Participatory planning for flood mitigation: models and approaches

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Introduction

This paper discusses a range of approaches, successful and otherwise, that have been developed to deal with different flood conditions, institutional arrangements and cultural practices. Examples are drawn from a developed world context in the UK, USA and Portugal, but with a particular focus on the UK. In all three countries there are organised institutional structures to plan for and manage floods and a range of approaches has been adopted. These are dependent upon local factors, both physical and, more importantly in the context of this chapter, human. The paper examines flood management decision making and the role of the flood defence engineer in the construction and alteration of floodplain landscapes, primarily through the provision of structural flood defences, and discusses how the engineer's vision can conflict with the values of some local residents. It draws on both quantitative and qualitative research with river engineers, floodplain residents and others involved in flood hazard mitigation (Fordham, 1992) and includes some of the findings from two major research projects: the Public Perception of Rivers and Flood Defence Project and the European Union-funded EUROflood Project. What unites these otherwise diverse cases is the preponderance of top-down, expert, masculine models of decision making that, while slowly changing, still find difficulty in relinquishing control and acknowledging different voices and values.

Planning for floods is a complex endeavour even when, as is often the case, the decision-making parameters are restricted to the scientific and technical dimensions. However, the reality is more complex than this and even the most technically competent proposals can fail to win the support of the communities at risk if other, social and cultural, dimensions have been excluded or included too late. In recent years the need for public consultation and participation has become more widely recognised and further stimulated through, for example, Local Agenda 21 initiatives. Yet, far from being consensus-building, these activities can be conflict-generating and can expose major disparities between those in professional decision making roles and the lay public about what constitutes both the problem and its solution.

The paper critically examines the dominance of top-down, scientific and technical modes of analysis in decision making structures for flood hazard mitigation. It explores the possibilities of incorporating more diverse and contextual knowledges — emphasising social and cultural, as well as scientific and technical, dimensions— and creating more democratic forms of decision making.

The structural bias in flood hazard management

Floodplain management is a multidimensional problem which has been ill-served in the past by a uni-dimensional, technical-engineering approach resulting in a bias towards structural 'solutions' to flood hazards. This approach has been based on an 'objectivist' (Cvetkovich and Earle, 1992) view of flood risk, which assumes there is an objectively measurable, 'true' level of risk, rather than a 'constructivist' view of risk which explicitly recognises that environmental hazards are social issues, involving subjective judgements about what is valued:

> *Risk is not an inherent quality of the physical world but represents an interaction between physical and psychosocial characteristics* (Cvetkovich and Earle, 1992: 6).

However, the concept of multiple adjustments to flooding is not new. Gilbert White (1945) discussed this concept in some detail over a half-century ago. Nevertheless, structural approaches generally became the norm in those countries that could afford them, and even some that, arguably, could not.

Many agencies with a responsibility for flood management have traditionally had a significant proportion of (male) engineers on their staff (as opposed to planners, for example) who have a bias towards the construction of physical structures to control and limit flood damage. This structural bias has meant that non-structural approaches (such as flood warning systems and land use planning) have fulfilled a secondary role, complementing physical structures or replacing them only when there is some overriding obstacle to their development. However, during the 1980s particularly, the increasing costs of structural solutions and, more particularly, the growing environmental concern at their impact, meant that the structural bias slowly began to be eroded.

> *This national commitment to the taming of rivers and coastal waters ranks among the foremost undertakings of mankind, equivalent to the pyramids of Egypt, the Great Wall of China, and the moon program. It is now in the process of joining them as past history* (Platt, 1986:29–31).

This was perhaps a rather optimistic assessment of the demise of physical flood programmes, even in the US, but certainly more non-structural measures came to be used and multi-functional approaches developed throughout the 1980s and 1990s.

Tulsa, Oklahoma

Tulsa, on the Arkansas River, has a long history of floods, which became increasingly frequent and damaging as floodplain development intensified. Flood control measures were piecemeal and reactive for many years and Tulsa is typical of many flood-prone areas locked into the damaging spiral of the 'levee effect', with floods occurring every two to four years throughout the 1960s and 1970s as billions of federal dollars were spent in structural flood control projects to protect and, ironically, encourage the increasing development of the floodplain (Patton 1993). In the 1980s Tulsa experienced more Federal disaster declarations for flooding than any other community in America (FEMA 1998).

Policies were geared towards re-establishment of the *status quo* and the 'system' worked against proactive initiatives to mitigate damage. Government funding supported rebuilding *in situ* and locked people into a cycle of repetitive flooding. Local people petitioned and lobbied over many years and eventually were successful in stimulating an official response which incorporated a multi-functional approach. This approach included *inter alia* acquisition and relocation of high-risk floodplain properties and a change of land use to less damaging recreational purposes (City of

Tulsa 1994). The aesthetic, ecological and recreational properties of river environments were incorporated into future planning in addition to the more usual hydrological aspects. Tulsa is one of 50 US communities to become Project Impact Disaster Resistant Communities: this is a community-based, partnership effort initiated by the US Federal Emergency Management Agency (FEMA) to help individuals, businesses and communities reduce their risks and future disaster costs (FEMA 1998). Tulsa is an early example of this kind of broader approach to floodplain management which goes beyond the structural to incorporate non-structural approaches, environmental enhancement, and community-government partnerships.

One of the major stimuli for changing flood planning practices has been the increasingly hostile reaction of the public to large scale, 'hard' engineering structures (straightened, deepened, concrete-lined river channels etc.) in what are often scenic and valued environments. This has been generally (but not exclusively) on aesthetic rather than (scientific) ecological grounds: the general public often having a somewhat limited knowledge of ecological principles but a strongly held sympathy for the conditions of wildlife; and a strong landscape sensibility.

The next stage in this developmental process was the emergence of river restoration projects (Holmes and Nielsen 1998; Vivash et al 1998; Tunstall et al 1997; RRP 1993, 1994) which seek to return river environments to their pre-disturbance state. Their overall strategy to 're-naturalise' previously over-engineered rivers is dependent upon an ecologically sensitive rationale and a stated aim of public participation and partnership. Nevertheless they are still primarily engineering projects.

Although the provision of flood defences to populations at risk of flooding is the responsibility of both statutory agencies and individual riparian owners, individual responsibility is less significant in the UK context because of the considerable scale and financial cost of flood protection, and its conceptualization as a public good (it is difficult to provide major defences, such as flood relief channels and embankments, for one person without also benefiting or impacting upon others). Such flood defence projects are widely perceived to be 'for the public good' and thus would appear to be uncontentious. However, this is not always the case and conflict between flood engineer and floodplain resident can (and frequently does) arise (Fordham, 1993). The reasons for conflict are various but include, often fundamental, differences in what river landscapes and environments symbolise and in the way environmental decision making is organised institutionally.

River landscapes

River landscapes have different meanings for different groups of people. For many people who have chosen to live by rivers, river landscapes have strong symbolic meanings. In the suburban context they often mark the separation of the working, or outside, environment from that of the home: they can represent a ribbon of rustic escape, the repository of a pastoral aesthetic and the last bastion of unchanging values. It is less often the case now in the industrialised North, that people living by rivers also gain their livelihood from them. Few river engineers live close to rivers because this would be deemed an irrational act due to the flood risk they present. For many engineers the river is their place of work; a flood control mechanism and the raw material of the engineering craft: synonymous with, and dependent upon, change, development and control. Cosgrove has argued (1990) that control of the river goes beyond curbing the negative effects of free-flowing rivers on homes and livelihoods: water represents power—machine power (mills and turbines) and political power (the so-called hydraulic civilisations are the most obvious example).

Many riverside dwellers minimise the separation between home and river and view the river as an extension of their property and so the construction of floodbanks and floodwalls between them and the river represents a direct assault (Fordham, 1992); firstly, on what is perceived as their most valuable asset, their home, and, secondly, on their aesthetic sensibilities. It is easy to underestimate the effect that environmental schemes—whether for urban renewal or flood defence—can have on some people. The affect can be similar to bereavement:

> *'We never thought in our lifetime that we'd be able to afford something like this, with that view and of course then we lost it . . . The thing is, it's gone forever. That view is never ever going to come back and it's gone.'* [Riverside resident, southern England].

This transcript extract, from an interviewee whose previously uninterrupted view of the river had been interrupted by a three metre high flood embankment, cannot convey the intonation and facial expression which would better support the comparison with bereavement. Links can be made to research examining the attitudes of former inhabitants of an American urban renewal scheme in Boston (Marris 1974) where the description has been found to be apt for some strongly affected floodplain residents:

> *For the majority it seems quite precise to speak of their reactions as expressions of grief. These are manifest in the feelings of painful loss, the continued longing, the general depressive tone, frequent symptoms of psychological or social or somatic distress, the active work required in adapting to the altered situation, the sense of helplessness, the occasional expressions of both direct and displaced anger, and the tendencies to idealise the lost place*. (Marris 1974:43).

The Thames Perception and Attitude Survey

In the Thames Perception and Attitude Survey (Tunstall and Fordham 1994), which examined attitudes to flood defence and the environment in the River Thames floodplain, strong attachments to place were demonstrated. The findings showed the importance of proximity to the river in affecting responses to flood risk. Interviewees expressed their preparedness to live with range of flood risks *(see Figure 1 and Table 1)*, from a 1:200 risk to a 1:5 risk. Those that lived closest to the river ('riverside' dwellers) were consistently more likely to accept the risk because of the environmental advantages that the river afforded them. For many of these interviewees, they had chosen to live there because they loved the river: they had made a trade-off between risk and environment (Fordham 1993, Fordham et al 1991).

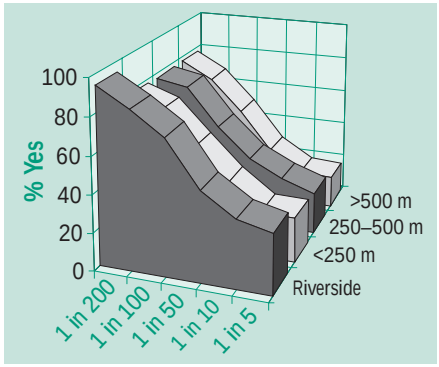

Figure 1: Preparedness to live with various flood risks

There is, of course, great spatial and experiential differentiation (between those flooded and those not; those who live close to the river and those who do not; those who have chosen to live by a river and those who have not; those who live in scenic river environments and those who live in degraded river environments; those for whom the river represents beauty and asset, and those for whom it represents risk and

'Would you be prepared to live in this same area if the risk of flooding were as follows:	
1	a 1 in 200 risk, each and every year, that your house would be flooded;
2	a 1 in 100 risk, each and every year, that your house would be flooded;
3	a 1 in 50 risk, each and every year, that your house would be flooded;
4	a 1 in 25 risk, each and every year, that your house would be flooded;
5	a 1 in 10 risk, each and every year, that your house would be flooded;
6	a 1 in 5 risk, each and every year, that your house would be flooded?"

	% Agreeing					
	1:200	*1:100*	*1:50*	*1:25*	*1:10*	*1:5*
Riverside	94	84	72	48	36	32
<250 *metres*	78	72	54	37	24	24
250–500 *metres*	77	74	53	37	28	22
>500 *metres*	77	68	50	29	18	17

Table 1: Preparedness to live with varying levels of flood risk (n = 494) (Tunstall and Fordham, 1994)

threat) that can create major divisions in communities. The differences can be complex but even those who have been seriously flooded can be opposed to flood defences which may be unacceptable on aesthetic grounds:

'You must be careful about engineers, they don't care about the look of a thing.'

These are the words of a woman on the south coast of England who had recently experienced flooding in which several tons of gravel and sea water had broken through the windows of her home (Fordham 1991b). She still objected to proposals for flood defences, comprising a gravel embankment, which would block her view of the sea. This was generally regarded as an irrational and even selfish position by some of the proposing engineers. Other examples of risk-environment trade-offs can be seen in both the US and, perhaps surprisingly, Bangladesh.

Big Thompson Canyon

Something of the tension between local residents and officials with decision making power is apparent in Colorado where a flash flood in 1976 killed 146 people (although seven bodies were never found) in the Big Thompson Canyon (Gruntfest 1977; 1987). This is one of the most scenic areas in the Rocky Mountain region. Some of its residents have also made a risk-environment trade-off; trading the risk of flash flood (although the level of risk of the 1976 event has been put as high as 1:10,000 (Gruntfest 1997)) against the considerable beauty of the location. But for local people there are many factors which keep them there which may not easily be quantified or rationalised. Therefore, it can seem perverse to professional emergency managers that they continue to put themselves and, some would argue, others at risk (two emergency responders also died during the flood disaster) through their continued presence in the canyon. The residents' own voices were heard at the Symposium held in 1996 to discuss what had been learned in the intervening 20 years (Gruntfest 1997) but, interestingly, they had not been on the original list of invited participants (Wamsley 1996 pers. comm.). While this oversight was redressed, it is indicative of the way 'experts' can assume their own appropriateness in making decisions for absent others.

The Big Thompson example is also notable for the subsequent emphasis on a simple but effective non-structural response. As you travel along the canyon you are faced with several road signs warning you to climb to safety in case of a flash flood (*Figure 2*). it remains a problem to get people to abandon their cars in times of flash floods and accept that they are 'better wet than dead' (Gruntfest 1997).

Figure 2: A simple but effective warning for flash floods in Colorado

Bangladesh

Even in Bangladesh, a country hugely vulnerable to floods, attitudes to floods and flood-prone areas are not as simple as some experts and 'outsiders' often believe. Research among the char-dwellers of Bangladesh (Schmuck-Widmann 1996; 1998 pers. comm.) has shown the strong sense of place (Relph, 1976) that (among other things) binds people to hazardous environments. Chars are river islands created, and often destroyed again, by silt transport. The chars may be washed away in a year or may last for decades. They clearly represent a high level of risk to their resident population who are acutely vulnerable and yet these islands are not entirely defined by the risk they represent:

'On the chars we are free as birds. Sometimes we live here, sometimes there. We are not bound to one place like the 'mainlanders'. On the mainland we would feel like in a cage.' (Schmuck-Widmann 1996: 68).

Even during the major floods to hit Bangladesh in the summer of 1998, risk and environmental benefit were seen to be in some kind of balance:

'An old man standing up to the neck in the floods said indeed it was a tough time, "but despite [this] I love to live here on the chars in the middle of this river, because here I get peace"' (Schmuck-Widmann 1998, pers. comm.)

It is important to approach flood planning from diverse perspectives in which local knowledge and preferences have equal weight to those of visiting experts.

The river engineer

There has been a shift in attitude and practice in recent years among engineers working in river and coastal management, from the former, dominant paradigm of working to control nature, to the more recent model that espouses working with nature. There is evidence, however, from the research discussed here, that many engineers have not complied willingly with this change; that rather than jumping freely into this new environment they have had to be pushed into it by public opposition and subsequent legislation. Some engineers would challenge the view that they have been forced into adopting these changes (Fordham 1992):

'Most of us tend to be drawn towards countryside and nature and that sort of thing. So I don't really think there is a great conflict. Nowadays I think people tend to want conservation, things that look nice, and that is what they're given but I think that the general attitude of engineers is that that is what we should be providing anyway … because this is why most of us tend to come towards this sort of job.' [River engineer].

'Where we can do things to enhance, we do. You know, we're not forced into it, we do it quite happily.' [River engineer].

However, the perceptions and attitudes of engineers have been found to have the characteristics of a closed system (Sewell

Rungs on the ladder of citizen participation	Nature of involvement	Degree of power sharing
8 Citizen control		}
7 Delegated power	*Citizens are given management power for selected or all parts of programmes*	} degrees of } citizen } power
6 Partnership	*Trade-offs are negotiated*	}
5 Placation	*Advice is received from citizens but not acted upon*	} } degrees of
4 Consultation	*Citizens are heard but not necessarily heeded*	} tokenism }
3 Informing	*Citizens' rights and options are identified*	} }
2 Therapy	*Powerholders educate or cure citizens*	} } non-participatory
1 Manipulation	*Rubber-stamp committees*	}

Table 2: Arnstein's 'Ladder of Citizen Participation' (source: Arnstein, 1969).

1974): their attitudes appear strongly conditioned by training, and to be closely allied to the standards and practices of their profession. They believe themselves to be highly qualified to do their job and to be acting in the public interest (Sewell 1974:120, Fordham 1992). Sewell concluded that 'experts are not in favour of institutional change, especially if it means that their own role will be altered' (1974:129). This is characteristic of social systems generally and can be conceptualised as a state of `dynamic conservatism' or a tendency to fight to remain the same (Schon, 1971). In the case of institutional structures for flood defence, environmental factors have already forced a degree of institutional change to accommodate them (i.e. in the provision of conservation and landscape officer posts and the imperatives of environmental legislation). In recent years the need for public consultation and participation has become more widely recognised and further stimulated through Earth Summit and Local Agenda 21 initiatives.

Consultation or participation?

Increasingly it is considered necessary to involve the public in the decision-making process in order to attempt to achieve consensus on what can be controversial issues. The 1992 United Nations Conference on Environment and Development (UNCED)—*The Earth Summit*—also made a major focus on public participation in environmental issues. The subsequent documentation, *The Rio Declaration and Agenda 21: Programme of Action for Sustainable Development*, encouraged the development of local level, popular participatory techniques (UNEP 1993).

The European Community Directive 85/337/EEC made public participation a legal requirement in European member states. There is, however, some discretion in interpretation and implementation. In the UK this directive was implemented in 1988 through Statutory Instrument 1217 (in respect of proposals for land drainage improvement works). This requires an environmental statement to be produced for projects likely to have a significant effect on the environment. The agency proposing to carry out works must decide whether the proposed works are significant and to announce in the local press either that they propose not to produce such a statement or that they have produced one. If the latter, copies must be produced for interested parties. The public involvement in this process tends to be at the end stage—consultation after production of the statement or assessment—and not necessarily in a pro-active way at the early stages of decision-making.

The full integration of participatory opportunities and techniques in public decision making is likely to take some time to become a widespread reality due, in large part, to inherent secrecy within institutions. Many public participation efforts have been limited to top-down consultation (Fordham et al, 1990) whereby a chosen option is promoted to the public who have little opportunity but to accept or reject. This can lead to an unacceptable polarisation of views (Fordham, 1992).

The terms 'participation' and 'consultation' are frequently used interchangeably but they are in fact discrete. Participation invariably implies consultation at some stage but the converse is not necessarily the case. Consultation can occur without any real participation in the decision-making process: views can be sought but disregarded. Involvement through consultation may not effectively influence the outcome. Resource managers rarely have the communication or group problem solving skills necessary for effective participation (Sewell and O'Riordan, 1976:19-20). National Rivers Authority (now Environment Agency) engineers interviewed in the early 1990s (Fordham, 1992) reported a major growth in consultative aspects of their work and a lack of any formal training at any point in their engineering career

A classic analysis of participation is presented in the form of Sherry Arnstein's 'Ladder of Citizen Participation' (Arnstein, 1969). The eight rungs of the ladder *(see Table 2)* represent varying levels of citizen control. According to this typology, consultation can be mere tokenism which simply reinforces the *status quo* and provides a means for informed consent rather than an expansion of democratic choice (Nelkin, 1984:36). Just how far up the ladder it is possible to go, and how far any decision-maker would want to go (given the largely voluntary nature of much consultation in the area of flood management) is debatable.

Whom to involve

Differences in perception between professionals in various fields and the public have been recognised for some time (White, 1966a, 1966b; Craik, 1970; Sewell, 1971, 1974; Sewell and Little, 1973; Cotgrove, 1982). Early work by Sewell (1974) provides an introductory framework of some of the key issues. He notes the reliance on expert opinion (notably engineers among others) in decisions relating to environmental quality which, he suggests, results from the complexity of the problems involved, from the uncertainty of individual decision-makers in the adequacy of their judgements and also partly from the promotional abilities of the professionals themselves.

A consequence of this has been the development of a technical elite which has assumed responsibility for the identification of problems and their solutions and whose advisory role has been institutionalised within administrative structures. A further consequence has been 'the alienation of the public in the policy-making process' (1974:111). Engineers, for example, not only define the problem to be solved, they also determine the options for a solution and frequently select the strategy to be adopted. This process inevitably gives expression to their views of what society wants (1974:112) or needs.

Sewell found scepticism on the part of professionals (particularly in the sciences) about the involvement of the public in

policy making because the latter were perceived as not sufficiently well informed and liable to produce a profusion of opinions which would make policy making impossible. However, while the presentation to the public of a few discrete alternatives has the advantage of simplifying the process of choice, unless the values of the public—rather than those of the professionals—are reflected in the alternatives, they may all be rejected (1974:129).

> *When practical decisions are needed open debate can rapidly yield place to authoritarian rule. In this respect the link between water management and power remains unbroken.* (Cosgrove, 1990:11).

The dominant masculine engineering values and culture favour the rational over the emotional and can lead to the exclusion of subordinated groups and values. Even the language used in science and engineering is indicative of this androcentric dominance: masculine/objective, feminine/subjective; masculine science is 'hard' science while feminine knowledge is subjective and 'soft' (Keller 1985). Feminist sciences and epistemologies attempt to transform partial, distorted, androcentric, mainstream representations, theories and practices (Harding 1990) but to date there has been minimal impact on the engineering culture. What is sought here is not necessarily a replacement of a masculine science and practice with a feminine paradigm but to acknowledge the legitimacy of alternative discourses:

> *Feminist inquiry can aim to produce less partial and perverse representations without having to assert the absolute, complete, universal, or eternal adequacy of these representations.* Harding 1990: 100).

Identities are contradictory, partial and strategic (Haraway 1990:197) and this becomes apparent in environmental disputes, of which flood defence scheme proposals are one. The selection of who 'gets to sit round the table' and make their voice heard is a strategic decision.

While it is accepted practice (and often a statutory duty) for agencies to consult official government bodies and selected groups, it is perceived to be more difficult to deal with a diffuse and heterogeneous public. Professionals prefer to deal with representatives unless members of the public involved are very few in number. This was the model adopted for the earliest stages of the Maidenhead scheme which subsequently proved problematic. Although, in order to achieve the best possible (at the time) environmental option, the Thames Region of the National Rivers Authority (NRA, now EA) had moved forward considerably in terms of a more inclusive and wide-ranging decision making process (see Gardiner 1988), the public opposed its plans to route the flood relief channel across an area selected as suitable by the 'experts' and not officially designated as of great wildlife importance (Tunstall, Fordham and Glen 1994; Fordham et al 1990). While 'officially' un-designated, the area was valued nevertheless by local people. These findings showed up in social surveys carried out after the formal consultation period in which local people's views had been presumed to have been canvassed through representatives. Those interviewed in surveys have expressed a preference for consultation with both the general public *and* their representatives *(*see *Figure 3* and *Table 3)* in order to ensure their own voices are heard.

When to involve the public

Evidence supports the view that participation should occur early within the decision-making process, before major choices have been made and options foreclosed (Kasperson 1986:276; Bruton 1980:440). However, many arguments against early participation have also been advanced; such as that information collection (possibly of a technical or scientific nature) may not yet be complete and the opportunity exists therefore for confusion when further assessment is carried out at a later date; that there is likely to be a profusion of interested and possibly competing parties requiring information; and that early consultation can increase the opportunities for opposition (McNab 1997; Kasperson 1986:277). However, once the problem area is defined, inertia on the part of decision-makers can make a fundamental re-examination of policy issues extremely difficult and costly: technical and policy issues are rarely clearly delineated (Krimsky, 1984: 50).

A series of social surveys (Tunstall, Tapsell and Fordham 1994; Tunstall and Fordham, 1994) carried out between 1987 and 1993 in several areas of England for the National Rivers Authority as part of the Public Perception of Rivers and Flood Defence Project, asked floodplain residents for their views on public consultation processes. The findings showed a strong preference for early consultation, either before the Authority/Agency starts studying and choosing options or at the stage when several options have been selected for them to choose between *(*see *Figure 4* and *Table 4).*

This preference of the public was at odds with the usual timing of consultation where river engineers favoured consultation at the preferred option stage or when they had selected several preferred options for the public to choose between. A major flood defence scheme for the Maidenhead area in southeast England, which involves the construction of a flood relief channel (a second 'River Thames'), met with early controversy through its decision to consult at the later stage when a preferred option had been selected (Fordham et al 1990).

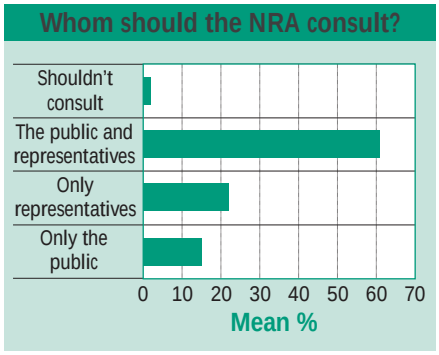

Figure 3: Whom should the NRA consult?

'In your view, should the National Rivers Authority …	
1 only consult the general public directly?	
2 only consult through representatives such as parish councils, residents' committees, wildlife and amenity groups etc.?	
3 consult both the public directly and through representatives?	
4 Shouldn't consult?'*	
** These questions varied slightly between surveys and areas. In all, over 1800 interviews were carried out.*	
	Mean %
1 Only the public	15
2 Only representatives	22
3 The public and representatives	61
4 Shouldn't consult	2

Table 3: Whom to consult (Source: Tunstall, Tapsell and Fordham 1994; Tunstall and Fordham 1994)

The NRA/EA has since learned from these public relations failures and now opts for a somewhat different model. It began, when it was still the NRA, with Catchment Management Plans (Gardiner 1992) which examined the whole catchment area rather than focusing on a project-by-project approach and used wide-ranging consultative exercises. It now develops Local Environment Agency Plans (e.g. EA 1997) which again take a catchment-based approach but also propose an integrated plan of action, combining flood defence with water resources, pollution control and development issues. This again places emphasis on early and wide consultation with the public and even devolves organisational control of many meetings to local groups. Thus a wider public can have access to the decision making arena. There remains a danger however that subsequent,

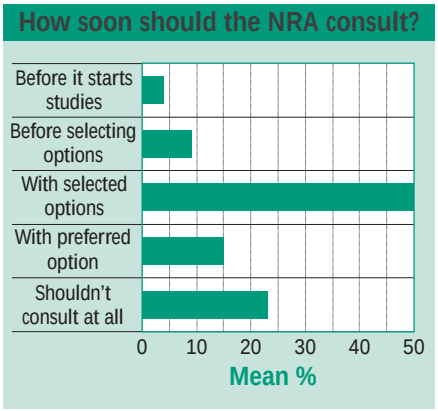

Figure 4: How soon should the NRA consult?

'If the National Rivers Authority were to propose a flood-relief scheme for this area, how soon do you think it should consult the public? Should it consult them …

1. Before it starts studying the flood problem?
2. Before it selects any options for the design or route?
3. When it has selected a number of possible options for the public to choose between them?
4. When it has chosen a preferred option for the design or route for the public to comment on?
5. The NRA should not consult at all but should go ahead with whatever it thinks best."*

** These questions varied slightly between surveys and areas. In all, over 1800 interviews were carried out.*

		Mean %
1	Before it starts studies	23
2	Before selecting options	15
3	With selected options	50
4	With preferred option	9
5	Shouldn't consult at all	4

Table 4: When to consult the public (Tunstall, Tapsell and Fordham 1994; Tunstall and Fordham 1994)

individual, flood defence schemes may not adhere to such 'open' forms of management.

Techniques used in public consultation exercises

Professionals involved in flood planning and management employ a range of techniques but typically favour a limited number, such as public meetings with slide and video displays, and written information or newsletters. These clearly favour one-way communication—from the expert to the public—and leave the professionals largely in control (although public meetings can, of course, be highly adversarial and threatening to those 'at the front').

The Portuguese case study for the European Union-funded 'EUROflood Project' (Correia et al 1996) was focused on the town of Setubal in the metropolitan area of Lisbon. This is a town with 90,000 inhabitants, located 35 km south of Lisbon, in the estuary of the River Sado. It is under considerable development pressure and was one of the most seriously affected areas during severe floods in 1967 and 1983.

The main focus of this particular element in the EUROflood Project was to design a Geographical Information System (GIS) for Setubal (Correia et al 1996) with an emphasis on its use as a public information tool. Thus, a GIS was proposed which would allow, *inter alia*, the involvement of the public in the different stages of the planning process of risk alleviation; the simulation of different scenarios such as different flood levels; the opportunity of seeing and understanding some of the technical aspects of the flood problem; and the possibility of active participation in the decision process, in a user-friendly environment, using innovative methods such as multi-media and the incorporation of oral histories etc. Thus, a large database could be constructed incorporating anecdotal, qualitative material as well as the more usual quantitative and 'scientific' data.

The use of a GIS was seen to be an advance in flood hazard communications strategies, particularly in a country without a culture of public participation in such decision making areas. The graphical display properties of a GIS were regarded as a positive element in the conveyance of complex human-environment interactions. However (perhaps somewhat typically) the technical aspects of data gathering and inputting absorbed the available resources and this final stage of public involvement was not completed.

While this was an innovative development in flood hazard information management, it remains one modelled largely on Irwin's (1995) 'deficit model' i.e. providing the public with (technical) information which they lack and have difficulty in understanding or accessing. The extent to which it could be used more proactively by the public remains untested.

Conclusion

It has been argued (Sewell and O'Riordan, 1976) that the ultimate aim of participation is 'community participatory design', through an integration of the latent planning potential of the public and the expertise of the elite; this being most possible at the small scale, community level where interest is high. A contributory aim in flood hazard mitigation is often the achievement of consensus; a notion based on social homogeneity. However, inevitably, distributional consequences occur, with costs and benefits being unevenly distributed (Lowe and Goyder, 1983:98–105); and, in non-homogeneous communities, increased participation is likely to highlight differences and increase conflict. Therefore, it is important to examine whether a condition for consensus exists: if so, participation may further its realisation; if not, (if a condition of diversity exists) then participation is likely to contribute little to conflict resolution and may increase conflict by creating conditions for confrontation and polarisation (Wengert 1976:27). This would make imperative the setting up of parallel agencies, departments, or processes for conflict resolution in, the more usual, heterogeneous social configurations.

But the perceived need for, and form of, consultation and participation can be different depending on whether one is communicating (official/engineer) or receiving (floodplain resident) information. A differentiation can be made between the public official's perception of the role of public participation—as a means to accomplish ends (characterised by such goals as: correcting misperception; educating the public; reducing conflict; easing implementation; and increasing legitimacy)—and the public's approach to public participation which tends to concentrate on ends rather than means and is characterised by conflicts over fundamental ethical issues such as: appropriate or tolerable levels of risk; who is to decide such levels; and, in terms of scheme or project development, whether it should go ahead at all; and for the benefit of whom? (Kasperson, 1986).

Despite recent developments in floodplain management which favour a broader agenda and more inclusive consultative policy, decision making is still dominated by an androcentric engineering culture which privileges a top-down, technocentric approach, a relationship to the public based on a 'deficit model', and a focus on the means to accomplish ends. Although the importance of ecological principles in river works is now generally acknowledged, these are founded upon a scientific/technical/rational discourse to which a more emotional ('feminine') sensibility is subordinated. Thus concerns about 'ordinary' landscapes and the 'look' of flood defence schemes can be relegated to the lowest level of priority and consideration. Engineers and planners can underestimate the importance of residents' attachment to their local areas and how it comprises a vital component of their social identity. 'A threat to their physical environment thus becomes a threat to the self.' (Hillier 1997: 19).

Alternative approaches, such as those informed by qualitative methodology and feminist theory for example, offer the possibility of a more inclusive form of

decision making in which no dimensions are barred from consideration, and in which reflexive and democratic processes are uppermost. 'Traditional forms of planning decision-making have tended to convey a message of place as identified and controlled by outsiders (the planners).' (Hillier 1997: 19) but sustainable environmental management, of which flood planning and management is a part, must include full integration of insiders' and outsiders' views. Andrew Maskrey has argued this case albeit largely within a 'Third World' context but it is a model which can be transposed to, so-called, 'developed' world initiatives:

The participation of people in the analysis of problems and the development of proposals is a vital characteristic of community based mitigation. The starting point is always the specific problems a community faces and people's perceptions of how to solve them. Proposals must be developed gradually, step-by-step. While this is a long process, in which each element has to be discussed and approved laboriously in meetings, it avoids the difficulties which can arise when proposals are generated outside, do not coincide with local needs and demands and overlook conflicting interests and objectives within the community. The long process of achieving consensus is worthwhile as it results in better proposals and a stronger community organisation (Maskrey 1989: 94).

The incorporation of such, seemingly, radical models and approaches into traditional engineering practice may appear utopian to some but a more achievable target is to ensure flood hazard mitigation is far more multi-disciplinary and end the separation of the technical and socio-cultural dimensions. There are signs that this process is beginning in some places but it is, as yet, at the earliest stage of transformation.

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