

## **Institutional and social responses to flooding – in search of resilience**

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### **Introduction**

Flooding is a natural and variable process arising out of a complex interplay in time, location and space of climatic variability, soil and vegetation cover, landform and land shaping processes. The pattern of human settlement in a landscape, whether village, town or city has altered the resilience of natural systems to cope with variability and in doing so it has transformed and substituted alternative, less organic systems. Anthropocentric acts of intervention and engineered transformation undertaken for the sake of perceived benefits have created new consequences that have given rise to new technological and social risks (Beck, 1992). Flooding is presented as a problem because it imposes chaos and disorder on society and the constituents of everyday life that contribute to well-being. Advances that have given rise to perceived improvements to our way of life have at the same time increased our vulnerability to the impact of natural

systems. Development and spread of the urban landscape has given rise to new causes of flooding that magnify the adverse societal impacts. The belief in technological solutions as the way to manage and tame an unruly nature can be traced back to the Victorian era and the rise of municipalisation (Hunt, 2004) in which social welfare was to be guaranteed by engineering works. The flood management has until recently emphasised investment and trust in constructed solutions that rely on structural robustness.

This attitude has been changing, brought about by a number of factors including the apparent failure of hard engineering to prevent or at least contain catastrophic flooding events. At the same time there has been a shift in public attitudes towards flood risks, no longer are they seen as acts of providence for which government has only a minor responsibility. More and more flooding is seen as the responsibility of government to do something about. More and more communities that are at risk are demanding that they be protected. Meeting such expectations and demands while in theory would be technically feasible is in practice impossible given the financial resources that would be required. As a result other approaches are being actively explored that accepts and lives with floods (Defra, 2005) and seeks to place an emphasis on building resilience amongst stakeholders as a coping strategy.

The concept of resilience in an ecological context was defined by Hollings (1973) as the amount of disturbance an ecosystem could withstand without changing self-organized processes and structures. Communities, their organisation, their institutions and their water form part of the ecosystem in which we live and it is rational to examine flooding in this context; particularly as we aim towards more sustainable development. Resilience, like sustainability is a broad concept, open to a range of interpretations (Gunderson, 2000) but provides an apposite metaphor for examining the web of interrelationships between the natural, social, technical and political spheres which we inhabit.

This paper is based on observations of institutional and social responses to a series of flooding events that have taken place within the City of Bradford Metropolitan District Council's (CBMDC) area of jurisdiction in West Yorkshire in the north of England. In the following section of the paper the background to the series of flooding events that occurred is given along with the institutional responses to those events. In order to try to understand the particular form of the institutional responses, which included a community based initiative, a series of semi-structured, open-ended interviews were carried out with those personally involved. The results of the interviews are reported on. In the discussion section the outcomes of the interviews are examined in order to draw out the lessons that

might be learnt from the effectiveness of the institutional and social initiatives that were adopted. Arising out of the interviews two key cross-cutting issues were found to predominate. These were: the ephemeral nature of community engagement as a societal response and; the problematic relationship between central and local government and democratic governance. Whilst certain tentative conclusions may be drawn caution needs to be exercised against an over-enthusiastic view that societal processes alone can lead to better flood risk management, if this obscures the role of natural processes.

### **Flooding in Bradford**

Two major rivers flow through the Bradford area, the Rivers Aire and Wharfe. Given the district's industrial heritage watercourses have traditionally been utilised as a source of power for factories. As a result settlement associated with the industries have grown up along and around the rivers. Flood Risk maps show some 3,476 properties as potentially at risk from flooding within the boundaries of CBMDC. Over time flooding has been experienced in one form or another all over the district. In 2000 widespread flooding occurred throughout Britain and affected the CBMDC area. These were the worst floods in Yorkshire for over 50 years, some 350 properties were flooded and over 400 people were affected, the second largest area in the country outside of York. In 2003 over a four week period between July and August, localised storms over the CBMDC area caused flooding to land and property on three separate occasions. And again in 2004 widespread flooding resulting from heavy rainfalls and saturated ground conditions caused more flooding. Over 100 years of development within the area has disrupted the natural drainage system, blocking and removing drainage channels in ignorance or disregard of their contribution to the drainage of the area, and the flows that they were required to carry. In common with many urban areas, impermeable areas have increased due to the paving of gardens and infill developments.

Between 1999 and 2004 in excess of 600 complaints of cellar flooding were received by Environmental Health section of the Council. The intensity of the climatic events, the run-off that backed up in urban areas and the overflowing of river banks together with the seemingly regular recurrence of flooding combined to give the impression that something was going on and needed to be responded to.

The scale of the potential problem, the risks and the costs anticipated to impact on Bradford are shown in Table 1 (Bradford, 2005).

**Table 1: Estimated current risks from flooding in Bradford area**

Main rivers and broader catchment causes		Intra-urban watercourses, local flooding and sewerage (once in 10 years)	
No of people at risk	Annualised costs	No of people at risk	Annualised costs
13,500	£7.6 million	2,000	£2.1 million

### **Institutional Response**

Over time the State has over time taken on responsibility for the management and mitigation of flood risk. This has given rise to a complex set of governance arrangements dispersed across multiple layers of the State and beyond. A number of recent reports have sought to try to set out and define the roles, responsibilities and interactions of the various groups (Defra, 2004; Bradford, 2005; HMSO, 2006; UKWIR, 2006). This is a difficult task since the roles of the various bodies concerned with water management are continually under review a full outline will not be attempted here.

From a policy perspective, central and increasingly regional, government set the overall context for water management and provide regional policy guidelines. At a local level the Local Authorities have a range of duties and responsibilities covering planning and development control, local drainage, watercourses and flood protection as well as civil contingency duties during emergencies. The Environment Agency plays a major role in the realisation of policy as well as a provider of flood risk management services, operating both at a national and a regional level. Beyond the State, water companies have a statutory duty to provide drainage and public sewers and are generally perceived to have an important role to play. However, it is the Local Authorities that when flooding occurs take a lead role in managing the immediate consequences. As a result they are credited by the public with a range of powers and responsibilities that in actual fact they cannot hope to exercise. Under these sorts of circumstances and events people turn to their local political representatives and demand action.

As a direct result of the series of flooding events between 2000 and 2003 and the associated political and public pressure the City of Bradford embarked upon a on a number of initiatives the general aim of which were to better understand and manage flooding and flood risk. These initiatives have included an independent inquiry into water management in Bradford (Bradford, 2005) and following the recommendations of the enquiry the establishment of a water management liaison and advisory group, the de-

velopment of community initiatives known as Flood Local Action Plans (FLAPs), revisiting development policies, investment in research and knowledge through collaboration with academic institutions. As a result of the confidence engendered by the local initiatives and as part of its efforts to improve their performance the CBMDC subsequently became involved in European Commission funded research and development projects in the North Sea Region (Interreg, 2006).

From being a victim of flooding Bradford has increasingly been seen as a champion of good flood risk management practice. The question that therefore arises is what is it that CBMDC has done to attract such favourable commentary. We focus on the two main initiatives, firstly giving a brief overview of what each of the initiatives entailed. Secondly we consider the perceptions of two initiatives based on the experiences of a number of stakeholders

### **Water Management Inquiry**

Following the flooding in August 2003 and as result of meetings with the public Local Councillors suggested the running of an independent public inquiry into flooding and its causes. This was accepted and an inquiry into water management was set up under an independent chair from outside the Council. In March 2005 the Inquiry presented its findings to the public and the CBMDC undertook to implement the recommendations especially regarding the sharing of knowledge and information amongst a wide group of agencies.

Following the recommendations of the Inquiry and the positive impact it had on relationships between various agencies CBMDC established a Water Management Advisory Group. The objectives were to the effective integrated water management, ensuring good communications between organisations and common understandings and knowledge (Bradford, 2005a). Other partnerships have followed; the Yorkshire Water and Bradford Council Technical Team meetings, and the Local Authority Land Drainage Group. Asset management and maintenance procedures were overhauled and several regeneration and development plans and projects were revisited to bring to bear the lessons learnt (Bradford, 2006). These activities are intended to be of an on-going nature, in other words to become part of the institutional landscape.

## **Flood Local Action Plans**

At the same time as the water management inquiry was getting underway a complementary project was embarked upon. Responding to the concerns expressed by communities that they did not know what was being done about flooding and that no one consulted them the Flood Local Action Plan project was set up. The project although initiated by CBMDC was undertaken by a local community group (civil society organisation) at arms length from the council. The purpose of the initiative was to help local groups of people share their flooding issues and experiences, through sharing and dialogue understand the issues, decide upon their own course of action and if needed negotiate with the appropriate agencies. Since its initiation 11 FLAPS were produced. However, the project could only continue while funds were available to the CSO. Subsequently to the project ending the work has been incorporated after a manner into the work of the Neighbourhood Support Service through the Neighbourhood Forums.

## **Researching Perceptions**

As a result of the proactive stance taken towards the management of flooding and the way in which use has been made of opportunities CBMDC is nationally seen as being at the forefront of efforts to better manage floods locally. The work has been recognised as nationally representing best practice (ICE, 2006; NFF, 2006). Clearly then there are lessons to be learned from the approaches adopted by CBMDC.

The research has focused on how the two initiatives have been perceived by various stakeholders. This has been used as a form of sense-making and to critically explore the premise that they have contributed to the building of local institutional and social resilience. In the institutional context local can be taken to mean localised to the CBMDC and the organisations with which it has sought to interact on flooding issues in its area of jurisdiction. In the social context it has a much more restricted community and geographical sense, referring in some cases to a single street.

The methodology adopted consisted of a review of available literature concerning floods in the Bradford district; conducting a series of interviews with various stakeholders who had been involved with flood management in various capacities; attending and observing public meetings and research project meetings related to flood management and; site visits to those areas that had been affected by flooding. A total of ten semi-structured interviews were conducted with eleven stakeholders. The re-

search adopted a critical incidents approach, explored with the informants through a series of open-ended discussions. Focusing on personal experiences of particular flood events allowed informants to reflect on those experiences, place them within contexts of their own choosing and provided a platform from which they were able to through the discussions critically evaluate subsequent developments.

In the following sections we present some selected extracts from the interviews conducted concerning the inquiry and the FLAPS. These then form the basis of the discussion that follows.

## **Water Management**

Although the decision to set up the water management inquiry came as a direct result of the 2003 floods there had also been a history of events that when taken together laid the foundations for that decision. Prior to the 2003 event a start had been made on bringing flooding forward as an issue;

“One of the things we weren’t doing was looking at issues some of the people had. One of those was flooding and it’s very interesting that it’s an environmental issue that’s socially affecting people. We started looking at some of those areas of flooding..... going out to the neighbourhood forums that we have to sit at the back and to listen to what the issues were. From that we started to look at some of the issues around flooding and started to sit in on the emergency room we started to have meetings.” Policy Officer.

Stakeholders identified a sense of bewilderment at the flooding that took place in 2000 and then the subsequent flooding in 2003, that despite the recovery and community initiatives recurring flooding events were still causing havoc. The essence of this is captured in the following quotation:

“When the whole thing started, my ward is now having floods twice a winter within ten years. Things are happening, nobody really understands why, on a much more accelerated basis. Why? Is it just climate change? Is it that farmers are farming differently? Is it that the driveways and surfaces are not porous? That is the basis of our concern. The other thing that really triggered things were the 2003 floods in Keighley where we had no idea what was causing them. We had different opposition parties at each other’s throats, blaming each other for previous mistakes. We had Yorkshire Water blaming Bradford Council and the EA was sitting there

saying, ‘nothing to do with us because this was in the road’.” CBMDC Councillor.

The prevailing institutional response, summed up below, only served to exacerbate an already bad situation.

“We were going into risk management but it was about masking risk. We know these issues are out there but actually if we just turn the other way we don’t quite see them and actually they are the fault of someone else. Internally we just dealt with the issues when they arose. Externally as far as we were concerned it was other people’s responsibility, it wasn’t about partnership workings it was about responsibility. If the water was in the river it was the EA’s. If it is coming over the top it was ours and if it got into the sewers it was YW and when it came back out again it was ours. That was very clear and everybody saw it like that.” Policy Officer.

The floods of 2003 coming on top of previous events and an inability to make any material improvement in flood management changed all that.

“We need to do something quite different and quite dramatic. So we started to put together some ideas and one of those was an enquiry. An enquiry because it would publicly wash things out and allow things to be said that wouldn’t otherwise. It would also allow things to move forward. But also we could do with somebody independent to chair it. We were supposed to form an internal water management group. The internal water management group was incredibly hard because we still cannot get agreement from certain directors.” Senior Policy Officer.

The Water Management Inquiry has been seen as making a significant contribution to improving the way the management of water generally and flooding issues were addressed, through the process of the inquiry.

“There are better relationships due to more formalised structures complemented by personal contacts. Both are needed. There is more sharing of even confidential information because levels of trust have been built up, more openness and an understanding of what others can and cannot do.” Drainage Manager.

“A realisation among each of the partners that attempts to share solutions and information will not be rebuffed or snubbed and that there are like-minded people within each organisation willing to help and promote open-door policies.” Yorkshire Water

“We have a district wide water management advisory group. So it means we are starting to work as a partnership. The biggest change was that we were able to work not from an engineering angle but from an overall management point of view. Now that is incredibly challenging for the EA and for YW although YW are slowly changing in the way they operate. The fact is that people have used it as a starting point. YW have come back and what they want is quarterly operational team meetings. That’s really exciting, to have meetings between YW and CBMDC teams. It’s about how parties are coming on board and how they are beginning to change, to share information and work in conjunction with each other.” Senior Policy Officer.

There is also a change in attitude and mindset which in itself has had a positive impact.

“The culture in our organisation has changed because we have had a number of successes because we have started to attract funds.” Councillor.

“Because things are beginning to work more smoothly it’s boosting the Directors (in the Council) and it’s stroking the politicians. It’s getting a positive spin on Bradford. Change in culture is slow, it is tenuous but I would like to think that between us we have moved on and changed things.” Senior Policy Officer.

These views were also echoed by other stakeholders involved in the inquiry and are representative of a sense that through the inquiry process there had been a building of social capital and the establishment of bridging ties between stakeholders.

### **Water Management Advisory Steering Group**

As has already been pointed out a direct outcome of the water management inquiry was the establishment of the Bradford Water Management Advisory Group, set up in June 2005. In June 2007 the group’s terms of reference were slightly modified in two substantive respects (Bradford, 2007). In the first instance the objective of acting as an informal platform for consultation was added and secondly the chairing of the group was removed from the Director of Environmental Services. Initially the momentum built up under the inquiry was maintained and a number of cooperative working initiatives, referred to above were put in place. However,

without the sharp focus of a pressing need or issue there was always the risk that the momentum would be dissipated. This appears to have happened with reports that the Advisory Group has lost its way and degenerated into a talking shop. Managing the transition from a focus on specific projects to a mechanism for facilitating cooperation and coordination with other organisations and maintaining interest and salience is a challenging task.

### **Floods Local Action Plans**

In 1997 Neighbourhood Forums were introduced as a mechanism through which local councils could engage with local people and communities across a range of policy and practical issues. Although there are reservations about their effectiveness and how representative they are the general consensus about them, certainly within CBMDC has been positive. It has also been noted Neighbourhood Forums have played a significant role as platforms following flooding events for meetings between communities, council officers and local councillors. In some cases this has led to the formation of local action groups (civil society organisations) that addressed specific flooding concerns in their areas. The extent to which such groups can be effective is highlighted by the following quote;

“The Stockbridge Neighbourhood Development Forum [formed following the 2000 floods] was active for about three years at the most. The Showfield group is different again. It’s now part of the Bradford Vision and working on a different agenda. It is not a failure; it’s achieved what it set out to do. The action plan that they came up with has been largely implemented. Because of the hard work post the flooding, the reputation and the contacts built up with other agencies (YW, Police, EA) implementation of the action plan was achieved. They had the credibility to pressurise other services to help them deliver. In other areas it has been more of a struggle because of the lack of a recognisable and coherent community to work with.” Area Coordinator.

“Neighbourhood Forums particularly the ones Bradford set up were incredibly powerful in building understanding within the communities; understanding of what had happened and why people found themselves in this position. Forums were very helpful in providing social care, advice on how people could get help, in providing social care, advice on how people could get housing repaired. Then in the later stages the forums were able

to engage people in option choices, and then to prepare people for their implementation.” Flood Defence Manager.

It was also a Neighbourhood Forum that was instrumental in the establishment of the water management inquiry. In this respect the role of local council officials and councillors is important.

“You need elected members who are seen as being able to effect change. Elected members are there to intervene and follow up. Council officers have a role to act as their contact and to have a role as their conduit to these other bodies..... Council officers are there to enable elected members to fulfil their role to the electorate.” Social Services Officer.

Effective as they are in providing a platform for communities – or those who attend them, to interact and to identify issues they are not the best means of addressing flood related issues. The FLAPS initiative was set up following community concerns, as expressed through Neighbourhood Forums regarding flood defences, drains, sewers and other flood related matters that did not understand what was going on. Addressing this required a much more intensive approach where the intention was that the need and request for an intervention came from the community. The FLAPS programme was developed to work with communities to identify concerns and then to work with the appropriate agencies to investigate these. FLAPS were designed to let communities have thinking time to define and understand their flood related issues and to empower them to take action.

The FLAPS process is well illustrated by the following set of extracts from the person who was involved in the work.

“I have gone out and leafleted an area. I would even leaflet each individual person and invite them to a meeting. Those with something to say would turn up, those who aren't really bothered and they are the majority wouldn't bother to turn up. We would then go through the moan stage where they would blame everyone. You have got to let them go through that. We would then go through the questions, I would highlight some questions that they still needed answering and then down to what is most important to them. I type them up and give them back to the individual who then circulates them to make sure I've interpreted what they have said correctly. I would only deal with one person. The FLAPS that I have set up I have one contact person who all the information goes through. I go back to that one person and they dissipate the information out to the group. I take [the questions] to the Steering Group. So I'll get the answers from the Steering Group. Take them [the answers] back to the group. That an-

swers their first lot of questions. What they don't get answers to is because a lot of times certain agencies will not give a response for the fear of prosecutions or whatever. Then I start going around [to individuals]. What can we do to protect your property? Well let's have a walk around. I do a lot of walking around houses. Once they [the community] say to me thank you, you have done as much as you can, we have got some answers now. If need be I set up meetings [with agencies]. When people ask questions they want the answers straight away. I can answer most peoples' questions to the level that they want them answering. These people are not experts, they don't understand technical jargon. Well I can answer it in language that they can understand and I think that is what they found useful."

"Most of the people that are elected as the individual for each of these 10 groups have some knowledge. Some are quite expert as they've been flooded a number of times, so they are quite noisy; some just like to hear their own voices. What I have said to them is they should set themselves up as a steering group for the District. They then could be classed as a consultation group or member for Council Scrutiny Committee." FLAPS Officer.

The approach adopted was aptly summed up by the local Council Area Coordinators as;

"Much of what he does is about helping local people to help themselves. They can do this better if they know who they are talking to and trust them and have direct contact with them. It is the "cup of tea and slice of cake" approach."

The tangible output from all this is the FLAPS document.

"In there is a little bit of history, where the money has come from, who the stakeholders are, the contact people, what you do before a storm, during a storm, after a storm. It covers things like emergency pack, your car, dog. Silly things, because when you are running around, you don't think of getting your medication or you don't think of this or that, so that is in there. Most of the time they [FLAP document] will end up in the bin but if 10 people read it, it's been an improvement. The document that comes out at the end of it has had input from YW, not so much from the EA because they all have their own little documents, the National Flood Forum and the Fire Brigade." FLAPS Officer.

One of the perceived benefits expressed by the local councillor responsible for the environment portfolio on the council executive was;

“I think that there is more confidence and more understanding. One of the greatest benefits for the people I know who have been directly involved is a greater understanding of the process and greater understanding that the Council is not a never ending pot of money. There has been a realisation that there are due processes to go through and that they have a part in it. I think the greatest benefit has been that a significant number of people now feel that they have a part in the process and not that they are apart from it.”

This is an interesting observation as it says little about an increased ability to cope with flooding and more about an increase in social capital. It is also an opinion that was echoed by others.

This project finished at the end of 2006 by which time a total of eleven FLAPS had been completed. A decision was taken not to continue funding a CSO to undertake the work but rather to incorporate in into the Council's own work programmes.

## **Discussion**

One of the questions that consideration of what has happened in the CBMDC raises is what sense can be made of the observed responses to the flood events that took place between 2000 and 2004. This is a very broad subject for discussion and will not be attempted here. Rather we consider what some of the impacts have been on flood management capabilities, could it be considered that the responses noted have contributed to resilience among stakeholders. Without going into a detailed discussion of what might be meant by resilience within a social context, we take it to mean a systems ability to absorb or cope with external stresses and disturbances as a result of, in this case, an environmental change called flooding. As all systems cope to a greater or lesser extent the implication is that somehow the capacity to cope better, that is minimise adverse effects has been enhanced.

The water management inquiry highlighted the need to enhance effective joint working through partnership arrangements as one of the few effective responses to the challenge of a lack of appropriate statutory powers to ensure appropriate action. The dispersal of responsibility for the management of different stages in the flood management cycle across a multiplicity of agencies has had a perverse effect. Far from adding resilience

through redundancy dispersion has served to increase brittleness by isolating actors and creating institutional barriers to cooperation. Bridging the divides both within organisations and across them has been seen as an effective coping mechanism that at least allows for a better understanding of what can and cannot be achieved. But also by doing so it encourages organisations to go beyond the strict limits of their responsibilities and re-mits, they are better disposed to take 'managerial' risks.

The nature of the inquiry following on from the series of flooding events that often involved the same organisational actors created a mechanism by which they could engage with each other on a protracted basis. The inquiry allowed a high degree of reflection and shared learning importantly not of what happened but of the constraints, opportunities and institutional norms within which the various actors were situated. It not only built knowledge but trust and personal relationships. As one person interviewed put it – they could now pick up the phone, ask a question and get something more than a non-committal response. Research has shown that the establishment of bridging ties (Putnam, 2000; Newman & Dale, 2005) are important in building social capital which has been seen as a key determinant of resilience and adaptive capacity.

However, what subsequent experience has also shown is that there is a need for ties, whether they be bridging or bonding to be regularly maintained and reinforced. Whether the establishment of formal structures of interaction such as the water management advisory steering group is the best mechanism is clearly open to question given the nature of their interaction. It is likely that the other initiatives whereby operational problems are addressed will prove to be more robust. Clearly the question of maintenance and persistence of the supportive conditions necessary to engender resilience, enhance social capital and adaptive capacity requires more research where conditions of institutional fragmentation pertain.

At another level what might be referred to as political resilience has certainly been enhanced. The various water initiatives have had major political benefits in the case of CBMDC. The image of Bradford as a progressive council, the attraction of European funding and the ties with academia have all reflected well on the existing political elite and has gone down well with the electorate. The situation is now one where the question of what is being done is not being asked but rather has deflected political questioning away and towards other parties such as central government.

With respect to FLAPS the whole point of them is to enable communities that are at risk to be better prepared and know what to do in the event of a recurrence of flooding. It would appear that the FLAPS process by allowing people in the community to vent their anger and seek answers has led to a greater understanding and appreciation of the complexities of

flooding. By coming together as a community it might be supposed that this has enhanced the sense of bonding within the community. The evidence from a couple of the community groups formalising their relationship and taking on their own forms of community action – aided by the council, would seem to support this. In other words there does seem to be some evidence to suggest that engagement and understanding can be transformative within a community. However, what the evidence also suggests is that these transformations are often time limited, though the reasons for this still need to be explained. Again to make the assumption that there is an erosion of resilience or adaptive capacity would be problematic.

From the evidence there is also a suggestion that there is a core of active community members and a surrounding ‘onion skin’ of decreasing engagement. How far beyond the core the lasting effects of social capital building go and the nature of the ties between community members requires further elucidation. To suppose that because some members of a community are not actively involved and that therefore they have little interest and have not benefited by the capacity building cannot be assumed.

It could be inferred that in the event of further flooding incidents that among those communities that were engaged with and have FLAPS that there could be less psychological and physical trauma amongst the community members. This however, in the absence of any data is speculation.

## **Conclusion**

The evidence presented here suggests that both institutional and social resilience has been enhanced by the processes put in motion by CBMDC. However, the work also raises as many questions as it seeks to answer, one of the most important being the question of the conditions of persistence. One of the facets to emerge from this work is that there are many different types of resilience; political resilience has for example been suggested. The theoretical underpinnings need to be further explored. Furthermore, more recent anecdotal evidence appears to suggest that it has been problematic in maintaining the impetus of cooperation. The reasons for this are not clear from this research and more follow up work is required. That said it is clear that the initiatives put in train have led to benefits in terms of trust, cooperation and confidence both institutionally and within those communities that were engaged with. But it also has to be acknowledged that in spite of these initiatives flooding will still occur. What these initiatives do is to lessen the impact and enhance capacity to cope with the physical and psychological impacts of flooding.

## References

- Beck, U. 1992. *Risk Society, Towards a New Modernity*. Trans. by M. Ritter. SAGE publications, London.
- Bradford. 2005. *Review to Consider the Future of Water Management and the Associated Problems of Flooding in the Bradford District*. Bradford: City of Bradford Metropolitan District Council.
- Bradford, 2005a. Bradford District Water Management Advisory Steering Group – *Terms of Reference*.  
[http://www.bradford.gov.uk/environment/environmental\\_protection/water\\_management/Advisory\\_steering\\_group.htm](http://www.bradford.gov.uk/environment/environmental_protection/water_management/Advisory_steering_group.htm)
- Bradford, 2007. Bradford District Water Management Advisory Steering Group – *Terms of Reference*.
- Defra (Department for Environment, Food and Rural Affairs). 2004. *Making Space for Water Developing a new Government strategy for flood and coastal erosion risk management in England*. A consultation exercise. July 2004 ([www.defra.gov.uk](http://www.defra.gov.uk)) London: Defra.
- Defra. 2005. *Making Space for Water: Taking Forward a New Government Strategy for Flood and Coastal Erosion Risk Management in England; Government First Response*. London, Defra.
- Gunderson, L.H., 2000. Ecological resilience – in theory and application. *Annual Review of Ecological Systems*, 31, 425-439.
- HMSO, 2006. *8th Report of the House of Lords Science and Technology Committee; Water Management*. House of Lords, London.
- Holling, C.S., 1973. Resilience and stability of ecological systems. *Annual Review of Ecological Systems*, 4, 1-23
- Hunt, T., 2004. *Building Jerusalem: The Rise and Fall of the Victorian City*. Weidenfeld & Nicholson, UK
- ICE, 2006. *Flood Management – Regional Focus*.  
[http://www.ice.org.uk/state\\_of\\_the\\_nation/flood\\_management\\_regional\\_overview.asp](http://www.ice.org.uk/state_of_the_nation/flood_management_regional_overview.asp)
- Interreg. 2006 [cited. Available from [www.interregnorthsea.org/projects-in-your-area.asp?areaid=uke4](http://www.interregnorthsea.org/projects-in-your-area.asp?areaid=uke4)].
- NFF, 2006. *Bags of Praise for Bradford* Man National Flood Forum Press Release.  
<http://www.floodforum.org.uk/infoanddownloads/conference2006/gsaawardsresults-bradford1.doc>
- Newman, L., & Dale, A. (2005). The role of agency in sustainable local community development. *Local Environment*, 10(5), 477-486.
- Putnam, R. (2000). *Bowling alone: the collapse and revival of American community*. New York: Simon & Schuster.
- UKWIR. 2006. *21st Century Sewerage Design: Summary Report*. London: UKWIR.