and economic influences that will also affect the management decision (reviewed in Gerrard and Petts 1998)’ (p. 7). This represents two different framings of the problem of risk assessment: a ‘technoeconomic’ framing or a more ‘sociotechnical’ framing. Guy (2004) defines these as:

‘technoeconomic – the idea that if technical knowledge is rigorously tested and demonstrably proved, then consumption choices will be made rationally

sociotechnical – the idea that science is a sociocultural phenomenon and that the technical is always in relationship with wider social, economic and political processes’ (Guy 2004, p. 687)

FRM is a good example of an area where at present the dominant framing is that of the technical engineering flood defence but increasingly the rhetoric is changing, as noted in *Making Space for Water* (Defra 2004b) and reflected in the change of name from ‘Flood Defence’ to ‘Flood Risk Management’. The very title of *Making Space for Water* suggests that, rather than trying to hold back floods and defend people from them, a more co-operative approach should be taken whereby people ‘learn to live with floods’ and communities become ‘flood resilient’. Understanding that different ways of conceptualising a problem will lead to different ways of solving the problem (e.g. building flood defence walls or considering managed realignment) and can be the source of disagreement between different stakeholders will be vital if progress is to be made towards a new approach to FRM. A further issue linked to ‘framings’ is the question of what knowledge or evidence ‘counts’. Two aspects of this are important for FRM: firstly, social science evidence and, secondly, ‘lay’ knowledge.

Because social science reflects on the way knowledge and science is ‘done’, there is an understanding of the ‘subjectivity of framing assumptions’ (Warburton *et al.* 2005, p. 128). There has been considerable work carried out looking at the sociology of scientific knowledge (SSK), and Irwin (2001) summarises it by saying ‘An SSK approach generally replaces any fixed notion of scientific determinism (i.e. that science simply follows a predetermined path of discovery and the development of “facts”) with a more fluid and dynamic interpretation of the active processes through which scientists “make sense” of the natural world’ (p. 74). This type of knowledge is important when trying to change existing framings of a topic or issue.

The second issue is that of ‘lay’ knowledge, or rather what evidence counts as important. In the area of risk perception and risk communication it is acknowledged that there has been a dominance of expert opinion. When confronted by lay expertise that may be counter to this expert view, there has been an assumption of ignorance on the part of the ‘public’ rather than acknowledgement of the place of lay expertise (i.e. everyday knowledge that is gained from living with a risk as opposed to studying a risk). Once it is

accepted that there are different ways of framing and understanding an issue, then this type of knowledge becomes more acceptable as evidence.

Warburton *et al.* (2005) provide an excellent review of these issues for the Environment Agency, examining risk, trust and uncertainty and the role of sound science, and the reader is directed to this for a fuller discussion of these issues. They present ten challenges to the notion of 'sound science', which include the issue of 'framing', public scepticism towards science, the failure of natural sciences to deal with complexity and the failure of the traditional scientific method to achieve desired policy goals. The section on 'Sound Science' (p. 127) makes the point that 'the decision-making process dealing with uncertain situations will need to take into account the process by which those decisions are made, the context within which they are made, and the legitimacy of the organisation making them, as much as in the technical arguments'.

Warburton *et al.* (2005, p. 133) go on to list three aspects of social science that differentiate it from the natural/physical/engineering sciences:

- 'It focuses on different fields of inquiry such as individual human and shared social attitudes, behaviours, institutions, cultures, beliefs and values.
- It uses different methodologies, often bringing together qualitative and quantitative methods.
- It has different ethical frameworks as a result of its subjects being human beings (individuals or groups, or wide social trends), which challenge the conventional split between subjective and objective stances. Human beings are the subjects of research, but also the agents; they are not passive, but engaged, often explicitly, in the research task, which creates different demands and responsibilities on social researchers.'

Understanding these issues will be vital for FRM if it is to move towards a new framing of the flood risk issue, and is one of the key reasons why social science research should be placed at the heart of FRM. Indeed, an exploration of these issues is supported by the Environment Agency's Science Strategy: 'we need a different, multidisciplinary approach [to our science] ... that combines the expertise of natural, social and economic sciences with technology and engineering' (Environment Agency 2004a, p. 9).

2.3.2 The relationship between research and policy

A further key issue for research and debate is that of the relationship between research and policy. It is worth discussing it briefly here so as to highlight the fact that it too should not be regarded as unproblematic. Typically, both researchers and policy makers want the research to be 'used', that is to influence policy or practice. Often, underlying this is what has been called a 'linear relationship between policy and knowledge, a 1:1 relationship' (In't Veld 2000, p. 1). Even though it is acknowledged that this is clearly not how research influences policy, the idea of this relationship persists, often implicitly, in the way research questions are framed (Petts *et al.* 2004), and in the way dissemination of findings is approached.

A number of models of the impact of research can be discerned. Robson (1993), adapting from Weiss (1979), provides seven models of the impact of research:

- Classical – Pure research leads to applied research, leads to development followed by dissemination.
- Problem solving – Problem identified then research carried out to solve it.
- Interactive – Continuing dialogue between researchers and policy makers.
- Political – Research sponsored to support political decision or policy.
- Procrastination – Research contracted to delay having to make a decision.
- Enlightenment – Indirect permeation of policy making by research.
- Multiple influences – Research seen as one of many influences on policy.

In addition, Warburton *et al.* (2005) quote Davies *et al.* (2000, p. 31), who highlight that there are certain conditions in which research findings are most easily used. These are:

- if the implications of the findings are relatively non-controversial, neither provoking rifts nor running into conflicting interests;
- if the changes that are implied are within a programme's existing repertoire and are relatively small-scale;
- if the environment of a programme is relatively stable, without big changes in leadership;
- when a programme is in crisis and nobody knows what to do.

Petts *et al.* (2004) provide a more detailed discussion of these issues with respect to research on the urban environment. They discuss the issues concerning what is traditionally called 'disseminating' knowledge, including the barriers to knowledge transfer. They distinguish between 'policy relevant' and 'policy oriented' research, with the former being concerned with research that may not have been carried out directly to influence policy, unlike the latter. This is a useful paper as it discusses issues raised by a wide range of participants at a number of seminars, including both researchers and policy makers as well as people from the natural/physical sciences and the social sciences.

Articulating implicit models of the research–policy relationship and understanding the conditions in which findings might have an impact is helpful in the consideration of the role of social science research in FRM.

2.4 Perceptions and practice of social science research in government

In this section we present some of the findings from the interviews undertaken that explored the perceptions of the current role of social science research in areas of government other than FRM.

Two interviews were carried out:

- one with a member of staff from the Civil Renewal Unit at the Home Office;
- one with a member of staff from the Social Research Group at the Forestry Commission's research organisation: Forest Research.

These findings present approaches and models of how social science research might be embedded within government organisations. Four themes emerged from the analysis:

- type of social science research;
- role and status of social science research with respect to policy and practice;
- impact of social science research with respect to policy and practice;
- uptake and dissemination of social science research.

2.4.1 Type of social science research

Within the Home Office there is a Research Development and Statistics Directorate (RDS) that carries out larger and longer-term pieces of social research. This research is often quantitative, and the directorate is careful to ensure that all work is quality assured and robust. Frequently, the RDS works to evaluate programmes and to measure performance of government programmes against key initiatives or public service agreements. The Civil Renewal Unit focuses on co-ordinating government work to increase citizens' and communities' engagement in decision making. It was felt that this traditional type of research needed to be supplemented by a more action-based qualitative approach to learning that can give insight into individual motivations and capture opinions about successful approaches in the process of empowering citizens.

The type of research that the Civil Renewal Unit is engaged in is best characterised as action learning. An example was that of 'Guide Neighbourhoods', where there is mentoring from one neighbourhood to another and the research looks at the process as well as trying to relate this to outcomes. In a way, this method can be thought of as a potential 'design experiment': the process is reflected on and changes can be made as it develops to try to improve its efficacy. This is a very different type of research from the more formal evaluations.

Within the Social Research Group of Forest Research there is a clear focus on a type of research that is informed by cultural geography, and though a pragmatic approach is taken it is felt that a qualitative understanding of issues is very powerful if analysis is carried out in a rigorous way. In addition, it was felt that the reductionist, objectivist view does not fit with the way in which environmental issues have been viewed since the Rio Earth Summit. There is a keenness to use newer approaches to social research.

2.4.2 Role and status of social science research with respect to policy and practice

Within the Home Office it was suggested that the role of social science is to provide support for policies and programmes. However, as the programmes that are evaluated are frequently one-off programmes, evaluations may not be used. Occasionally a decision to continue the programme will be made before the evaluation has been finished and it was recognised that this was an inherent problem in many government programmes. It was suggested that there was also a tension between the policy makers' desire to have simple answers to big national issues and the fact that research tends not to provide simple answers, but often provides more questions. In the Civil Renewal Unit social research was more regarded as part of reflecting on processes of citizen engagement and trying to identify promising principles or lessons. With respect to the status of different types of research it was felt that randomised controlled trials would

probably be regarded as most credible, but scepticism was expressed as to the extent to which those types of studies could realistically be carried out on citizen engagement.

Within the Social Research Group of Forest Research the role of social science was regarded as showing how forests deliver against public policy. Although apparently peripheral to the business of forestry, some of the social benefits turned out to be much more important than expected – the relationship between forests and health and well-being, for example, turned out to be keenly interesting to health professionals. It was felt that social science was submerged compared to natural and physical science research and social scientists had fought to get representation on the board of Forest Research. Social Science is just one part of a group called Environment and Human Sciences. It was felt that it needed a larger role as social issues become bigger issues for the Forestry Commission. Their stakeholders had also echoed this view, but social science only has about 2.2 per cent of the total research budget. An example was given concerning the relationship between social science and natural/physical science researchers in forestry. A science project had a concept of 'end users', but it was necessary for the social scientists to ask 'Who are the end users' and to do some work to find that out. It was suggested that the social scientists are struggling to be accepted among the natural and physical scientists. It was also felt that social scientists needed to provide solutions in order to be accepted.

Currently, Forestry Commission staff 'on the ground' are receptive to social science work, and although there may be a lack of understanding in some places there is a recognition that findings can help in their day to day work. While it was suggested that at the policy level there was support for the role of social science, it was felt that in some of the upper levels of the Forestry Commission there is less acceptance of social research and an idea that perhaps rigour is best obtained by economic valuations. Also, there is more resistance to qualitative social science in Scotland, where the Head Office of the Forestry Commission is located.

2.4.3 Impact of social research with respect to policy and practice

Within the Home Office it was felt that sometimes evaluations did not have the impact that they might have and that this was partly due to a mismatch in timing between the research process and the policy process, with the former usually taking longer than the latter. However, it was felt that policies are changed at the smaller scale; for example, the recognition that some sections of the population find it harder to engage with the community through a volunteering bureau has led to thinking about other routes to volunteering. In multi-stage programmes action learning was thought to have an influence on practice as it enabled reflection as the process happened. It was felt that practitioners should be brought into the loop with policy makers and academics and this is something the Civil Renewal Unit is encouraging through its development of the Active Citizen Centre (<http://www.active-citizen.org.uk>).

The interviewee from Forest Research felt that its policies are quite enlightened and it has driven research in some ways. An example of research that has had an impact on policy is the area of evaluation, where qualitative methods were used to talk to under-represented groups on how they might 'get active'.

2.4.4 Uptake and dissemination of social science research

In the Civil Renewal Unit it was acknowledged that government did not always put time into disseminating research effectively, and that usually large reports were put onto websites. The Unit is working hard to redress this. It has a dedicated member of staff for communication and is developing a 'brand' so that reports are easily identifiable. The Unit also aims for documents to be readable and approachable.

The Social Research Unit at Forest Research has developed a training course and booklet called *Proving It! – Evidence Gathering for Forest Managers* (Martin and O'Brien 2005). The aim of this course is to train forest managers to have some understanding of social research: 'Our aim is not to make you an expert in social research but rather to encourage you to use such research and to understand how to obtain advice or to commission professional researchers' (p. 1).

2.5 Perceptions of social science research from academia

In this section we present some of the findings from the interviews we undertook that explored the perceptions of the current role of social science research in areas of academia other than FRM. The aim was to talk with academics who work within the general area of environmental decision making and who therefore have expertise in the role of social science within areas often dominated by the natural/physical sciences.

Two interviews were carried out for academia:

- one with a Professor in Geography at the University of Cambridge;
- one with a Senior Lecturer/Fellow in the Social Policy Research Unit (SPRU) at the University of Sussex.

From the two interviews carried out, two themes emerged within which a number of other issues are discussed. It should be noted that the issues raised below focus on social science research in the context of environmental policy making and therefore inevitably issues of the relationship between different disciplines are raised.

The two themes were:

- the current role of social science in environmental policy making;
- the relationship between social science research and policy.

In addition, one participant reflected on the role of social scientists in the context of environmental policy making.

2.5.1 The current role of social science in environmental policy making

Two contrasting modes of research were identified from the interviews with respect to social science and environmental policy making. These could be broadly termed as either additive or transformative.

The first mode refers to when social science is brought in at the end of a natural/physical science project, perhaps to overcome barriers to implementation or to provide solutions to problems that cannot be answered by natural/physical science or the positivist approach. In this mode there tends to be a preference for quantitative methods, and the research will tend to add to existing knowledge but is unlikely to transform the way problems are examined or understood. Questions will tend to be framed by natural/physical scientists and the social scientists' knowledge will be interpreted within those framings.

The second mode, transformative, is where social science knowledge helps us to understand values and framings of problems, and indeed is involved early on in defining research questions. This mode of research is linked with qualitative approaches. It may be resisted by natural/physical scientists as it is often challenging to existing framings.

Linked to these modes are models of the relationship between disciplines. Within the first mode there is an implicit model: 'in which natural science "defines" the problem and social scientists are seen as somehow smoothing the way for the necessary technical solutions' (Petts *et al.* 2004, p. 6). The challenge of translating research findings into implementation is often conceptualised as a communications issue, with the social scientist (often regardless of his/her experience) being called upon to provide methods of engagement that will enable a technical solution to be 'accepted' or 'understood'. In framing the problem as one of communication, research questions remain within a natural/physical science framing. We return to this issue of communication as the 'problem' in the next section where we consider the relationship between research and policy.

A different model is one where all disciplines contribute to the problem definition phase of the research process equally, and in doing so approach a problem from a number of perspectives. This can be transforming within a system that is predominantly viewed through the lens of the natural/physical sciences.

It was suggested that at present social science in environmental policy making tends towards the former mode of research. However, it was considered that there is a growing recognition from environmental policy makers that the latter mode is necessary as well. Interestingly, the transformative approach to social science can be seen to be playing a current role, not perhaps through standard research projects, but through the presence of key social scientists on committees and groups (e.g. Defra Science Advisory Group, Royal Commission for Environmental Pollution (RCEP)) that represent areas of interest which have traditionally been dominated by the natural/physical sciences. For example, for its latest piece of work (Bystander Exposure to Pesticides) the RCEP began with an open meeting, and had a social scientist, Professor Alan Irwin, to give the first paper so that the different framings of the problem could be explored and reflected upon.

2.5.2 The relationship between social science research and policy

This theme emerged from questions about the use and impact of social research on environmental policy and the role of 'evidence-based' policy making. The interviewees elaborated on a number of issues.

Firstly, the idea of 'good use' was discussed. Although it might appear that 'good use' is not always made of social science research for government, this is partly because of a naïve assumption about the relationship between research and policy, that research is carried out and feeds neatly into the policy-making process. Instead, ideas of 'diffusion' of knowledge were discussed.

The same naïve assumption of linearity about the relationship between research and policy was felt to be inherent within the concept of 'evidence-based policy making'. Holding this assumption of linearity constrains working in the transformative mode of social science. It was suggested that perhaps 'evidence bounded'¹ policy making might be a more fruitful concept, retaining the aspects of robustness and analysis implied in evidence-based policy making, yet clearly indicating that the evidence would not make the policy/decision, rather that would be for political discussion.

In addition, it was suggested that barriers to the use of social science research were linked to the perception of it being low down the epistemological pecking order and because of a perceived difficulty for it to provide solutions (perhaps rather the difficulty is to provide solutions to problems framed from a natural/physical science perspective). However, it was suggested that there was an increasing acknowledgement that other social science approaches, apart from positivist ones, could help provide useful understanding and insight into policy issues.

Secondly, the issue of communication emerged again as a key point. It was suggested that sometimes the 'problem' of turning research into policy is considered to be one of communication, that is, crudely, if social scientists could only communicate the findings clearly then they could be turned easily into policy. This was echoed by comments on language, specifically, that social scientists are frequently being asked to write without 'jargon'.

2.5.3 Reflecting on the role of social scientists – a note of caution

A final issue raised was that of reflection by social scientists on their role in interdisciplinary contexts. It was suggested by one participant that as social scientists may call for reflection on framings of problems by natural/physical scientists they should also reflect on their own framings of issues. The issue of the authority of social scientists in this arena was raised; there is a tension between wanting a place at the table and being clear about what is known and what is not.

The quote below also expresses this issue:

'Social scientists have to establish their authority in the first place, this is not assumed, indeed it can be undermined by an image of 'soft science' that is arbitrary, replete with simple insights and open to competition from other people's views of the world ... Against such difficulties there can be a temptation to oversell what the social scientist knows. While it might seem legitimate for a natural scientists to say that they only know about the atmosphere for example, a social scientist is often pushed into making judgements outside of their expertise'. From a summary of a presentation by Professor Ortwin Renn (Petts *et al.* 2005, p. 2)

¹ The term 'evidence bounded' came from Andy Stirling in his interview.

Finally, it was said that sometimes in establishing authority and legitimacy language can be used in such a way as to suggest that only experts are able to understand it. This is often criticised as 'jargon'. However, it was suggested that in the pressure to 'avoid jargon' technical social science language that is precise about definitions can easily remain undeveloped. Language should be used to provide precision about concepts and ideas, and therefore may still require explanation to someone without expertise in a specific area of knowledge.

3 Current contribution of social science to the FRM science programme

3.1 Defra/Environment Agency Joint Thematic R&D Programme for Flood and Coastal Defence: 2004/2005

The current FRM science programme has six themes and is jointly managed by Defra and the Environment Agency. Table 3.1 shows the six themes together with the number of projects per theme and lists those projects that are social science led or multidisciplinary. This information comes from the Defra/Environment Agency Joint Thematic R&D Programme for Flood and Coastal Defence Joint Schedule of Projects, April 2004 (Defra 2004a).

Table 3.1 Information from Defra/Environment Agency Joint Schedule of Projects (April 2004)

Theme	Number of projects on schedule as of April 2004	Social science led projects	Number of multidisciplinary projects including a social science element
Fluvial, Estuarine and Coastal Processes (FCP)	19	None	None
Policy Development (PD)	6	The Appraisal of Human Related Intangible Impacts of Flooding	Development of economic appraisal methods for flood management and coastal erosion protection
		Community and Public Participation: Risk Communication and Improving Decision Making in Flood and Coastal Defence	Consistent standards of defence for flood cells
			Developing a multicriteria analysis methodology for application to Flood and Coastal Management appraisals
		Sustainability of flood and coastal management	
Broad-Scale Modelling (BSM)	9	None	None
Flood Forecasting and Warning (FFW)	18	Flood Warning for Vulnerable Groups	None
		The Social Performance of Flood Warning Communications	
		Public Response to Flood Warnings	

		Capacity Building for Flood Risk Communities ²	
		Improved Flood Warning Awareness and Response in Low Probability/High Risk Flood Zones ³	
		Organisations and FFW – Contribution to the National Flood Forum	
		<i>Managing the Social Aspects of Floods</i> ⁴	
		<i>Business Needs for Flood Warning</i>	
Risk Evaluation and Understanding of Uncertainty (Risk)	15	None	Flood Risks to People phase I Risks to People phase II
Engineering (Eng)	21	None	None

The first three themes are led by Defra and the second three themes are led by the Environment Agency. Each theme has a theme advisory group (TAG), which is designed to provide guidance in what is included in the research programme. This structure of FCD research was set up in 2001. From this brief overview it can be seen that there are ten social science projects, out of a total of 88 projects, and that they are concentrated within two themes. There are six projects with social science input to multidisciplinary projects and these are over two themes (Policy Development and Risk Evaluation and the Understanding of Uncertainty). The FFW theme does have a clear policy of separating the ‘social’ and ‘technical’ projects (Hatton 2005, personal communication), and therefore has no projects listed under ‘multidisciplinary’. It is not known what approach the other themes take, but our overview would suggest there is not this separation between the social and technical projects within the ‘Policy Development’ and ‘Risk, Evaluation and Understanding of Uncertainty’ themes.

Together with the above, all completed research projects from the FRM research programme between 2001 and 2004 were examined in terms of their social science approach, methods and contractors.

Table 3.2 provides more information on completed and ongoing projects taking a social science approach that were funded through the Defra/Environment Agency FCD research programme.

² This project is renamed as ‘Community Engagement with its Flood History – Understanding Risk’ in Table 3.2.

³ Note that this project is referred to in Table 3.2 with the title ‘Improved Flood Warning Awareness and Response in Low Probability and Medium to High Consequence Flood Zones’. Its name changed from the schedule to the final project title.

⁴ Note that this project and the following one are included in the list from the Environment Agency of projects ongoing in FFW but are not included in the Defra/Environment Agency schedule April 2004.

Table 3.2 Projects taking a social science approach within the Defra/Environment Agency FCD research programme 2000–2005

Project title	Aims	Approach and methods	Contractors' details	Time period
Defra/Environment Agency research theme: Policy Development				
The Appraisal of Human Related Intangible Impacts of Flooding	To develop and validate survey instruments using focus groups and pilot surveys for (i) health impacts and (ii) estimation of willingness to pay. To undertake a national survey and, based on the results, develop an economic appraisal methodology	Literature review, focus groups, large-scale questionnaire with stated preference questions	Risk and Policy Analysts: Peter Floyd. FHRC, Middlesex University: Sylvia Tunstell, Sue Tapsell and Colin Green. etfec: Ece Ozdemioglu. CASPAR, University of Newcastle: Michael Jones-Lee, Hugh Metcalf and Sue Chilton	January 2001 – July 2003
Community and Public Participation: Risk Communication and Improving Decision Making in Flood and Coastal Defence	To review the effectiveness of consultation and community procedures and practices used in flood and coastal defence in England and Wales and, from this, to put forward suggestions for best practice methods to enable the public and stakeholder groups to better appreciate flood and coastal defence issues	Literature review, focus groups and interviews	Scott Wilson Kirkpatrick Ltd led by Jeremy Richardson	October 2001 – April 2003
Defra/Environment Agency research theme: Flood Forecasting and Warning				
Social Issues and Flood Hazard Warning – Scoping Study	To set out a programme of social science research for FFW	Literature review and outline project proposals	Terri Sarch, Sylvia Tunstell and Sue Tapsell, FHRC, Middlesex University	December 1999 – March 2000
Flood Warning for Vulnerable Groups	To document the social distribution of flood risk (are some social groups disproportionately likely to experience flooding?), to document the variance of awareness of flood risk within the populations in flood risk areas, to document the variance in ability to respond to flood warnings and cope with flood events within the population in flood risk areas	Literature review, interviews, focus groups, secondary analysis of survey data and mapping population characteristics	Dr Kate Burningham, Dr Jane Fielding and Dr Diana Thrush, University of Surrey	July 2001 – April 2004
Inclusion of Organisations in Flood Planning and Warning Supporting Activities	To support a workshop and related activities to establish best practice for the involvement of all agencies and local	Workshop and related activities	National Flood Forum	February 2002 – March 2005

	communities in the flood planning and warning process to facilitate effective delivery of the service			
The Social Performance of Flood Warning Communications	To identify the social barriers to effective performance of communication and dissemination technology currently available and likely to impact in the 2000–2010 period, and to make recommendations for maximising the effectiveness of current and new technology in order to assist the Environment Agency in achieving its performance targets		Middlesex University FHRG, Contact: Sue Tapsell	February 2003 – March 2005
Public Response to Flood Warnings	To provide a detailed understanding of the ways in which the ‘at risk’ public understand, interpret and respond to flood warnings	Literature review, secondary analysis, focus groups and interviews, survey	University of Surrey: Dr Kate Burningham, Dr Jane Fielding, Dr Diana Thrush and Mr Rob Catt	March 2004 – September 2005
Community Engagement with its Flood History – Understanding Risk	This project aims to increase community engagement and participation by getting communities involved in establishing, analysing, debating, disseminating and ‘owning’ their local flood history and risk information within a longer-term environmental change context	Literature review, setting up of volunteer network, community workshops, community focus groups	Input to part of an EC project to be carried out by University of Gloucestershire, Dr Lindsey McEwen	October 2004 – October 2006
Improved Flood Warning Awareness and Response in Low Probability and Medium to High Consequence Flood Zones	To provide Thames Region, and more widely the Environment Agency, with robust information which can be applied to the problem of raising awareness of flood risk in those areas where probability is low but consequences are medium to high	Review of literature and key informant interviews in three countries (Netherlands, USA and Australia). Case studies of low flood probability zones with questionnaires to places where specific flood warning campaigns had been carried out	Greenstreet Berman: Dr Joscelyne Shaw	December 2004 – May 2005

<p>Managing the Social Aspects of Floods Part 1</p>	<p>To gain a better understanding of the social aspects of floods and effective ways of addressing these. There are six parts to the project:</p> <ol style="list-style-type: none"> 1. Understanding social impacts: urban and rural communities 2. Understanding social impacts: vulnerable and deprived groups 3. Improving stakeholder engagement in decision making and delivery 4. Improving community and citizen engagement in decision making, delivery and flood response 5. Improving the contribution of social science to the FRM science programme 6. Synthesis 	<p>Literature review, interviews with key stakeholders, workshop with key stakeholders, some data mapping for Part 2 only</p>	<p>Collingwood Environmental Planning: Dr Clare Twigger-Ross, Dr Gerda Speller (Parts 1, 4, 5 and 6) University of Staffordshire: Prof. Gordon Walker, University of Surrey: Dr Kate Burningham (Part 2) University of Bristol: Dr Sarah Cornell (Part 3)</p>	<p>Jan 2005 – September 2005</p>
<p>The Needs and Responses of Businesses and Other Non-Residential Property Owners/Managers to Flood Warnings⁵</p>	<p>To review practice nationally and internationally in providing warnings to businesses and services. To provide information on businesses' experiences, needs and views of the flood warning service. To obtain data on and evaluate damage reducing actions that businesses take or would be able to take in response to a flood warning with different characteristics and warning lead times. To evaluate factors associated with the flood management service that would enhance businesses' ability to reduce damages incurred.</p> <p>June 2005 – July 2006</p>			

As noted above, FFW has the largest number of social science research projects. Since 1999 it has commissioned research firmly grounded in robust social science, building on work carried out by the Flood Hazard Research Centre at Middlesex University (e.g. the health effects of flooding) for the Environment Agency Thames Region. The Policy Development theme has had more of an economic focus, approaching social science research from a need to develop the project appraisal guidance for flood and coastal defence schemes. The 'intangible impacts of flooding' project is an example of this, whereas the 'community participation' project is more firmly based within approaches from sociology and social psychology.

The research projects can be split into two categories:

- those which take a 'traditional' research approach (i.e. starting with a research question, collecting evidence, analysing results, presenting conclusions) which might be broadly within the 'positive' category (Gilbert 1993);
- those which take a more collaborative, action research approach.

⁵ This project had not been let when this report was written.

All the projects except two ('Inclusion of Organisations in Flood Planning and Warning Supporting Activities' and 'Community Engagement with its Flood History – Understanding Risk') fit into the first category. Although this first category follows a traditional approach to research there is a mixture of methods: both quantitative (e.g. surveys, secondary analysis of survey data, mapping of population characteristics) and qualitative (e.g. interviews and focus groups). The qualitative research is used for gaining insights, which are then tested further in a survey of a representative sample, and for collecting data on attitudes, perceptions and feelings in their own right.

The two projects that are in the second category are each quite different. The first, Inclusion of Organisations in Flood Planning and Warning Supporting Activities, was a way in which the Environment Agency supported a community organisation (the National Flood Forum) in considering how organisations might be included in flood planning and warning. The second, Community Engagement with its Flood History – Understanding Risk, is taking a collaborative approach and working with community organisations to encourage engagement in flooding issues through work on community flood histories. As well as the traditional approach of gathering relevant literature, the researchers are setting up a volunteer network of 'local volunteer representatives from a range of interests (including schools, civic societies, volunteer environmental organisations, parish councils) to access and record additional local sources and to discuss format and content of the landmark events' (Project Form A), and carrying out local community workshops and focus groups with the aim of encouraging communities to 'own' their flood histories.

3.2 Relevant social science research from other Environment Agency science programmes

Across the whole of the Environment Agency science programme there are a number of social science projects within other topic areas. In 2001 it was estimated that there were between 10 and 15 social research projects in progress, covering flood defence, radioactive substances, sustainable development, process industry regulation, local government, chemicals policy and land quality (Twigger-Ross 2001). Since 2002 social science has had its own science area. Table 3.3 lists the projects in the social science programme for 2004/2005.

Table 3.3 Projects in the Environment Agency's social science programme 2004/2005

Project title	Aims	Approach and method	Contractors	Time period
Joining Up Project – Phase 2 – Development of Social Policy	To develop the Environment Agency's social policy and to develop social practice using action research and action learning	Literature reviews, developing a social appraisal tool and four pathfinder projects using action research	Diane Warburton, Sue Porter, David Wilkinson	May 2002 – April 2004
Methodology for Recreational Carrying Capacity	To develop a methodology to quantify and assess recreational impact and carrying capacities in the		Medway Swale Estuary Partnership	January 2003 – December 2006

	natural environment. This will provide an objective criterion to use in a wide range of scenarios from lottery applications to public enquiries			
Environmental Inequalities Part 2	The objective of this research is to gain a better understanding of environmental inequalities and the most effective ways of addressing them. This work focuses on three aspects core to the Environment Agency's work: waste, flood risk and water quality	Literature reviews, data mapping and workshop with key stakeholders	Led by Prof. Gordon Walker, Staffordshire University with Professor Judith Petts and Dr Sarah Damery, University of Birmingham Dr Kate Burningham and Dr Jane Fielding, University of Surrey Dr Carolyn Stephens and Ruth Willis, London School of Hygiene and Tropical Medicine Dr Malcolm Eames and Dr Karen Lucas, Policy Studies Institute and University of Westminster	December 2004 – May 2005
PURE Partnerships – A Case Study	To provide the Environment Agency with an evaluation of the partnership approach as a means of realising its strategic objectives by examining the stakeholder engagement of four different partnership projects in North East England	Literature review, stakeholder interviews and workshops using an action research approach	University of Newcastle	September 2002 – April 2005
The Social and Economic Health Benefits of Environmental Improvement	To build understanding of the social and economic human health benefits of the Environment Agency's activities, delivered through environmental improvements. Through this, to increase understanding of the contribution the Environment Agency makes to quality of life, and enhance its contribution made to sustainable development. To develop Environment Agency policy, process and practice as appropriate to take account of health benefits, delivering environmental outcomes			October 2003 – September 2006

Influencing Patterns of Resource Consumption	The objective is to identify the ways in which the Environment Agency could contribute to motivate more sustainable patterns of behaviour, particularly in the delivery of specific business areas, i.e. Water Framework Directive, reduction in diffuse pollution and the reduction of water use			March 2005 – May 2005
Managing the Social Aspects of Floods Part 1 (joint with FFW theme)	See Table 3.2 above for details			
Managing the Social Aspects of Floods Part 2	The overall objective of this scoping study is to establish the most appropriate and realistic ways of engaging with stakeholders in the development of strategic Catchment Flood Management Plans (CFMPs) for the Aire and the Calder. This will be done working alongside the Ridings Area Flood Defence Team and the Corporate Affairs team in North East Region	Review of current guidance on stakeholder engagement in CFMPs, questionnaires and interviews within an action research framework	David Wilkinson (Whole Systems Development) is leading the project, with support from Diane Wade (Whole Systems Development) and Jane Corbett (University of Oxford)	January 2005 – May 2005
Delivering Environmental Benefits Through Regeneration	To assess the contribution of environmental improvement to the goals of the government's core regeneration programmes, and to provide guidance on a framework for evaluating the contribution of Environment Agency projects in regions and areas to regeneration			March 2005 – February 2007

The range of methods and approaches that have been taken across these social science projects show a similar split to the Defra/FRM research projects into:

- those which take a 'traditional' research approach;
- those which take a more collaborative, action research approach.

Again, the majority (six of the nine projects) use a traditional approach to research, although as with the FRM projects a mixture of quantitative and qualitative methods are used.

The three projects which take a more collaborative approach are the PURE Partnerships project, Managing the Social Aspects of Floods (2), and the Joining Up – Development of Social Policy project. The Joining Up project finished in April 2004 and it was felt it might be useful here to provide some initial evaluation on that project and its 'success'. The

contractors engaged in the project were contacted and asked some general questions (see Appendix 2).

The Joining Up project (Phase 2) consisted of literature reviews (Warbuton *et al.* 2005), development of a social appraisal method, and four pathfinder projects using action research (e.g. Wilkinson *et al.* 2004). What was interesting about the project was that it explicitly took an action research/action learning approach and that it aimed to develop social policy from the 'bottom up' as well as 'top down'.

Action research can be characterised as part of the 'interpretative' tradition, with a focus on the research process as a change process. Warburton *et al.* (2005) provide an excellent review of the area of action research, which has been developing since Kurt Lewin first coined the term in the 1940s. Lewin (1948) was disillusioned with the way in which social psychology was becoming increasingly experimental and distanced from practical situations and wanted to better integrate theory, research and practice. As Warburton *et al.* (2005) discuss:

'Action research works, as Lewin originally proposed, through four basic activities: planning, acting, observing and reflecting (Hart and Bond 1995). These activities are not, though, linear. They should instead be seen as "in a spiral of steps each of which is composed of a circle of planning action and fact-finding about the result of the action." (Lewin 1946, cited in Hart and Bond 1995). Constant evaluation of the action is central to decide what to do next, based on whether the action taken has led to an improvement.' (Warburton *et al.* 2005, p. 41)

A further key aspect of action research is that the development of the research process and actions are decided jointly by researchers and 'subjects'.

Using this approach was innovative for the Environment Agency as a way of developing policy but also as a way of carrying out research.

The overall philosophy of the Joining Up project can be characterised as action research/action learning, with the involvement of Environment Agency staff at all stages in designing and carrying out the action and the research.

All contractors agreed that the way of working was regarded as very helpful for some staff. In particular, staff who needed solutions to specific problems found the approach helpful, and the way in which the approach values people's experiences was welcomed. The contractors felt it was successful in the sense that the staff were engaged in structuring the findings of the research in their own words, and that they could see that the way of working was about practical change. In addition, the process enabled staff to understand and appreciate different perspectives and knowledges about an issue (e.g. flooding), which helped in their working with those communities. All the contractors felt that there were staff who became very enthusiastic about the process and the way of working.

The contractors were asked to consider what parts of the project had been most and least successful. The four pathfinder projects were considered successful in the ways described above (e.g. valuing experiences, enabling understanding of different perspectives). Also, the development of the social appraisal method, although a more

'traditional' piece of research, did involve close collaboration between one of the contractors and a social policy advisor such that the interviews were all carried out together, so the element of mutual learning was carried through. The part of the project that was felt to be least successful was that of the relationship between the contractors and the two groups involved in overseeing the whole project: the project board and the project development group. It was felt that these two groups were least comfortable with the action research/learning process. The project development group, while supportive, were perhaps most affected by organisational changes and less able to embrace a newer way of working. The project board, it was felt, were focused more on 'a social policy' as a product, rather than being engaged in the process of developing that policy in a collaborative way with the contractors.

In reflecting on the part of the project considered to be least successful, a number of issues were identified by the contractors. Specifically, at the beginning of the project, the Environment Agency was undergoing considerable organisational change through the 'Better Regulation Improving The Environment' (BRITE), 'Making It Happen' and 'Local Contributions' programmes. This meant that there was considerable uncertainty for staff about their responsibilities and roles, with many under the BRITE process having to re-apply for their jobs. Furthermore, both the social policy manager and the consultants were new to the Environment Agency and its organisation and so were learning as they went through the project. In addition, there was considerable turnover of staff on the teams that were set up as part of the project. All these factors meant that it was a difficult system in which to put a new way of researching and learning.

Arising out of this reflection was something that one contractor termed 'temperature testing'. This would be taking time to understand what research approaches an organisation is prepared to work with, and understanding which parts of the organisation will be more or less receptive to different ways of working. This links to the discussion earlier in this report in section 2.3.2 on the relationship between research and policy, but goes further to suggest that understanding the organisational context in which the research is carried out is vital, especially for action research/learning as it is focused on working with staff in a mutual learning process. If an organisation is both hierarchical and somewhat chaotic (as are many large organisations), this approach may be resisted by those in charge as it prompts a questioning of possible imbalances in power and knowledge. On the other hand, it may be welcomed by those further down the hierarchy as it can acknowledge their experiences, local knowledge and expertise.

From the rest of the Environment Agency science programme the following three projects are ongoing and are concerned with social aspects of flooding:

- Social Impacts of Stormwater Management Techniques including River Management and Sustainable Urban Drainage Systems (SUDS).
- Implementation of Sustainable Management of Urban Rivers and Floodplains (SMURF) Partnership.
- Contribution to the EPSRC Flood Risk Management Research Consortium.

3.2.1 Social Impacts of Stormwater Management Techniques including River Management and SUDS

This project was funded by the Environment Agency but carried out through the auspices of SNIFFER (Scottish and Northern Ireland Forum For Environmental Research). The contractors were the University of Abertay (Stella Apostolaki and Professor Chris Jeffries) and the project ran from 2001 to 2004. Its overall aim was to assess public attitudes towards the application of stormwater management techniques. The programme was divided into three main phases, using three case studies (Glasgow, London and Athens):

- the assessment of public perception of SUDS;
- the assessment of professional perception of SUDS;
- the assessment of public and professional perception of three different stormwater management practices applied in Glasgow, London and Athens.

Face-to-face questionnaires, interviews and focus groups with key stakeholders were used to collect data.

The key findings (SNIFFER 2005) can be summarised as showing:

- 'the importance of public awareness and participation in planning when new methods are to be implemented in urban areas ...
 - that members of the public hold strong views as to what they like or dislike about SUDS and water management installations that have been constructed in their local area ...
 - the amenity, recreational value and aesthetics of new schemes seem to be of major importance in determining public acceptability ...
 - there is a general preference for sustainable urban water management and for river restoration schemes compared with more conventional "hard engineering" approaches, such as culverting of rivers. This was expressed both by members of the public and by professionals involved in planning and implementation.'
- (SNIFFER 2005, p.3)

3.2.2 Implementation of Sustainable Management of Urban Rivers and Floodplains (SMURF) Partnership

SMURF (Sustainable Management of Urban Rivers and Floodplains) is a three-year partnership project that started in August 2002 and runs until 2005. SMURF is supported financially by the EU LIFE-Environment programme, with the Environment Agency as the lead partner. Other institutions involved are Birmingham City Council, Severn Trent Water, H R Wallingford, Staatliches Umweltamt Herten, University of Birmingham and King's College London, each providing different expertise.

The project is based on the River Tame in the West Midlands – specifically the urban area of the river catchment that includes Birmingham and a large part of the Black Country. The River Tame is a typical example of an urban river – polluted, heavily modified by culverting, straightening and re-routing, and with concrete banks and few natural features.

SMURF aims to tackle these environmental problems on the Tame by integrating the planning and management of land use, water quality, ecology and flooding. The methods developed by the SMURF project will be used as a model for work on similar rivers throughout the UK and the European Community.

The overall aim is to demonstrate how the principles of urban river basin management planning can be applied to highly modified and degraded catchments.

By implementing sustainable land use planning and water management techniques the SMURF project aims to:

- improve the amenity, ecology and sustainability of the river catchment;
- involve local communities in the planning of the river basin;
- establish ecological objectives for the river system and a transferable Sustainable Indicators set;
- develop a detailed land use planning model to help with future redevelopment in the floodplain and protect the community from future impacts of climate change.

A range of techniques have been used through the project, which can be best described as an action research project. In May 2005 a final conference was held. This provided:

‘an opportunity to review the progress made during this three-year LIFE-Environment project and critically assess the project’s outputs. The conference also explored some of the progress being made towards implementation of the Water Framework Directive (WFD) and the relationships with the management of urban rivers.’ (website, 2005 <http://www.smurf-project.info/events.html>)

This project has been highlighted by Environment Agency staff as one where there has been great emphasis on, and success in, engaging with stakeholders.

3.2.3 Flood Risk Management Research Consortium (FRMRC)

This consortium is funded by the Engineering and Physical Sciences Research Council (EPSRC) in collaboration with the Defra/Environment Agency Joint R&D programme, UK Water Industry Research (UKWIR), the Natural Environment Research Council (NERC) and the Scottish Executive. It is a multidisciplinary research consortium investigating the prediction and management of flood risk.

‘The portfolio of research will include:

- the short term delivery of tools and techniques to support more accurate flood forecasting and warning, improvements to flood management infrastructure and reduction of flood risk to people, property and the environment;
- the establishment of a programme of high quality science that will enhance our understanding of flooding and improve our ability to reduce flood risk through the development of sustainable flood management strategies.’ (FRMRC 2005, p. 1)

There are nine priority areas. Priority area 7 is Stakeholder and Policy and is led by Dr Joe Howe, University of Manchester. Within that priority area are five projects:

- 7.1 – Stakeholder Involvement – led by University of Manchester

- 7.2 – Policy – led by University of Manchester
- 7.3 – Risk Communication – led by Flood Hazard Research Centre, University of Middlesex
- 7.4 – Integrated Sustainable Development of Floodplains and Wetlands – joint with Morphology and Habitats
- 7.5 – Socio-Psychological Dimensions of Flood Risk Management – not yet started, waiting for more funding.

The FRMRC has a budget of £5 million and runs from 2004 to 2008.

Within the proposed new starts for the whole of the Environment Agency science programme 2005/2006 two projects may be of interest:

- Public Attitudes Towards Angling
- Scoping Climate Change, Flooding and Human Health Risks

3.3 Research incorporating social issues and flooding carried out within the Environment Agency, but outside the formal science programme

3.3.1 Thames 2100 project

Thames Estuary 2100 (formerly Planning for Flood Risk Management in the Thames Estuary) is a joint initiative between the Anglian, Southern and Thames regions of the Environment Agency. It aims to determine the appropriate level of flood protection needed for London and the Thames Estuary for the next 100 years. The effects of climate change, such as sea level rise and increased rainfall and storm frequency, mean that London and the Thames Estuary will be at greater risk from flooding in future years. Furthermore, many flood risk areas are undergoing development and regeneration, meaning that more people, buildings and infrastructure are likely to be exposed to the risk of flooding in the future.

Although London's existing tidal defences offer a high level of protection from today's flood risks, they were only designed to provide protection up until 2030. While slight modifications to these defences could extend their useful life by a few more years, the need for a long-term, strategic look at London's flood defences is becoming increasingly apparent. Thames Estuary 2100 is the first step of the process and will help shape the way in which future flood defence schemes are designed and managed. Taking action now will allow time for research, design and the physical construction of the defences.

Thames Estuary 2100 aims to:

- look at tidal defences in the context of the wider Thames Estuary setting;
- assess the useful life of the existing defences and gain an understanding of the 'drivers' (i.e. climate change, urban development, social pressures and the environment);
- inform and gain support of political and funding partners and stakeholders;

- prepare and manage a programme of studies (linked with consultation) that will eventually lead to a strategy for flood risk management in the Thames Estuary for the next 100 years.

3.3.2 Building Trust pilot project

The Building Trust with Communities (BTwC) toolkit has been produced (Environment Agency 2004b) as practical guidance for Environment Agency staff to help them when working with communities (customers and stakeholders) as part of their existing job. It is about improving the way that the Environment Agency works with people and planning actively for engagement. The BTwC toolkit is intended to provide generic guidance on engagement processes for Environment Agency staff across all aspects of their work.

Shaldon flood risk management scheme (in Devon) has been chosen to pilot the toolkit. The pilot scheme is part of the core work of the Environment Agency's National Community Relations Team. They have engaged facilitators to help design the community engagement process for the potential flood risk management scheme at Shaldon. They are helping Environment Agency staff to use good practice for public participation and the BTwC toolkit.

Shaldon is a coastal village at risk of tidal and fluvial flooding and the community does not have experience of flooding within living memory. Part of the project will also be looking at how to communicate about future ('not real') flood risk. A scheme for Teignmouth on the other side of the estuary was rejected late on by the community, so the project will also be looking at lessons that can be learned from that.

This work started in March 2005 and will be running until late 2007. Outputs will include:

- a cost evaluation of the BTwC toolkit;
- an engagement process that could be used on other schemes;
- a better understanding of how engagement fits and can be designed to fit into legislative process requirements;
- a better understanding of how to communicate and engage people on future flood risk rather than experienced flooding;
- lessons learned to be shared across functions and the organisation.

The contact person is Ruth Rush, Community Relations Manager, Environment Agency Head Office.

3.3.3 Floodscape

Floodscape is an ongoing European funded project being 'run' by the Environment Agency. It is focused on finding approaches, other than building sea defences, to deal with flooding. These approaches should be sustainable in the long term. Flood risk management is considered in such a way that it is possible to make space for water during flood events, while retaining the normal use of the land, or even enhancing and diversifying its use and quality. In order to deliver sustainable solutions, innovative approaches are regarded as necessary and it is on these approaches that Floodscape focuses. In this, it is very much in tune with the approaches advocated within the *Making Space for Water* strategy (Defra 2004b). Floodscape is a four-year project, from 2002 to

2006, and is an Interreg IIIB programme (a European initiative with the aim of generating interregional co-operation across Europe). The partners involved are:

- UK Environment Agency – carrying out four pilot projects: Thames Gateway, North Kent Marshes, Aveley and Rainham Marshes and Ham Lands;
- Netherlands – Dienst Landelijk Gebied (DLG – Sustainable Land and Water Management): Pilot project – River Waal;
- Belgium – The Ministry of the Flemish Community: Pilot projects – Prosperpolder and River Durme;
- Germany – Hessen Ministry of Environment, Forest and Agriculture: Pilot projects: River Fulda and Diemel catchment areas and the location for the demonstration investment activity is within the Fulda catchment area;
- Germany – Federation for the Waste Water Systems and Flood Defence Baunatal-Schauenburg: Pilot Project – Katzenmule Flood Retention Area.

3.3.4 Understanding Behavioural Responses to Flood Risk

This research is the PhD work of Tim Harries, which is sponsored by the Environment Agency through a case studentship with ESRC. He is based at the Flood Hazard Research Centre in Middlesex University. He is trained in social psychology and the research is focused on understanding the processes that influence householder responses to flood risk, with emphasis on people who have no actual experience of flood. The work will investigate how people respond to flooding, what motivates their behaviours, and how they make decisions about what behaviours to take at different times in the flood risk cycle.

This research is important because it draws on a wide base of existing research around attitudes and behaviour change from social psychology, which has not been directly applied to understanding responses to flood risk in the UK. The aim is for the PhD to be finished by December 2006.

3.4 External flood risk management research programmes

In addition to research that is supported by the Environment Agency, there are three high-profile multidisciplinary programmes that are being funded through the European Union, EPSRC, NERC and ESRC. These are the flood risk management research consortium FRMRC (which is discussed above in section 3.2.3) and FLOODsite, both of which have social science projects as part of their programmes, and Flood Risk from Extreme Events (FREE), which had not yet commissioned projects in July 2005. While FREE appears not to have a social science element, Dr Joe Howe (Manchester University) has been appointed to the steering committee of the programme and he is working in the areas of stakeholder engagement and water management.

3.4.1 FLOODsite

‘The *FLOODsite* Integrated Project will produce improved understanding of specific flood processes and mechanisms and methodologies for flood risk analysis and management ranging from the high level management of risk at a river-basin, estuary and coastal process cell scale down to the detailed assessment in specific areas. It includes specific actions on the hazard of coastal extremes, coastal

morphodynamics and flash flood forecasting, as well as understanding of social vulnerability and flood impacts, which are critical to improving the mitigation of flood risk from all causes. The project seeks to identify technologies and strategies for sustainable flood mitigation and defence, recognising the complex interaction between natural bio-physical systems and socio-economic systems, to support spatial and policy planning in the context of global change and societal advance. Several pilot studies are included in **FLOODsite.**' (Samuels 2003, p. 2)

Of the 27 research tasks listed in the FLOODsite project, three are focused on socio-economic issues. These are:

- **Task 9: Guidelines for socio-economic flood damage evaluation.** This task 'aims to provide harmonised methodologies for the evaluation of flood damages in form of proposals for EU flood damage evaluation guidelines' (Samuels 2003, p. 15)
- **Task 10: Socio-economic evaluation and modelling methodologies.** This task is concerned with improving 'understanding and methods to map potential loss of life, to assess the effectiveness of flood warning systems and to deal with complex multi-criteria decisions' (Samuels 2003, p. 15)
- **Task 11: Risk perception, community behaviour and social resilience.** This 'comparative inter-country analysis with case studies of three EU countries (Germany, Italy, UK) is planned in Sub-theme 1.3. Different types of communities and their preparedness to flood events will be characterised and the major driving forces of flood defence behaviour will be examined.' (Samuels 2003, p. 16)

While there are social science projects within FLOODsite they are few in number. Tasks 9 and 10 come from an economic perspective whereas Task 11 comes from a psychological/sociological perspective. There could be some synergies with the work in this task and the work being carried out in task 7.3 within the FRMRC programme.

3.4.2 Flood Risk from Extreme Events (FREE)

The FREE programme is a NERC-funded programme running from 2005 to 2010. It is designed to 'deliver fundamental environmental science advances compatible with, and supporting, the developing applied-research programme Flood Risk Management Research Consortium (FRMRC) led by EPSRC, with Defra, the Environment Agency, UKWIR and NERC'. It has a budget of £10 million. It is not clear if there will be a discrete social science input into the programme.

3.5 External interdisciplinary research programmes with projects relating to flood risk management

There are also programmes and projects that, while not directly focused on FRM, have research that is pertinent to FRM.

3.5.1 Rural Economy and Land Use Programme (RELU)

The programme is a collaboration between the ESRC, the Biotechnology and Biological Sciences Research Council (BBSRC) and NERC. It has a budget of £24 million, with additional funding provided by the Scottish Executive Environment and Rural Affairs Department and Defra. Unlike the other programmes, because ESRC is involved, there is a substantial social science input to the programme, although there is not a focus specifically on flood risk. More details can be found in Appendix 4.

3.5.2 Harmonising Collaborative Planning – HarmoniCOP

The aim of the HarmoniCOP project (2002–2005) is to increase the understanding of participatory river basin management planning (RBMP) in Europe. RBMP is the integrated cross-sectoral planning and management of river basins, if necessary across political and administrative borders. The project's objective is to generate practical information about participation processes in river basin management and to support the implementation of the public participation provisions of the European Water Framework Directive. More details can be found in Appendix 4.

3.5.3 Flood Hazard Research Centre, Middlesex University

The Flood Hazard Research Centre (FHRC) at Middlesex University has a long and distinguished record of research into all aspects of flood hazard. This has included a great deal of social science research, especially concerning the health effects of flooding. Much of the work has been commissioned by the Environment Agency (see Table 3.2 above).

The FHRC is involved in three of the research programmes listed here, specifically:

- Flood Risk Management Research Consortium
- FLOODsite
- HarmoniCOP
- Floodscape

In addition, Tim Harries' PhD is based at the FHRC. More details of the FHRC can be found in Appendix 4.

3.6 Climate change research programmes

There are a number of programmes and projects investigating climate change that are of interest. The UK Climate Impacts Programme and the EPSRC have a joint programme titled 'Building Knowledge for a Changing Climate'. The projects are all broadly multidisciplinary and include the following:

- Engineering Historic Futures: Adapting Historic Environments to Moisture Related Climate Change (<http://www.ucl.ac.uk/sustainableheritage/research>)
- Built Environment Weather Scenarios for Investigation of Impacts and Extremes – BETWIXT (<http://www.cru.uea.ac.uk/cru/projects/betwixt>)

- Climate Change Risk Assessment: New Impact and Uncertainty Methods – CRANIUM
- BESEECH – synthesising socio-economic scenarios for the BKCC projects
- BIONICS – interaction of climate change, vegetation and engineering on the performance of infrastructure earthworks
- HORIZONS – impact of climate change on the UK aviation industry
- Adaptation Strategies for Climate Change in the Urban Environment – ASCCUE
- Adaptable Urban Drainage – AUDACIOUS

Two of the above projects (ASCCUE and AUDACIOUS) were mentioned specifically in relation to flood risk management. More details on these two projects can be found in Appendix 4.

3.6.1 Tyndall Centre work

Another key centre for climate change research is the Tyndall Centre. The Tyndall Centre is a consortium of researchers, co-ordinated from the University of East Anglia but with UMIST in Manchester and the University of Southampton as regional partners. The centre's vision and purpose are expressed below:

'Vision

To become an internationally recognised source of high quality and integrated climate-change research, and to exert a seminal influence on the design and achievability of the long-term strategic objectives of UK and international climate policy.

Purpose

To research, assess and communicate from a distinct trans-disciplinary perspective, the options to mitigate, and the necessities to adapt to, climate change, and to integrate these' (Tyndall Centre 2005).

More details on work at the Tyndall Centre can be found in Appendix 4.

3.7 Perceptions of the current contribution of social science to the FRM science programme

In this section we present findings from the interviews we carried out, which explored the perceptions of the current contribution of social science to the FRM programme. Among the participants, there was a range of knowledge and experience of social science research. There were:

- two academics engaged in FRM social science research;
- two Environment Agency/Defra staff with considerable experience of managing social science research projects within the FRM area;
- one Environment Agency member of staff with experience of managing an engagement process implementation project;

- one Environment Agency member of staff engaged in the Thames 2100 project, which has a social research component;
- two Environment Agency staff with considerable FRM operational experience;
- two Environment Agency FRM policy staff;
- one participant from a community perspective who is a clinical psychologist by training.

A general perception that emerged from the interviews about the role of social science in FRM was that it was important and necessary to have social science input in order to solve FRM problems. Specifically, it was suggested that if FRM is about reducing risk to people (as well as property) then it is critical that people are understood. Problems have been addressed by engineering solutions in the past, but now there is a realisation that other tools are needed and that is where social science can be useful. It was also suggested that social science should be able to help reduce the consequences of flooding.

This attitude, a sense that technical solutions alone will not be enough to solve FRM issues, is neatly summed up by the following quote:

‘Social science has been seen as an add-on but now it is being realised that it is every bit as essential as a flood wall.’

In some of the interviews there was a sense that social science was being held up as a solution to FRM issues, that where the technical solutions were failing, social science would be able to provide some answers. It was clear, and often acknowledged, however, that much more understanding was needed of what social science was and what sort of solutions and tools it could really offer.

When asked about the impact of social science research projects on policy and the practice of FRM there was agreement among those who had knowledge of the projects, that projects did have an impact, specifically within the flood warning programme of social research. Within the Flood Forecasting and Warning (FFW) theme a range of social research is used to underpin policy and practice. Specifically, the flood warning campaigns are always evaluated and findings taken on board, and recent work on flood warning and vulnerable communities will enable the targeting of warnings to the needs of specific communities. While some of the research carried out within the Defra/Environment Agency FFW theme was regarded as not being very closely tied to business issues there was a sense that within this area social science research is becoming embedded within the business. As a result, while there may continue to be debate about specific projects, the use of social science research is largely uncontested.

A further project that was named by several participants as having an impact on practice was that of the ‘Appraisal of Human Related Intangible Impacts of Flooding’ project. As a result of that project a new element has been added to the appraisal process so that account can be taken of ‘human related intangible impacts’.

This general sense that social science was needed, has a key role to play and can have a real impact on policy and practice was tempered by three key themes. These give an indication of where effort might usefully be directed in order for social science’s role to be fully developed.

The three themes were:

- the perceived value of social science research in relation to natural/physical and engineering sciences;
- the perceived extent of knowledge and understanding of social science, and the types of 'problems' it could address;
- the organisation of FRM social science research.

3.7.1 The perceived value of social science research in relation to natural/physical and engineering sciences

The academics suggested that social science was not being seen as of value by other scientists, both within the FRM research programme and within multidisciplinary research projects outside the programme, and that it was often thought of as an add-on or extra to natural/physical and engineering sciences. It was also commented that there was a lack of dialogue between social scientists and natural/physical engineering sciences in FRM generally. FRM was perceived as having a largely technocratic culture and another perception was that from some within the Environment Agency there was scepticism towards social science research.

The Environment Agency and Defra staff considered social science to be clearly on the research agenda and regarded by other disciplines as necessary to FRM, but thought that there was a need for greater understanding of what issues it could address together with better communication with other disciplines. One perception was that social science is not linked clearly to problem solving in the way that 'technical' research might be.

The participants felt that there was not at present a consensus across Environment Agency FRM staff on the value of social science, with some championing its use and others considering it to be a low priority. In addition, Environment Agency and Defra participants considered Defra FRM staff to be supportive of social science research and to have a good understanding of what can be achieved in a research project, while the academics considered Defra and the theme advisory groups (TAGs) to place a low value on the role of social science. The issue of the value placed upon social science research was closely linked to the next theme, that of knowledge and understanding of social science.

3.7.2 The perceived extent of knowledge and understanding of social science

There were expressions about the perceived level of understanding of social science within the Environment Agency and Defra. Participants reflected on the general levels of understanding within the Environment Agency and Defra and also on their own understanding.

All the participants, to some degree, felt that many Environment Agency staff do not understand social science research and its potential use in their work. There was a concern that, because of the low level of understanding of research methods and how social research questions can be addressed, expectations of what projects could deliver were sometimes unrealistic. Social science was also considered not to be part of

'everyday' FRM thinking at present. Several participants expressed their own ignorance of what social science research might be able to address.

Participants reflected upon the nature of social science and the types of problem it could address. Those with least knowledge and experience of social science research often made a link between social science and social skills. Their talk about social science and what it could offer would quickly be linked to how to support Environment Agency staff in working with people, especially people in controversial situations (e.g. when a flood defence scheme may not be built). Such views came predominantly from Environment Agency FRM operations and policy staff. These perceptions suggest a view of social science focused on engagement and communication issues.

The lack of understanding by staff of social science was felt to be compounded by the way in which it is currently organised within the Environment Agency in general, not just within FRM, and that is explored in the next theme.

Staff with experience of social research projects were able to comment on what types of social research they regarded as useful. In terms of quantitative research it was considered that large-scale surveys were useful as they provide statistically significant data and this was appreciated by FRM staff. However, it was also felt that case studies and interviews were often accessible to non-technical audiences and in that sense were useful if carried out well. Research that gathered opinions from experts was considered to be not very useful, but all approaches were acknowledged to have their limits. Underlying these comments was a sense that both quantitative and qualitative research approaches were useful, and what was most important was ensuring the research was robust and of a high standard.

3.7.3 The organisation of FRM social science research

From the interviews it emerged that there are a range of relationships between different parts of the Environment Agency and between Defra and the Environment Agency that could help facilitate the use and understanding of social science research.

Firstly, the relationship between the Defra/Environment Agency research programme and the Environment Agency's day to day 'business' was discussed. Comments came from Environment Agency staff closely involved with FRM social science research as well as from Environment Agency operational staff with interest but little experience of social science research. One perspective was that there should be more of a clear link between the Environment Agency's work and the research projects, such that the benefits of research projects were clearly articulated at the beginning of a project. It was felt that Environment Agency staff are under-represented on the TAGs and that can make the groups seem distant from the 'day to day' work of FRM. It was felt that there also should be greater representation of social sciences on the TAGs, together with greater transparency in terms of the process by which projects get onto the research programme. At present it was felt there was little room for research ideas to be fed into the process from the 'front line'.

Secondly, in discussing the current arrangements for social science research in FRM a wider issue of the arrangements for social science research generally in the Environment Agency was raised. The Social Policy Team (responsible for social science research

generally) were perceived to be 'remote' from the 'day job' and also lacking resources to implement some of the research findings. This remoteness was also articulated as a difference between the 'academic minded' and the 'practical minded' staff within the Environment Agency. With respect to the relationship with FRM it was suggested that there should be dialogue between Social Policy and FRM so that they know about each others' projects and it is understood how the projects relate to each other.

Finally, there was a sense that there needed to be improved relationships between operations and head office on social science so that research could be effectively disseminated and engaged with. At present it was felt that there was no mechanism for finding out about what research projects were being carried out or how to engage with them, and that this applies both to FRM projects in particular and social science projects in general. The TAGs meet twice a year. They do have statements that set out the **R**ationale of a project, its **O**bjectives, how it will be **A**ppraised, **M**onitored and **E**valuated (ROAME statements) and work plans, and it was felt that greater transparency of the development of the programme and work plans might address this issue.

3.7.4 Recommendations for further research and practice

Participants provided some solutions to the issues that they identified. It was suggested that there was need for:

- development of languages/dialogue between practitioners, policy makers, academics;
- development of a knowledge base of social research and practice so that its use becomes normalised and embedded within the Environment Agency;
- an understanding of how knowledge is transferred within the Environment Agency so as to enable learning from the social science research projects;
- establishment of champions for social science work (e.g. Barbara Young, but also champions from within FRM rather than Social Policy);
- clear social science and Environment Agency operations representation on the TAGs so that themes have a balance of internal and external representation;
- clarity on the process by which social science research projects are commissioned and evaluated;
- explicit articulation of the relationship between social science research projects and the 'business' of FRM;
- clarity on the relationship and synergies between social science research in Environmental Policy and social science research in FRM.

4 Conclusions and recommendations

4.1 Conclusions

A number of key issues emerge from the above review. The first is that there is quite a range of social science projects being carried out both within the Defra/Environment Agency FRM research programme and outside that programme. However, although there is a clear process by which the overall Defra/Environment Agency FRM research programme is developed, a brief analysis of the social science projects suggests that it is not clear that there is an overall strategy for why those social science projects have been commissioned. This relates to both the Defra/Environment Agency FRM research programme and the Environment Agency social science programme. There do not appear to be statements for any of these themes on the general approach to what social science research is commissioned and why. An exception is the Flood Forecasting and Warning (FFW) theme, where the scoping report carried out in 2000 (Environment Agency 2000) provided a clear research programme for social science research and the projects that were prioritised then have been carried through.

Secondly, some of the projects are closely linked to business issues and indeed have a clear impact on 'business' (e.g. the 'Appraisal of Human Related Intangible Impacts of Flooding' and the Flood Warning and Vulnerable Groups projects). However a fair few do not have clear links to a business objective, be that an operational objective or a policy objective. This means that immediate use of the research can often be perceived as limited. The notion of 'good use' is one that is debated, but from the interviews we would suggest that there is an underlying perception among many FRM staff that 'good use' should follow a fairly linear model from research through to application and if it does not then the research might be regarded as not useful. Certainly, clarity on the objectives of research is to be welcomed, but it might also be useful to consider what constitutes 'good use' and how that might best be achieved given the complexity of the Environment Agency.

Thirdly, while there is a sense that social science is useful for FRM, especially as technological solutions are seen to be not able to deliver complete flooding solutions, it is clear that many staff have low levels of knowledge of social science research, methods and practice. Social science can be discussed as being able to provide some solutions for FRM without its meaning being clearly articulated. We suggest that as a result social science means different things to different people within the Environment Agency. This is a key issue in terms of capacity building within the Environment Agency.

Fourthly, there is no clear process by which potential users of the research (e.g. operational staff) can engage with the research either as it is being carried out or once it has been finished. Internal dissemination is a fairly static process of sending out documents to a list of interested members of staff.

There are a number of changes currently within FRM that could provide opportunities to change the way social science is being carried out and used. Specifically:

- *Making Space for Water* puts an emphasis on social issues and on evidence-based policy.
- The rhetoric of resilience and risk points towards FRM solutions that involve behaviour change and adaptation, which can only be understood using social science.
- Changes in the organisation of FRM within the Environment Agency will demand a greater contribution from the social sciences.
- The Defra/Environment Agency FRM research programme is under review and again offers the possibility of change or debate about change.

4.2 Recommendations

- R1: Develop a clear vision of the role of social science research for the Environment Agency within the Social Policy Team. This might include:
- consideration of what constitutes social science research evidence;
 - clarity on the relationship between social policy development and social science research;
 - outlining the benefits of social science research for the Environment Agency;
 - demonstrating how social science research can provide solutions to specific issues;
 - considering what kinds of organisational structures and resources might exist that could support the vision, and what gaps there are;
 - understanding the context of the Environment Agency and realistically assessing where the opportunities for input might be;
 - understanding how social science information is currently disseminated/diffused through the organisation and developing mechanisms for that dissemination/diffusion;
 - developing a network of champions for social science.
- R2: Develop an approach to embedding social research within the organisation perhaps using FRM as an ‘early adopter’ function. This might include:
- having a dedicated FRM social science person who has a watching brief and understanding across all the projects internally and externally and who links back to the Social Policy Team. This person should also be clearly linked into the Defra/Environment Agency programme;
 - ensuring that there is adequate social science representation when planning the R&D programme;
 - developing a network of champions both ‘up stream’ and ‘down stream’;
 - investing time and effort in staff development with training in social research, etc.;
 - developing mechanisms for linking operations with research such that research can be closely tied to business issues where appropriate;
 - understanding the range of ways in which research can influence the ‘business’ of FRM and using those different models to facilitate the influence of social science research in changing the FRM culture from a ‘technoeconomic’ one to a ‘sociotechnical’ one.
- R3: Engage systematically with academics, policy makers and practitioners of FRM by setting up a forum for discussion and debate about the key issues for FRM, making this an interdisciplinary forum so that a new language for FRM can be developed, but run it using good practice facilitation and dialogue.

Appendix 1. Interview schedules

Interview schedule for participants with a FRM background

It should be noted that for those interviewees who had knowledge and experience of social science research, the second set of questions within Section 3 were asked.

Section 1 – Part 1. The impacts of flooding on rural and urban communities

- 1. What are the social aspects of flooding?*
- 2. In which ways are rural and urban communities affected differently?*
- 3. Can you think of any clear-cut differences of social aspects between rural and urban areas?*
- 4. Do you know of any work which addresses these issues specifically?*

Section 2 – Part 4. Community and citizen engagement in FRM

We are particularly interested in the effectiveness and efficiency of the public participation process and outcome due to community involvement compared with reliance upon FRM decision making, delivery and flood response without community involvement.

- 1. Can you think of any anecdotal work which would suggest positive/negative impacts of community involvement on effectiveness and efficiency during the three stages of flood occurrence (before, during, after flood)?*
- 2. Which, in your view, are the key issues concerning community involvement and effectiveness/efficiency in terms of FRM?*
- 3. What, in your view, could be done to improve local people's involvement?*
- 4. Are there issues which you feel should be addressed by the Environment Agency and have been omitted to date?*
- 5. What recommendations would you make to the Environment Agency for further research and future policies?*

Section 3 – Part 5. The role of social science in FRM

- 1. What is the current role of social science in FRM and how is it perceived by organisations such as the Environment Agency, Defra, academia and others?*
- 2. What is lacking in the Environment Agency's social science policy/programme to date? How could it be improved?*

3. *Any other comments/questions?*

Part 5 – The Role of Social Science in FRM – Questions for those interviewees with knowledge and experience of social science

1. *What do you see as the current role of social science research in FRM within the Environment Agency/Defra research programme?*
2. *How do you feel it is regarded by Environment Agency FRM staff? What improvements could be made?*
3. *How do you feel it is regarded by Defra FRM staff? What improvements could be made?*
4. *How do you feel it is regarded by other FRM research projects carried out within the natural or engineering sciences?*
5. *How do you feel the social science work that has been carried out has been used within the Environment Agency? Could it be improved? In what ways?*
6. *Within Defra/Environment Agency – outside Defra/Environment Agency?*
7. *Do you think it has had an impact on FRM policy? In what ways?*
8. *Do you think there is the potential for it to impact FRM policy? In what ways?*
9. *Do you think it has had an impact on FRM operations? In what ways?*
10. *Do you think there is potential for it to impact on FRM operations? In what ways?*
11. *How would you characterise approaches to social science that have been taken within the Defra/Environment Agency research programme in terms of theoretical orientation and methodological approach?*
12. *How well do you think social science is integrated into the FRM research programme? Could it be improved? In what ways?*
13. *What is lacking in the Defra/Environment Agency programme to date? How could it be improved? Are there some key pieces of work that you feel should be carried out?*

Interview schedule for academics engaged with social science and environmental decision making

1. *What do you see as the current role of social science in government environmental policy making?*
2. *What would you say are the key issues surrounding the generation and use of social science research in environmental policy making?*
3. *How do you think social science research is regarded by organisations such as the Environment Agency and Defra? How could it be improved?*
4. *How do you think social science is regarded by natural and physical sciences within the area of the environment?*
5. *Do you feel that good use is being made of the social science research carried out for government, specifically in environmental decision making? What would you consider to be 'good use'?*
6. *What might be the barriers and facilitators of that use?*
7. *Have you any examples where there has been a clear influence of social science research on policy?*
8. *Do you think there are preferred approaches to social science in terms of theoretical orientation and methodological approach in the areas of environmental decision making?*
9. *What do you think are the key issues for the future of evidence-based policy making?*
10. *What approaches to research do you think are likely to be most effective?*
11. *What do you consider to be the key issues around interdisciplinary working for social science?*

Interview schedule for social scientists in government/agencies

1. *Can you tell me a bit about your role and your involvement in social science research?*
2. *How is social science research organised within the Home Office/Forest Research?*
3. *What do you see as the current role of social science in the Home Office/Forest Research and how is it regarded by staff?*
4. *How well is social science respected/used by policy makers?*
5. *Can you say how research is typically used within the Home Office/Forest Research?*
6. *What about outside the Home Office/Forest Research?*
7. *In what ways do you think social science research impacts on the way policies are carried out?*
8. *In what ways do you think social science research impacts on Home Office/Forest Research practice?*
9. *In terms of theoretical orientation and methodological approach, how would you characterise the types of research carried out at the Home Office/Forest Research?*
10. *Are all approaches regarded equally?*
11. *How are projects commissioned?*
12. *Are there clear routes for uptake/use of research?*

Appendix 2. Questions for the Joining Up team

1. *How would you characterise the research approach/philosophy taken across the Joining Up project in terms of a specific social science approach?*
2. *How would you characterise the approaches taken for each part of the project?*
3. *What guided your choice of approach for each part of the project?*
4. *What did you feel was successful about your approach(es)?*
5. *What was unsuccessful? What do you feel constituted success in the different parts of the project?*
6. *How did you feel the participants/co-researchers in different parts of the project reacted to/engaged with the research approaches?*
7. *How do you feel the findings of the Joining Up project have been received within the Environment Agency?*
8. *Do you think that your approach to research has helped/hindered the understanding and uptake of the findings?*

Appendix 3. Interviewees

Below is a list of people who were interviewed for the project.

Name	Affiliation	Contribution to research
Joanne Reilly	Environment Agency	<i>Part 1 The impacts of flooding on rural and urban communities</i> <i>Part 4 Community and citizen engagement in FRM</i> <i>Part 5 The role of social science in FRM</i>
Colin Candish	Environment Agency	<i>Part 1 The impacts of flooding on rural and urban communities</i> <i>Part 4 Community and citizen engagement in FRM</i>
Kevin House	Environment Agency – Senior Technical Officer Thames 2100	<i>Part 4 Community and citizen engagement in FRM</i> <i>Part 5 The role of social science in FRM</i>
Jonathan Chapman	Environment Agency – Defra/Environment Agency research co-ordinator	<i>Part 1 The impacts of flooding on rural and urban communities</i> <i>Part 4 Community and citizen engagement in FRM</i> <i>Part 5 The role of social science in FRM</i>
Simon Hughes	Environment Agency – Flood Event Manager	<i>Part 1 The impacts of flooding on rural and urban communities</i> <i>Part 4 Community and citizen engagement in FRM</i> <i>Part 5 The role of social science in FRM</i>
Ruth Rush	Environment Agency – Corporate Affairs	<i>Part 1 The impacts of flooding on rural and urban communities</i> <i>Part 4 Community and citizen engagement in FRM</i> <i>Part 5 The role of social science in FRM</i>
David Wilkes	Environment Agency – Area Flood Risk Manager	<i>Part 1 The impacts of flooding on rural and urban communities</i> <i>Part 4 Community and citizen engagement in FRM</i> <i>Part 5 The role of social science in FRM</i>
Dave Hornby	Environment Agency	<i>Part 4 Community and citizen engagement in FRM</i>
David Richardson	Defra/Environment Agency FRM research, Policy theme leader	<i>Part 1 The impacts of flooding on rural and urban communities</i> <i>Part 4 Community and citizen engagement in FRM</i> <i>Part 5 The role of social science in FRM</i>
Gill Holland	National Flood Forum	<i>Part 1 The impacts of flooding on rural and urban communities</i> <i>Part 4 Community and citizen engagement in FRM</i>
Julian Simcox	Independent facilitator	<i>Part 4 Community and citizen engagement in FRM</i>
Dr Mary Jordan	Clinical psychologist and chair of local	<i>Part 4 Community and citizen engagement in FRM</i>

	community group	
Jessica Milligan	University of East Anglia	<i>Part 1 The impacts of flooding on rural and urban communities</i> <i>Part 4 Community and citizen engagement in FRM</i> <i>Part 5 The role of social science in FRM</i>
Prof. Tim O’Riordan	University of East Anglia	<i>Part 4 Community and citizen engagement in FRM</i> <i>Part 5 The role of social science in FRM</i>
Prof. Joe Howe and others	University of Manchester	<i>Part 1 The impacts of flooding on rural and urban communities</i> <i>Part 4 Community and citizen engagement in FRM</i> <i>Part 5 The role of social science in FRM</i>
Prof. Susan Owens	University of Cambridge	<i>Part 5 The role of social science in FRM</i>
Dr Andy Stirling	University of Sussex	<i>Part 5 The role of social science in FRM</i>
Paul Tabbush	Forest Research, Forestry Commission	<i>Part 5 The role of social science in FRM</i>
Civil Renewal Unit, Home Office		<i>Part 5 The role of social science in FRM</i>

Appendix 4. Further details on programmes and projects

Rural Economy and Land Use Programme (RELU)

Within the RELU Programme there are four thematic areas:

- The Integration of Land and Water Use
- The Environmental Basis of Rural Development
- Sustainable Food Chains
- Economic and Social Interactions with the Rural Environment

These are further categorised into two groups: Food Chains (Theme 3) and People and Rural Areas (Themes 1, 2, and 4). Four types of project can be funded: research projects, scoping studies, capacity building and development activities. Two rounds of projects have been funded and from that two completed scoping studies and one ongoing research project look to be of interest:

- Scoping Study: Developing Tools for Interdisciplinary Research: Physical and Social Science Perspectives on the Use of Rural Catchments – lead: Dr Elizabeth Oughton, Centre for Rural Economy, University of Newcastle;
- Scoping Study: Developing Spatial Data for the Classification of Rural Areas According to Socio-Economic and Environmental Sustainability Factors – lead: Dr Meg Huby, Department of Social Policy and Social Work, University of York.
- Research Project: Integrated Land and Water Management in Floodplains: The Experience of Agricultural Flood Defence Systems in England and Wales – lead Prof. Joseph Morris, Cranfield University

In October 2005 a third call for proposals was launched which has three aspects:

- i) Research into the management of animal and plant diseases (Theme C).
- ii) Research under the theme of economic and social interactions with the rural environment (Theme D). Under this theme, the programme would also welcome, where appropriate, proposals from teams that, as well as combining inputs from the natural and social sciences, include additional contributions from the physical or engineering sciences.
- iii) An opportunity for holders of scoping studies (SS) or capacity building awards (CBA) under RELU's first call to submit an application for an interdisciplinary research project that builds directly on their SS or CBA, where they have not already done so under the second call

More information can be found on the website <http://www.relu.ac.uk/>

HarmoniCOP

HarmoniCOP makes use of nine case studies carried out in nine European countries. As the cultural context will differ during these field experiences, the case studies function as a means of gaining a deeper understanding of participatory processes in Europe. Within the UK the partners are the University of Aberdeen, WRc Swindon and the Flood Hazard Research Centre, University of Middlesex, and the case study is the Ribble Catchment.

One of the work packages is 'Participation as a social learning process'. It has the following aims:

- 'to conceptualise river basin management planning (RBMP) as sets of social processes at different levels, characterised by different forms of interest representation, conflicting interests and institutionalisation;
 - to specify the concept "social learning" for RBMP and make it measurable;
 - to identify critical issues for participation as a means to promote social learning and
 - to identify possible ways to handle these issues.'
- (<http://www.harmonicop.info/index.php>)

More information can be found at the website <http://www.harmonicop.info>

Flood Hazard Research Centre, Middlesex University

In addition to the projects mentioned in section 3.5.3 there are two other social science research projects at FHRC listed within 'Current Research' on their website. These are:

- Public Participation in the Water Framework Directive
- Developing a National Strategy for Public Participation in the Water Framework Directive

For both of these the contact person is Sylvia Tunstall.

In addition, there is a 'genuinely interdisciplinary' (FHRC 2004) project called DINAS-COAST, which is developing 'an integrated methodology to assess potential impacts and vulnerability of the coastal zone to sea-level rise' (FHRC 2004).

There are other projects recently completed listed within the 'Recent Research' web page, and the website also lists a number of PhD students and their research topics.

More information can be found at <http://www.fhrc.mdx.ac.uk/research>

Climate change research programmes

Adaptation Strategies for Climate Change in the Urban Environment (ASCCUE)

This is a multidisciplinary project involving researchers from four universities (Manchester, Cardiff, Southampton and Oxford Brookes) led by Professor John Handley at the Centre for Urban and Regional Ecology (CURE) at the University of Manchester.

ASCCUE is part of the joint UK Climate Impacts Programme (UKCIP) and ESPRC programme 'Building Knowledge for a Changing Climate'.

The principal aims of ASCCUE are:

- to develop an improved understanding of the consequences of climate change for urban areas and how these, and the neighbourhoods within them, can be adapted to climate change;
- to explore policy options for urban planning in response to climate change, with emphasis on changes in urban form and urban management;
- to produce a toolkit for climate-conscious planning and design at various scales from neighbourhood to the whole city level.

The objectives are:

- to make a city-wide assessment of climate-related risks to, and constraints on, development in two contrasting urban areas;
- to investigate climate change impacts on building integrity, human comfort and urban green space at the neighbourhood level;
- to examine the interaction between adaptive strategies and measures to reduce greenhouse gas emissions;
- to involve local and national stakeholders in impact assessment, solution testing and dissemination of findings.

In order to examine these objectives, two case study areas have been chosen and these are Lewes (East Sussex) and Greater Manchester. The project began in April 2003.

Adaptable Urban Drainage (AUDACIOUS)

AUDACIOUS aims to investigate key aspects of the effects of climate change on existing drainage in urban areas and to provide tools for drainage managers and operators to adapt to uncertain future climate change scenarios. This plugs a gap in current drainage related research, in that it is proposed to establish a rational framework for problem-oriented, cost-efficient, adaptable and sustainable decision making for those owning and responsible for managing, operating, regulating and developing urban drainage systems to mitigate likely future problems arising as a result of climate change.

AUDACIOUS focuses on flooding that is caused by a lack of capacity or hindrance (e.g. blockage) of the urban drainage system, rather than inundation of buildings on river floodplains due to overland flows from major watercourses. The focus is on adapting existing systems, but will consider new build and is envisaged to link with other primary areas such as interaction of urban floods with other urban infrastructure (e.g. transportation, communications, buildings) and to tackle some of the many cross-cutting issues (e.g. socio-economic implications, stakeholder perception, planning, insurance risk and land development).

Within this context, the objectives of AUDACIOUS are:

- to set out a clear picture for a range of stakeholders of the scope and interactions between the likely problems caused to the performance of existing drainage systems due to climate change and the wider urban catchment;
- to provide new procedures, computer models and appropriate (targeted to particular users) guidance (toolbox) to facilitate the assessment of climate change impacts and the development of mitigating responses for building and local drainage systems;
- to enable and demonstrate the integration of the models and procedures with the behaviour of, and within, the wider context of drainage and urban systems;
- to establish the baseline procedures for evaluation and mitigation of the effects of climate change on existing urban drainage and to disseminate these widely.

Tyndall Centre Research

There are four research themes: Integrating Frameworks, Decarbonising Modern Societies, Adapting to Climate Change and Sustaining the Coastal Zone. Within each of these themes are numerous projects, many of which have relevance to flood risk management. Two from the Adapting to Climate Change theme have both a social science and flood risk focus. These are:

- Identifying who and what can enhance adaptation along UK coastlines: Responding to climate change: Inclusive and integrated coastal analysis – Prof. Tim O’Riordan;
- Redesigning the coast: Exploring new forms of governance for more effective coastal management – Dr Kate Brown.

More information can be found at <http://www.tyndall.ac.uk/>

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Abbreviations and acronyms

An abbreviation or acronym is included here if it is used more than once throughout the report or if it is better known in its abbreviated form.

ASCCUE	Adaptation Strategies for Climate Change in the Urban Environment
AUDACIOUS	Adaptable Urban Drainage
CASPAR	Centre for the Analysis of Safety Policy and Attitudes to Risk
Defra	Department for Environment, Food and Rural Affairs
eftec	Economics for the Environment Consultancy Ltd
EPSRC	Engineering and Physical Sciences Research Council
ESRC	Economic and Social Research Council
FCD	Flood and Coastal Defence
FFW	Flood Forecasting and Warning (research theme)
FHRC	Flood Hazard Research Centre (Middlesex University)
FREE	Flood Risk from Extreme Events
FRM	Flood Risk Management
FRMRC	Flood Risk Management Research Consortium
NERC	Natural Environment Research Council
PD	Policy Development (theme)
RBMP	River Basin Management Planning
SMURF	Sustainable Management of Urban Rivers and Floodplains
SNIFFER	Scottish and Northern Ireland Forum For Environmental Research
SUDS	Sustainable Urban Drainage Systems
TAG	theme advisory group
UKWIR	UK Water Industry Research

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