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Improving the link between policy research and practice: using a scenario workshop as a qualitative research tool in the case of genetically modified crops

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ABSTRACT   This article reflects on the use of a scenario workshop as a way of improving the link between policy-related research and policy practice, in the light of current interest in evidence-based policy. It describes a scenario workshop that was used to engage senior policy actors in our research project on the precautionary principle in relation to genetically modified crops. The workshop highlighted some of the difficulties faced by qualitative researchers in attempts to provide evidence for senior policy makers. Nevertheless, we conclude that engaging policy makers within the research process in this way allows researchers scope to explain more about the nature of the evidence being produced and how it may be useful. The dialogue encouraged by more active engagement of potential end-users increases the likelihood of producing grounded 'evidence' that they will find relevant.

KEYWORDS: *dissemination, evidence-based policy, GM crops, scenario planning, user engagement, workshops*

Introduction

In recent years there has been increasing pressure on researchers to produce research that represents value for money, and that is relevant to end-users such as policy makers and practitioners. As Locock and Boaz (2004) note, research activities are often criticized by policy makers for not being relevant or useful. Social science, in particular, is being challenged to provide a more solid and less disparate evidence base for making policy decisions (Lyall et al., 2004; Oakley, 2001). While the link between research and policy has been debated in many countries, there has been a particularly British interest in policy and practice that is based on evidence (DEFRA, 2003, 2004; Nutley, 2003; Solesbury, 2001).

Evidence-based policy making is concerned with attempting to improve decision making by drawing on what has been proven to be effective. It focuses

on raising decision makers' awareness of research and improving researchers' dissemination activities. In a White Paper in 1999 (Cabinet Office, 1999a), the UK government made clear its view that better use should be made of evidence and research in policy making. However, what the government means by 'evidence' is broad. It includes not just expert knowledge and published research but also the outcomes of stakeholder involvement and consultations (Cabinet Office, 1999b). This interest in 'evidence-based' policy making has largely been driven by funders of the social sciences, such as the Joseph Rowntree Foundation, the Nuffield Foundation and the Economic and Social Research Council (ESRC) (Solesbury, 2001). It has led to the establishment of networks and special centres that aim to promote, advise and advance discussion in this area, such as the ESRC UK Centre for Evidence Based Policy and Practice at Queen Mary College, University of London, and the Evidence for Policy and Practice Information and Co-ordinating Centre at the Institute of Education, University of London. More recently, the Department for Environment, Food and Rural Affairs (DEFRA) has initiated an evidence-based policy-making project, led by the Science Strategy Team, to promote and develop guidance on the use of evidence in policy making (DEFRA, 2004).

Interaction between researchers and users has been encouraged in government policy statements. For example, a recent paper on the UK government's emerging thoughts on science and innovation in the next 10 years notes that:

> Universities and public laboratories must continue to develop a stronger programme of engagement with users on knowledge exchange, to create conduits for productive flows of ideas and people between research and its practical application. (HM Treasury, DTI, DfES, 2004: 8)

Government concern for evidence to help 'produce policies that really deal with problems' (DEFRA, 2004) is consequently focusing researchers' attention on end-user needs and dissemination of research findings. Dialogue and interaction with potential users are now considered essential elements of successful research projects (see, for example, Solesbury, 2003), and research proposals usually have to include plans for such interactions in order to obtain funding.

In our own research, concerning understandings of the precautionary principle in relation to policy decisions about GM crops, we used several ways of engaging with potential end-users. These included setting up an advisory panel whose members we could contact for advice on policy documents and whom we should interview, and for feedback on research ideas and draft reports; face-to-face interviews; and scenario workshops.

This article focuses on the scenario workshop we ran in the UK as part of our research, and considers its effectiveness as a tool for engaging with policy actors.[1]

Our research project, entitled Precautionary Expertise for GM Crops (or PEG for short), was funded by the European Commission and we had research partners in six other member states (Austria, Denmark, France, Germany, Spain and the Netherlands).[2] The overall aim of the research was to analyse how the

concept of the precautionary principle was being understood in seven different member states, and at EU level, and compare those understandings with current practices in relation to the regulation of GM crops, whose regulatory framework is based on the precautionary principle (see Carr, 2006). Policy documents were analysed to identify different accounts of precaution, which were then used as the basis for interviews with key decision makers, their expert advisers and the groups that attempt to influence them, to provide more detail. These detailed accounts were used to compile checklists of the main features of different understandings of precaution, which were then compared with precautionary practices for GM products. The final analysis showed how the precautionary principle was being interpreted in many different ways, often to support particular policy positions. The differences help to explain the continuing disputes among EU member states and the European Commission over GM product decisions, because they affect perspectives on the uncertainties considered to be relevant (Carr, 2006; Levidow et al., 2005).

The scenario workshop described here was held at the half-way stage of the project to inform the UK part of this wider study. Parallel workshops were held at the same time in each of the research project's partner countries.[3] The workshops provided a way for us to engage with senior policy actors involved in the policy process concerning the commercialization of GM crops, and to obtain their active involvement in the research process at a relatively early stage.

The first section of this article considers alternative models of the links between research and policy processes. The following section provides background on scenario approaches. The third section gives a brief summary of the GM policy context at the time of our workshop, before describing the workshop in detail. The article concludes by reflecting on the use of scenario workshops within our research process and the implications for qualitative research more generally.

The link between research and policy

Enthusiasts for 'evidence-based' policy are often criticized for overlooking the fact that, although a large amount of 'evidence' or research is produced, it is not necessarily used (see, for example, Young et al., 2002). Critics point to the root cause as being misconceptions of how the policy process operates. Traditionally the link between research, policy and practice has been viewed as a set of rational and linear steps, i.e. define the problem, analyse the alternatives, make the decision, implement and review. Research and evidence are generally seen as informing the second step – that of analysing the alternatives. Citing Shulock's notion of 'the paradox of policy analysis' (Shulock, 1999), Young et al. (2002: 218) comment on the way a paradox arises from the 'mismatch between notions of how the policy process should work and its actual messy, uncertain, unstable, and essential political realities'. They note how this paradox is rooted in the traditional or 'ideal' view of the policy process, whereby policy research is seen as objective and conclusive and is issued in a systematic way to assist with making choices.

A better appreciation of the complexity of the policy process has led to a move away from traditional linear models towards alternative, more participatory and inclusive models (for example, Jasanoff, 2005; Keeley and Scoones, 1999; Spash, 2001). These models emphasize the need to look beyond formal government policy making towards the informal relationships and networks that constitute a wider policy process. This shift has also prompted a search for new ways to analyse the links between policy and research. For example, Shulock (1999) notes that research may be viewed as a resource for informing wider public debates about policy decisions. Young et al. (2002) note that, in this sense, research may be perceived as being more useful as part of the democratic process than as part of the decision-making process. They argue that 'research can serve the public good just as effectively when it seeks to enlighten and inform in the interests of generating a wider debate' (p. 223). They therefore call for the broader view of an 'evidence-informed society' rather than 'evidence-based policy'. Nutley (2003) also comments that 'evidence-informed' or 'evidence aware' policy may better describe the aims of researchers, policy makers and practitioners than 'evidence-based'.

ENGAGING USERS

However the link between evidence (or research) and policy is described, a key component in forming useful evidence is communication. Traditionally, researchers have not given much consideration to how their research may be used in practice. Although more attention is now being given to the dissemination of research findings, it generally attracts few resources. Solesbury (2003) notes that a typical ratio of research production to research communication effort might be around 50:1. He suggests that doing less research, but doing it more effectively, could prove to be better value for money and calls for an 'on-going research dialogue' rather than 'one off' dissemination. As noted by Nutley (2003), although efforts have been made to build bridges between researchers and government policy makers, improving communication has tended to focus on improving the dissemination of the research findings – for example, by providing accessible summaries of the research, targeted at the needs of the audience.

Such dissemination pays little attention to how much is actually assimilated by the users of the research, nor does it consider to what extent the users consider it to be relevant. User engagement within the research process itself is therefore being promoted as a means of ensuring that research is relevant and useful to those who may make use of it. For example, in advice on writing a successful research application, the ESRC comments that 'the ESRC is placing a new emphasis on user engagement and this shouldn't be just an afterthought' (Economic and Social Research Council, 2003). The ESRC also recommends that more careful thought is given to the dissemination of research findings. In this respect, Nutley (2003) notes that dialogue may be a more appropriate metaphor to use than dissemination, because it implies a two-way

communication strategy that operates more effectively between researchers and end-users.

Interest in 'user-engagement' initiatives is generating a wider view of what may count as evidence, and greater consideration of the way in which knowledge is produced. For example, Smith et al. (2004) offer a number of examples within healthcare that provide a broader view of what counts as evidence and of the methods used for obtaining it. For instance, sources of evidence may include testimonies, storytelling and autobiographies. Methods may include encouraging practitioners to reflect on their intuitive, personal knowledge. Such methods involve working in a participatory way with users of research and are now a recognized practice in many areas, particularly in those where lay people and science necessarily interact, such as healthcare, development studies, agriculture and conservation (see, for example, Countryside Commission, 1998; Scoones and Thompson, 1994; Smith, 2004). These approaches arose out of experiences of failure of existing practices to deliver the desired outcomes, and the unintended effects of new innovations. More recently, approaches emphasize the importance of research *with* people rather than research *on* people, and of learning by both the researcher and those the researcher involves in the research (Cerf et al., 2000; Leeuwis and Pyburn, 2002). They emphasize iterative reflection on shared experiences (Keen et al., 2005), with the researchers placing themselves as far as possible within the system of interest rather than being objective observers of the system (see Figure 1).

Scenario approaches

One approach that we have previously found useful in providing an interactive environment for researchers and policy makers is that of scenario workshops (see Carr et al., 2000).

Consideration of the future is an essential part of all decision making. People have always explored ideas about the future – for example, the ancient Greeks consulted oracles. The field of 'futurism' is said to date back to the 1500s and 1600s (Lindgren and Bandhold, 2003). Forecasting has been an important part of attempts to manage economies through the centuries. In the 1910–1930s an economic forecasting industry developed in the USA, although its standing was damaged by the Great Depression, which forecasters failed to predict (Hawkins, undated). In its more contemporary form, forecasting arose from the work of the early systems thinkers of the 1940s and 1950s, when it was developed in the context of security and strategic analysis. The foundation of modern scenario approaches is generally attributed to Herman Kahn and the RAND Corporation. During the 1970s, studying the future was promoted by many organizations. Pierre Wack of Royal Dutch/Shell was particularly influential in the development of scenario analysis as an aid to strategic decision making (see, for example, Wack, 1985).

These early scenario approaches were mechanistic in character and based on the supposition that the future of socio-economic systems was in principle
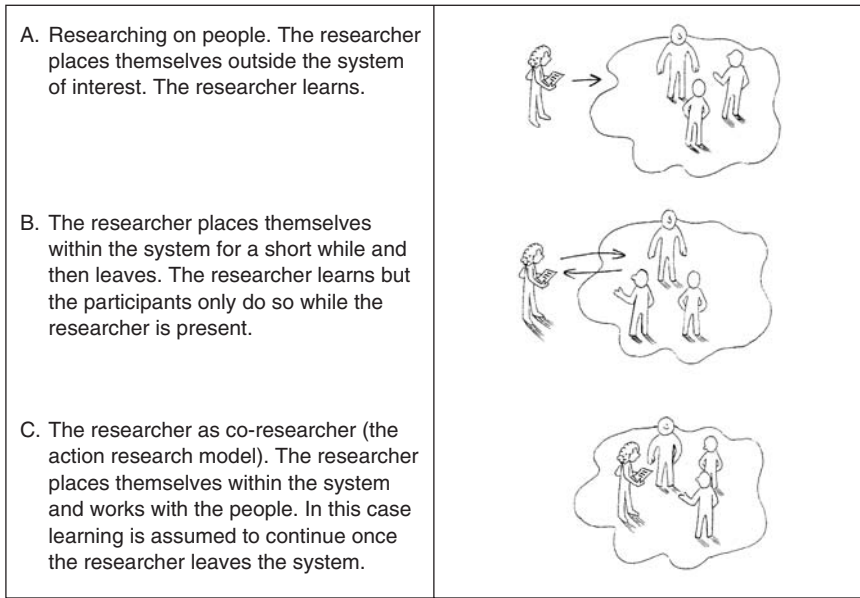
A. Researching on people. The researcher places themselves outside the system of interest. The researcher learns.

B. The researcher places themselves within the system for a short while and then leaves. The researcher learns but the participants only do so while the researcher is present.

C. The researcher as co-researcher (the action research model). The researcher places themselves within the system and works with the people. In this case learning is assumed to continue once the researcher leaves the system.

FIGURE 1.   *The relationship between the researcher and the system of interest* (Oreszczyn, 1999).

knowable (Berkhout and Hertin, 2002). They made use of simplified quantitative models that came in for much criticism over their accuracy, so that their popularity declined for a time in the late 1970s to early 1980s. Concerns about resource conservation and the environment in the 1980s and 1990s resulted in a renewed interest and an array of new approaches (see Eames and Skea, 2002).

Since its original conception, scenario planning has been used extensively by companies and governments as a strategy tool and by researchers interested in modelling the causes and consequences of what may happen in the future (Van der Heijden, 1996). Current scenario approaches are designed to draw on various types of expertise and knowledge in an exploration of future trends so as to inform decision-making processes. Importantly, modern scenario approaches have moved away from their mechanistic roots. No longer is the future perceived as objective and knowable – rather, it is constructed from a number of different perspectives offering a diversity of views. Futures, therefore, are treated as a set of possible alternatives depending on a person's viewpoint. This approach, based on diverse scenarios rather than a single forecast future, is particularly appropriate for situations involving controversy and scientific uncertainty, as in the case of GM crops.

As Bradfield et al. (2005) note, there is a multitude of practical techniques and methodologies for scenario building. Some require a high degree of specialist expertise, such as those utilizing large computer models to model climate change (IPCC, 2001), while others involve more informal and participatory workshops, such as those used by UK government departments to assist with

policy development. Scenarios were used by the UK's Prime Minister's Strategy Unit, for example, in their review of the costs and benefits of GM crops (Prime Minister's Strategy Unit, 2003). In this case, four scenarios for analysing the range of possible costs and benefits that may occur from cultivating GM crops in the UK were developed in a workshop with key stakeholders. These scenarios were then refined by the Strategy Unit, resulting in five scenarios for futures 10–15 years ahead. The scenarios revealed a number of issues: the trade-offs that would need to be made; the way interactions between policies and attitudes could affect the different futures; the impact on non-GM farmers; the central importance of public attitudes; the potential impacts on wider science and industry; and the international implications.

While there are many different techniques used for differing purposes, most scenario-building exercises involve the construction of plausible scenarios by identifying the key variables and by considering the roles of the different actors involved – that is, they identify the components of a scenario that are likely to change and the likely influences on the direction of change. As noted by de Jouvenel (2000), it is important to recognize that the paths that lead to the final image of a particular future are as important as the final image. Many different futures may be generated by considering different timescales.

Using scenario workshops to link policy research and practice: a UK scenario workshop on GM crops

As one of our responses to the demands on researchers for improved dissemination and greater involvement of users, we incorporated scenario-based policy workshops involving senior policy actors, i.e. our potential end-users, within our research project on precaution and GM crops. Similar workshops were held, at the half-way stage, in each of the countries involved in the project. These national workshops all contributed to the design of a subsequent workshop that we held for EU-level policy actors. This section describes the UK workshop, including the policy context at the time it was held, how the scenarios were chosen, how the workshop was run, and our observations on the process and resulting scenario maps.

THE POLICY CONTEXT

Fortuitously for the policy relevance of our project, our UK workshop coincided with a time (mid-2003) when GM crops were high on the political agenda. The government was in the midst of an initiative called 'GM Nation?', which involved an extensive formal public debate (Steering Board, 2003), backed up by reports from scientists (GM Science Review Panel 2003, 2004) and social scientists (Prime Minister's Strategy Unit, 2003), on all aspects of the commercialization of GM crops, prior to a decision about whether to allow the commercial production of those GM crops already given EU-wide approval (see Oreszczyn, 2004, 2005). Independently of this initiative, but at the same

time, research on people's views on whether GM food should be available to buy was undertaken by the Food Standards Agency (FSA, 2003). In autumn 2003, the results of the Farm Scale Evaluations (FSEs) on GM crops were published (Royal Society, 2003). The FSEs involved large-scale, farmer-managed trials, which had been initiated by government three years earlier in an attempt to answer questions about the possible impacts on biodiversity of growing the GM herbicide-tolerant (GMHT) crops maize, sugar beet, and spring and autumn sown oilseed rape. Also in 2003, the Agriculture and Environment Biotechnology Commission (AEBC, a government advisory body) produced a report on the controversial issues of co-existence and liability for GM crops (AEBC, 2003).

Despite this wealth of research and information, and the employment of a more deliberative approach, much of the evidence remained inconclusive and open to challenge. There were competing arguments surrounding both the social and scientific evidence base (see Oreszczyn, 2004, 2005). Rather than providing conclusive evidence, gathering increasing amounts of evidence tended to highlight what was not known about GM crops and particularly what was not known about the environment and agriculture more generally. Consequently, assessing the evidence and analysing the alternatives in order to make an appropriate, rational policy decision on the commercialization of GM crops remained difficult. The process illustrates the 'messiness' of policy making (as also noted by Levitt, 2003) and the difficulties associated with obtaining evidence for decisions.

CHOICE OF SCENARIOS

Our workshop focused on the policy decision that the government would soon have to make about whether or not to go ahead with the commercialization of GMHT crops.

We used three policy scenarios as a tool for considering possible causes and consequences of commercialization. Because a one-day workshop was not long enough for participants to construct their own scenarios as well as to explore and map their causes and consequences, the research team devised the three scenarios beforehand, on the basis of information we had already gathered on the existing political context for GM crops and our initial one-to-one interviews with key policy actors. Rather than choose scenarios far into the future, as recommended by many authors, we drew on the views expressed in our interviews to choose three scenarios that we considered plausible policy options for present decision makers. As noted by Berkhout and Hertin (2002), thinking too far ahead is not routine for most organizations and can seem difficult or meaningless to many people. Limiting the time-scale to the near future and keeping scenarios simple enables them to be more readily understood by participants unfamiliar with scenario planning, as we anticipated most of ours would be.

The chosen scenarios were:

1. Commercialization is postponed further.
2. Limited commercialization goes ahead.
3. Commercialization goes ahead.

The wording of the scenarios was deliberately left somewhat vague and ambiguous to allow scope for interpretation according to individual views, and to encourage participants to think creatively and develop their own storylines for the scenarios through discussion.

   Although the focus of our research was precaution, as noted earlier, we focused on decisions associated with the commercialization of GM crops, rather than on precaution, for several reasons. First, commercialization involves making practical policy decisions, and we were mainly interested in precaution as it relates to practice. Second, any decision about commercialization inevitably involves some interpretation of precaution in practice, however narrowly or broadly defined. Third, the issue of commercialization provided scope for a broad discussion, encompassing divergent views of the precautionary principle and its relevance. Also, commercialization was a lively and controversial issue more likely to attract workshop participants than a workshop specifically on precaution.

DETAILS OF THE WORKSHOP

A letter of invitation to the workshop was sent to over 60 key stakeholders with influence on the decisions being made about GM crops in the UK. They covered a broad range of expertise – farmers' groups, industry, government officials and advisory committee members, consumer groups and NGOs. The event attracted 20 participants from a range of backgrounds, but predominantly scientists, all of whom were involved at a high level in the policy process, either directly as a member of a government department or advisory committee, or through their position within their organization (see Table 1).

   As a result of the many demands on their time in connection with the official GM debate, some groups, particularly the environmental NGOs and farmers, were not well represented and consumer groups were not represented at all. Representatives approached from these groups did, however, express a wish to be kept informed of the workshop outcomes and were invited to comment on the draft workshop report and scenario maps (see Oreszczyn, 2003).

   Before the workshop, we sent those invited a background document giving details of our research to date (see Oreszczyn, 2003: Appendix 3). This served a dual purpose – as a briefing document for the exercise and as a means of dissemination of results to date. This document summarized current issues relating to the commercialization of GM crops in the UK, such as the way expertise was being broadened on advisory committees, the common concerns over co-existence of GM and non-GM crops, and desirable agricultural futures. It also detailed the emerging themes and interpretations of precaution in the UK from our documentary analysis and interviews. Although we did not specifically ask for comments at this stage, a number of participants provided valuable feedback on this document during the workshop.

TABLE 1   *List of organizations participating in the workshop*

Advisory Committee on Releases to the Environment (ACRE)
Agriculture and Environment Biotechnology Commission (AEBC)
Bayer Crop Science
Biosafety Research Group – John Innes Centre
Centre for Ecology and Hydrology
CropGen
Department of the Environment, Food and Rural Affairs (DEFRA)
Institute of Grassland and Environmental Research
Macaulay Institute
National Institute of Agricultural Botany (NIAB)
Plant Bio-Science Ltd.
Prime Minister's Strategy Unit
Soil Association
Sense about Science
Sussex Policy Research Unit (SPRU), University of Sussex
Supply Chain Initiative for Modified Agricultural Crops (SCIMAC)

THE WORKSHOP PROCESS

The workshop was managed by two professional facilitators, using a 'hands-off' approach to moderation. Berkhout and Hertin (2002) recommend professional moderation for such events to ensure constructive discussion, particularly when the issues under discussion are contentious. In the context of the workshop, the aim was to give all participants the opportunity to express their views, whatever their perspective, while appreciating that, in practice, power relations mean that some views carry more weight than others. The scenario activity was not designed to look for agreement on the scenarios or to produce a consensus view on a particular scenario. Rather, it was designed to be open to the perspectives held by the participants, because areas where there are disagreement can provide important insights. Also, to attempt to achieve consensus on such a contentious issue would have been unwise. Furthermore, for controversial topics, such as GM crops, we believed that the workshop would offer a way for different stakeholders to explore various policy scenarios in an open, imaginative and non-confrontational way, i.e. it would provide a 'safe' environment in which people could air issues that concerned them.

In the introduction to the day, it was agreed with participants that no remarks from the discussions would be attributed to a particular individual, in order to encourage people to speak freely without fear that any controversial views they expressed might later be attributed to them personally. We set the scene for the scenario exercise by depicting the main issues at the time using a cartoon-like summary diagram called a 'Rich picture' (see Figure 2). Rich pictures have their origins in Soft Systems Methodology, developed by Peter Checkland (1981), where they are used to gain an understanding of a human activity system. They provide a pictorial representation of a situation from a

particular person's or group's perspective. The rich picture used for this workshop was based on the main topics raised in our initial interviews for the project, as set out in the briefing document sent to participants before the workshop. For example, the flying jeans and worried figure halfway down on the right-hand side represents in a cartoon-like form the issue of 'jean' flow and the concerns of organic farmers about the impact this might have on their crops. In the context of our workshop, the rich picture had the advantages of summarizing large amounts of information briefly, presenting controversial topics in a light-hearted way and encouraging participants to look in a fresh way at familiar issues.

A further introductory talk (on the policy context) was given by one of the participants (a member of the government scientific advisory body ACRE), in line with our intention that the day should provide an opportunity for a dialogue between researchers and invited participants rather than a one-way dissemination.

Following the introductory talks, participants were divided into three groups. Each group was assigned one of the three scenarios and asked to consider its possible causes and consequences. Groups were encouraged to consider as many causes and consequences as possible, and to write these on 'post-it' notes where they could be seen by all members of the group. So that the groups could share their ideas, this discussion was followed by a 'carousel' activity, whereby each group moved to where the other groups' ideas were displayed and added any further ideas that they considered were missing. This allowed each group to contribute ideas to all three scenarios. Furthermore, it gave each group the opportunity to explore other groups' ideas and saved time by allowing each group to add more ideas without the need to start from scratch on each scenario. When they had considered all three scenarios in turn, each group returned to their initial scenario to sort all the causes and consequences into themes, before giving a short presentation explaining these themes to the other groups.

After a break for lunch, the groups were given instructions on how to create scenario maps by sorting the material gathered throughout the morning into logical sequences of causes and effects. Participants were asked to identify gaps in the logic of these sequences, to think about possible interactions of causes and consequences and possible unintended consequences, and to consider how various actors might respond. Each participant was able to present their own viewpoint by adding a new sequence to the map if their view was not consistent with those of the rest of the group. In this way the final maps incorporated all the participants' views, although not all participants necessarily agreed with all the views on each scenario map. Once the maps were complete, each group gave a short presentation on their scenario map to the other groups. The workshop closed with an overview of the day given by one of the participants (chair of ACRE), followed by an opportunity for informal chat over refreshments.

Immediately following the workshop, a short report was sent to all participants, briefly describing our initial observations from the scenario maps,

FIGURE 2.   *Picture representing the key UK issues for GM crops. Used in the workshop presentation.*

identifying common themes and providing brief observations on the process (see Oreszczyn, 2003: Appendix 8). We included a photo report of the workshop containing photographs of all the post-its and scenario maps completed by the participants. Subsequently a draft report was then produced by

the researchers and sent to the participants, together with copies of the scenario maps drawn on the day (see Oreszczyn, 2003: Appendix 8). Any further comments from the participants (there were several) could then be included in the final report. The following section provides details of some of the policy-relevant observations on the three scenario maps and on the process of creating them.

OBSERVATIONS ON THE SCENARIO MAPS

Despite the limited amount of time available for the scenario exercise, a rich variety of causes and consequences were identified and mapped by the workshop participants. An example of one of the maps as it was drawn by the participants for the scenario 'limited commercialization of GM crops goes ahead' is shown in Figure 3. The four boxes at the top of the map show broadly the theme, or category of issues, described below each box. The causes of the scenario were placed above the main central scenario box, leading into it, and the consequences of that scenario were placed below the box, flowing from it. The arrows signify 'leads to' or 'contributes to'. So, for example in Figure 3, the item 'new research opportunities for developing crop management' leads to 'further data for risk assessment', which in turn leads to 'experience in managing'.

Similar maps were produced for the other two scenarios. There was much commonality of issues across the three scenarios. This was evident from the themes that the three groups identified. Common themes included difficulties surrounding co-existence (of GM and non-GM crops) and public acceptance, effects of GM on agricultural strategies and practices, and public sector investment in research and development. The first two themes were prominent in policy discussions at the time, while the third was of particular concern to those participants who were employed in public sector research.

Some elements of the GM debate were striking by their absence from the scenario maps. For example, the debate about scientific uncertainty was missing – possibly a reflection of the predominantly science background of participants and their confidence in the scientific risk assessment of GM products. Also, although the Farm Scale Evaluations (FSEs) were mentioned in Scenario 3, little attention was given to their role in the policy decision about whether or not to allow commercialization to go ahead.[4] Given the importance that the government placed on the FSEs for providing evidence for a policy decision, this was surprising. It is possible that this was because that role was taken for granted. The precautionary principle was only mentioned in Scenario 3 and was not actively discussed by the workshop participants, supporting our interview finding that precaution was rarely raised without prompting in connection with GM crops (and justifying our decision not to make the concept of precaution central to the scenario titles). However, precaution is implicit in all the scenario maps in terms of the precautionary measures that might be triggered under certain circumstances. For example in Scenario 1, causes such as health scares and horizontal gene
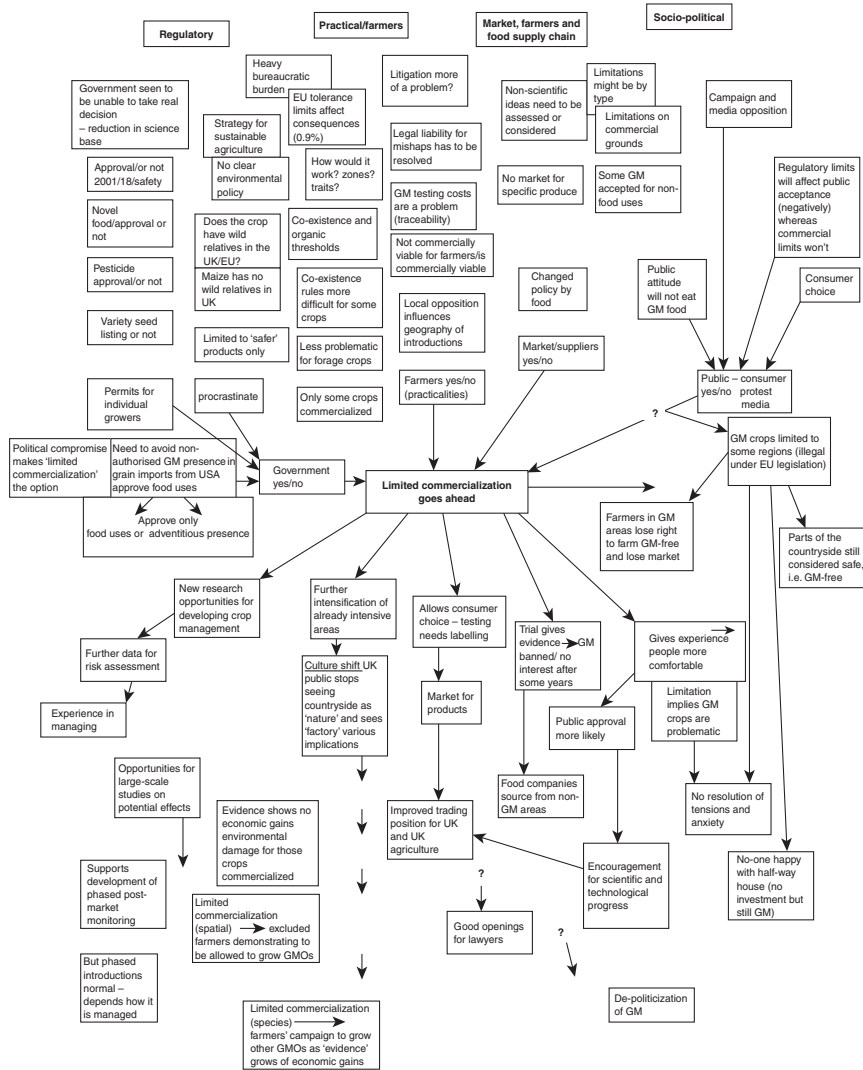
FIGURE 3.   *Scenario 2: Limited commercialization goes ahead.*

flow were considered likely to contribute to (precautionary) consequences such as revising the risk assessment and the postponement of commercialization, and, in Scenario 2, one line of causality suggests that limited commercialization would occur for 'safer' products only.

Scenario 2 ('Limited commercialization goes ahead') was difficult for participants; as a result, there were fewer links in this scenario map than in the other two. Initially the group spent much time discussing what the term 'limited' meant in this context, so ran out of time for their first task, that of identifying

the associated issues. Furthermore, the group divided their consequences early on into themes – for example, regulatory, commercial, farmer – but then became confused over how plausible causes might correspond to those themes. This group also spent time discussing how to structure the scenario map, because it was felt many of the issues could be described as both a cause and a consequence – for instance, public concern and co-existence measures. Despite these difficulties, this scenario generated some of the most interesting observations.

For example, discussions over the meaning of 'limited' raised important issues. Participants had different ideas about what 'limits' were plausible and how they might happen. There were discussions over what situation 'limited' was relevant to – for instance, whether it meant anything less than the commercialization of all the crops already approved. It was pointed out that 'limited' commercialization already exists, as GM grain is being used for animal feed, and that even Scenario 3, 'Commercialization goes ahead', would still have limits (for example, it would still be regulated).

Whereas the group working on Scenario 1 identified large numbers of consequences for their scenario ('Commercialization is postponed further'), the group working on Scenario 2 identified a larger number of causes than consequences. This may be because the Scenario 2 group devoted more time to discussing how a situation different from the existing one might occur. Ideas about potential causes of limited commercialization included government inability to take a decision; difficulties with legal liability or GM testing costs; no market for some products; problems with public acceptance; difficulties with co-existence for particular crops; changes in food policy; and differences in the commercial viability of particular crops. It was suggested that limited commercialization might be likely to occur because it is an attractive political compromise. It would provide an opportunity to accommodate all sides in the controversy. However, the discussion of consequences suggested that in practice this compromise might leave almost all the existing problems unresolved, while at the same time adding new ones. One person commented wryly that one consequence would be that environmental lawyers would benefit. Full details of all the workshop scenarios may be found in Oreszczyn (2003).

Discussion

GROUP WORK: IDENTIFYING CAUSES AND CONSEQUENCES

Most of the participants already knew each other, felt reasonably comfortable with the tasks set for them, and worked together well. In discussing causes and consequences, one group appointed a scribe to write down their views whereas, in the two other groups, individuals or sub-groups wrote down their own phrases. The group approach had the advantage of encouraging discussion and allowing the opportunity for clarification of the phrases. The individual approach had the advantage of allowing the expression of a greater diversity of views, some of which might not otherwise have surfaced if they were felt not to be shared by other members of the group.

The scenario title allocated to each group influenced the way the group functioned. For example, Scenario 1 ('Commercialization is further postponed') seemed to be easier for group members to consider than the other two scenarios, probably because it involved a continuation of the existing situation ('Business as usual'). Scenario 2 ('Limited commercialization goes ahead') was the most problematic for group members because of the ambiguity about the meaning of 'limited'. Nevertheless, the discussions as group members tried to resolve this difficulty gave important insights into the problems that might occur with this scenario in practice.

With the benefit of hindsight, we recognized that the discussions about the scenarios were as important as the points that were documented on the post-it notes and scenario maps. For example, often if there was disagreement about a cause or consequence, then the cause or consequence, and the points that arose during the discussion, were not noted down. Some members of the groups were more dominant than others, illustrating on a small scale the important role of power relations in determining whose views count, even when efforts are made to ensure that all views are heard. In some cases, they 'policed' the ideas that were recorded by removing post-its with ideas that they considered inaccurate or untrue. In other cases, they spent time attempting to correct the 'misperceptions' of other group members. Tape or video recording of discussions could provide a better record in future and could help capture some of the ideas than would otherwise be missed for reasons such as these.

GROUP WORK: SCENARIO MAPPING

In the scenario mapping exercise, participants tended to group causes and consequences of scenarios according to particular themes – for example, regulatory issues, marketing issues, social issues. The advantage was that grouping provided a convenient way for participants to organize their ideas. The main disadvantage, in terms of one of the purposes of the exercise, i.e. to encourage creative thinking, was that it restricted participants' attention to chains of causality within themes rather than encouraging them to look for interactions across themes. However, if more time had been available for the exercise, cross links could have been explored in a subsequent stage.

When attempting to impose a logical sequence on chains of causes and consequences, participants often assumed ideal situations in terms of institutional capacity to control or manage practices. For example, in Scenario 1, it was suggested that one consequence of further postponement of commercialization might be to force government funds away from biotechnology and towards agriculture, with the result that agriculture might then develop in 'a more sound direction'. Yet agriculture is not necessarily a priority for government spending and there is no consensus about the meaning of a 'sound' direction. Another example, from Scenario 3, was the tendency to invoke perfect regulation. The assumption that regulations operated perfectly made specific negative consequences of commercialization, such as health risks, 'impossible'.

Idealized representations of scientific research and economically rational businesses were also often invoked.

Some consequences were viewed as more certain to occur than others, leading some participants to suggest that consequences should be weighted according to their certainty. In other cases participants were unsure about which of two contrasting possibilities might occur – for example, more, or less, intensive agriculture; more, or less, sustainable practices. Although the combined expertise of the participants was considerable, many consequences lay beyond consensual predictions. Differences of opinion reflected not just the uncertainties associated with GM crops, but also differences in the values and interests of the workshop's participants. For example, Scenario 3 had a chain relating to investment in the UK science base that half-jokingly ends with the consequence 'I still have a job'. The scenario-mapping exercise had the advantage of allowing contrasting predictions about chains of consequences to be represented alongside one another on the same map, bringing into the open the diversity of views. It also revealed to us as researchers some of the 'taken-for-granted' assumptions, such as the assumption that GM crop management guidelines would be implemented as intended, so that harmful effects anticipated by critics would not occur. A follow-up exercise with a wider diversity of people might encourage participants to think in different ways or challenge their taken-for-granted assumptions.

ROLE OF FACILITATOR AND RESEARCHERS

The two facilitators deliberately adopted a 'back-seat' role except during the introduction and the explanation of the scenario-mapping exercise. Participants were deliberately given little direction during the discussions. This meant that they occasionally became bogged down or spent time attempting to correct other participants' 'misconceptions'. We took this to be a reflection of the way policy actors (or institutions) work out how to frame an issue, and how they can become blind to possible/plausible causes or outcomes of decisions, and how they view what, and whose, evidence counts. Our approach to facilitation had the advantage of allowing the workshop participants to interact freely with one another.

Similarly, the researchers took a 'back seat'. Although two researchers were allocated to each of the three groups, for the most part they did not take part in the discussions of issues and the mapping exercise unless asked. Instead they listened to the discussions and observed the interactions among the other participants. This had the advantage that the views expressed were those of the end-user participants. It had the possible disadvantage that opportunities for exchanges of views between researchers and end-users were missed. The informal social session after the workshop helped to address this.

IMPROVING THE LINK BETWEEN RESEARCH AND PRACTICE

As noted earlier, the intention was to use the workshop as a policy research tool to provide more directly policy-relevant evidence to inform our wider research on understandings of precaution in relation to GM crops. It was not

intended to point the way to a particular scenario, although several of the participants commented that they found the exercise useful for thinking about the way forward. The workshop enabled us to check any assumptions we were making and examine the assumptions of some of the policy actors involved in GM policy discussions at that time. Participants discussed and revealed their different views on what counts as a cause or effect for a particular scenario. They highlighted, and so acknowledged, the complexities of policy language, such as the meaning of uncertainty. They discussed what counts or does not count as evidence for such a controversial issue, and how scientific or economic evidence may resolve some issues but may also lead to further disagreements. Their scenario maps generated a large number of consequences for each scenario and highlighted the complex and interacting variables involved in any decision for GM crops. They indicated the difficulties involved in making any decision on commercialization work and illustrated that any of the scenarios might lead to more disagreement among the various policy actors. In this way the workshop demonstrated some of the complexity involved in making any policy decision about GM crops and provided policy-relevant insights to inform our wider research project.[5]

The workshop gave us an opportunity for improving interactions with policy actors. Through the background document circulated before the meeting and the introductory talk, we were able to draw to the attention of potential end-users the results of our documentary analysis and interviews, and our initial thinking on our research. The interaction among the workshop's participants presented opportunities for forming ongoing dialogues between the researchers and policy makers, as advocated by Solesbury (2003), rather than one-off and one-way dissemination from researchers to policy makers. For example, the interactive format of the workshop allowed immediate feedback on the research and informal discussion between researchers and end-users. The face-to-face contact established at the workshop made it easier for follow-up conversations by email and telephone. Some of the people who were involved in the workshop have since provided us with useful contacts for advice, and support for subsequent projects. Further, the scenario maps also had the potential to inform policy discussions on GM crops, especially as the workshop coincided with scenario work by the Prime Minister's Strategy Unit for the national debate on GM policy, and we were invited to exchange ideas about scenario analysis with those involved in that process.

In their work on conversational learning, Baker and colleagues (2002) comment on the way that conversations not only facilitate learning but can also generate new knowledge. In their view, conversations are social experiences though which people may discover new ways of seeing the world. The scenario exercise generated a space for such conversation, and therefore potentially a space for learning, both for researchers and for policy actors. The day involved many discussions: around the building of the scenario maps, during the lunch and tea breaks, in the final feedback session and afterwards in the informal

social session. Reflections on the day in a closing speech from the Chairman of ACRE, and feedback on the day and on the final workshop report from participants all contributed to a reflective process. The workshop also provided insights for us as researchers from the interactions of participants. For example, in their discussions, participants frequently referred to the need for 'trust' in relation to the decision-making process, thus confirming the shared significance of an issue that we had already identified as important in individual interviews. Another example was the tendency for some participants to think in terms of idealized situations when considering the future, so that they regarded some potential adverse consequences as impossible because they took for granted that regulations would prevent them.

For our end-user participants, it is less easy to gauge what they have gained from the experience. However, following the workshop several participants commented that they had found the day useful and stimulating. One participant particularly valued the exercise because the types of issues it raised reflect the host of uncertainties and issues that people are concerned about and that have to be taken into account by government policy makers. Another participant commented that the diagrams would be useful for identifying potential policy interventions and practices. It is difficult to demonstrate that a research intervention such as this actually stimulates the implementation of any particular policy or contributes directly to the policy-making process in the way that the concept of 'evidence-based' policy (or the linear model of decision making) suggests it should. Indeed, given all the effort that the government was expending at the time on gathering evidence from a huge variety of sources, it would be arrogant to think that our contribution would have an observable impact on policy decisions. Lyall et al. (2004) have noted the difficulty of evaluating end-user relevance, particularly where tacit knowledge is involved and where definitions of what counts as 'use' may be different or the use not directly obvious.

REFLECTING ON THE PROCESS

For this kind of more participatory research, reflection plays an important role in the process (McClintock, 1996). So time was built into the workshop schedule for a concluding discussion about what we had done and for reflection on the day's activities and outcomes. As Lyall et al. (2004) observe, research rarely provides definitive solutions for decision makers. A process of reflection and more general discussion therefore affords space for considering how the evidence being produced might be relevant to actual decisions.

The issue of the subjectivity and validity of the exercise, in particular, was raised in this discussion. Not all participants felt comfortable with the nature of the evidence we were gathering. Many workshop participants were from a scientific background and were concerned about the subjective nature of the scenario exercise. For example, there was concern that there was no way of testing the accuracy of the scenario-map statements. Berkhout and Hertin (2000) have noted that this is a common criticism of this type of exercise, particularly

from scientists who may not feel comfortable about using an inherently subjective framework. However, although scenarios are intended to be plausible, they are not designed to be verifiable, and this was explained to the participants.

Some participants also expressed concern about the open-ended character of the exercise. However, others responded that they felt this was one of its strengths, commenting that because in practice there is no clarity on many of the issues, the nature of the exercise allowed many voices to be heard rather than assuming that scientists speak with one voice. As mentioned earlier, one participant suggested that more rigour could be imposed by weighting the views according to the evidence available to support those views. For example, because there is wide scientific agreement that gene flow will occur, this view could carry more weight. Although there are tools and approaches that can be used to follow on with an activity that weighs variables in this way (see, for example, Schlange and Juttner, 1997), as we explained to the participants, there was not time within the workshop to do this on this occasion. Weighting might be a useful exercise for follow-up work. Given more time, participants might be asked to discuss the elements of scenario maps in more detail, to explore and identify what people take 'evidence' to mean and to draw out some of the similarities and differences. This would involve discussing not only the degrees of certainty/uncertainty attached to statements, but also whether statements are predominantly fact-based or value-based, and whether the person making a statement has expertise on that topic or is straying beyond their area of expertise.

Conclusion

The distance between researchers and policy makers and practitioners has been a persistent concern (Locock and Boaz, 2004). Researchers are increasingly under pressure to make their research relevant to the 'real' world and to ensure meaningful dissemination of their work. However, there remains a tendency for dissemination to be seen as the final stage of a research project (Barnes et al., 2003). Rarely do researchers attempt to engage participants in an interactive learning process at an early stage of a project. Although the use of stakeholder advisory boards or steering groups for research projects is increasingly promoted for this purpose by research councils, such approaches provide an opportunity for more active involvement of only a few key stakeholders or end-users. The experience from this workshop demonstrates how larger numbers and types of potential users might be more actively engaged in the research process, increasing the likelihood of producing relevant, grounded 'evidence'.

Despite its advantages, the difficulties of involvement/interaction-type research should not be underestimated. As Locock and Boaz (2004) note, 'one of the biggest challenges in promoting integration and partnerships is the skills and inclination gap'. This type of work requires facilitation and communication skills that are not necessarily well developed among researchers in the normal course of their work. While the engagement of policy actors in the

research process is invaluable for ensuring that research findings are relevant to policy and practice, it can present a challenge for researchers, particularly when they are attempting to attract senior professionals with little time to spare, or NGOs with limited resources. Designing the workshop to address current concerns is important for gaining the enthusiasm of the participants and for contributing to current policy thinking. However, as was the case with this workshop, there can be no guarantees about who will attend. As a result, each workshop has to be viewed as a 'unique' experience, which although not fully representative can still produce useful evidence. The use of professional facilitators, as in this case, can help ensure that interactive workshops run smoothly, that all voices are heard, and that the workshops meet the researchers' aims.

The scenario exercise highlights some of the difficulties faced by qualitative researchers in attempts to provide policy-relevant evidence for senior decision makers. The exercise revealed to the researchers some of the taken-for-granted assumptions of the participants. Researchers' recommendations either have to take these assumptions into account or decide to challenge them and risk being ignored. Further, criticisms over the unscientific nature of the scenario exercise, raised by some participants at the reflection stage of the workshop, highlighted the way policy makers want evidence that is more than subjective opinion. It is not always clear to them how qualitative research, such as the scenario-mapping exercise described here, can be taken into account in policy making. There is need for rigour in qualitative research to ensure it is taken seriously by policy makers and is viewed as equal in worth to scientific research. However, the lack of understanding of the nature of the evidence produced by qualitative research presents real challenges for qualitative researchers. Building in time for reflection by researchers with policy makers within the research process (as in the closing session of our workshop) offers one way of providing space for those doing the research to explore such issues with those potentially using the evidence produced.

Jensen and Lauritsen (2005) note that 'we need to explore more and better ways of connecting with the objects and subjects we are researching'. Many different approaches are required in order to bridge policy and research (Nutley, 2003). Collaborative methods are required that enable exploration of the research topic with others. Scenario workshops such as the one described here offer one way of involving policy makers within the research process, to do research *with* policy makers rather than doing research *on* policy makers. By engaging policy makers within the research process at an early stage, it allows us as researchers to explain more about the nature of the evidence we are gathering, and how it may be useful for policy. Such engagement allows knowledge derived from the thinking and interactions of the researchers and policy actors themselves to generate co-produced, grounded qualitative evidence for use by all participants. This interactive process may lead to stronger links between policy research and practice than the sequential process implied by the conventional model, whereby researchers produce evidence that then informs policy.

NOTES

1. In this article we take a broad view of the term 'policy actors', considering it to refer to all those engaged in contributing to the policy-making process.
2. The research was coordinated by the UK research team. Communication between the research partners involved meetings every six months for the duration of the two-year project, as well as continuous email communication.
3. Reports on all the workshops are available at: http://technology.open.ac.uk/cts/peg/index.htm
4. Subsequently the FSEs played a major part in the government's decision to allow limited commercialization of GM crops, i.e. Scenario 2.
5. Full details of the research findings are set out in project reports: for the UK, see Oreszczyn (2003), and for the EU, see Carr (2006) and Levidow et al. (2005).

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