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Managing and researching floods: sustainability, policy responses and the place of rural communities

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The unprecedented rainfall in southern parts of Britain this winter (with 2014 the wettest January since records began in 1910; UKMO, 2014) have brought widespread flooding. “January [2014] was notable for the persistence and spatial extent of floodplain inundation, particularly from large, slowly responding rivers and in low-lying areas such as the Somerset Levels.” (CEH, 2014: 1). But is persistent rainfall the only cause of flooding? In the most devastated areas, tensions have been running high as residents, politicians, scientists and the regulator (the Environment Agency) have debated the causes of the flooding and the appropriate solutions to it. It has quite quickly turned into a ‘wicked problem’ (Nie, 2003) characterised by societal, political and environmental complexity. In the Somerset Levels, one of the worst affected areas, this has been contested most forcefully as an issue of dredging. Many local residents, farmers and politicians point to the reduction in dredging works undertaken or permitted by the Environment Agency. Dredging, they argue, is necessary to maintain the capacity of watercourses and to permit more rapid conveyance of floodwaters. The Environment Agency, on the other hand, argues that dredging would not have prevented the current flooding and maintains that dredging has its own negative consequences (such as increasing flood risk further downstream – in often larger towns and cities – and damaging aquatic biodiversity). ***In this commentary, we transcend hydrology and social sciences and use the current floods in southern Britain as an exemplar to explore the interactions between (social) scientific knowledge, conceptualisations of sustainability and the uneven distribution of impacts on affected communities in managing physical effects, human consequences and responses to these extreme hydrological events. We reflect on the role of hydrologists in providing critical responses to flood events and suggest they have a greater role to play in directing more socially responsible flood research.***

The policy response

In its quest for an immediate response to the crisis, the UK government has vowed to commence dredging at the earliest opportunity following the recession of the floodwaters. In many ways this response is surprising since it hints at the failure of the predominant policy approach to ‘natural flood management’ (Barber and Quinn, 2012; Batterbee *et al.*, 2012; Morris *et al.*, 2014) and resonates much more with the type of interventionist and engineering-led approach to flood control which preceded it. Penning-Rowsell *et al.* (2006)

have demonstrated neatly how flood policy adapts 'catalytically' during times of flood 'crisis' and have argued that, rather than developing new ideas, such catalytic changes are based on the acceleration and magnification of ideas that pre-exist in the political ether. Based on this theory, and their evidence from past policy responses to flood crises in England and Wales, Penning-Roswell *et al.* (2006: 335-336) speculated on the likely policy accelerations that would take place given a significant new flood event. They suggested likely responses could include: the withdrawal of private insurance provision; enhanced technological developments in prediction and warning; 'a deliberate policy of relative inaction' representing an extension of the 'return to nature' approach to flood management; or a 'severe reversal' of the return to nature theme if the government were faced with a 'major loss of life from catastrophic urban flooding'. Whilst it is far too early to know what the long-term policy response of the current crisis will be, we have seen in the immediate policy response an at least partial reversal of the 'return to nature' discourse, with the government proposing a significant scaling-up of dredging activity and (although muddied and muddled in the vagaries of the ongoing political dispute) providing an explicit criticism of the expertise of the Environment Agency in guiding flood management. There are two further points of interest in relation to the predictions of Penning-Roswell *et al.* (2006). The first is that, although since 2006 the UK has not witnessed flooding leading to a 'major loss of life', where recent flooding *has* affected urban areas (e.g. in 2007) there has been an accelerated push toward 'natural' catchment-based approaches to flood management. The second is that the current crisis has been felt predominantly by rural communities, and it is this characteristic which seems to have elevated a potential reversal, or at least a sharp questioning, of the 'natural' approach to flood management. This rural dimension and the political weight of the 'rural voice', therefore, were not foreseen. It should be added, though, that unlike the more ambitious claims of 'the new science of socio-hydrology' (Sivapalan *et al.*, 2012), Penning-Roswell *et al.* (2006: 335) maintain that it would be impossible to forecast (let alone model with certainty) human responses to floods, the different roles of key actors and the consequent interactions with hydrological processes. It could further be added that the dredging response does not so much represent the continuation of prevalent existing flood management ideas but the return to an almost relict discourse associated with land drainage, agricultural production and the prioritisation of human welfare above that of environmental integrity (which Penning-Roswell *et al.* [2006] associate with the period 1930-1970s in England and Wales).

Sustainability?

We want to propose that this dispute, taken more broadly, is not about dredging versus not dredging but reflects a contradiction between the paradigm of sustainability (or, more correctly, how it has been interpreted) and the imperative of politics to act in the 'here and now'. Sustainability, as is commonly framed through the idea of achieving inter- and intra-generational equity, requires an extension of our spatial and temporal horizons to look to the consequences of decisions and actions into the future and upon contemporary communities living further afield (Munda, 1997). It also recognises the need to balance environmental, economic and social considerations (Pearce, 1988). Gaining global appeal since the 1992 Earth Summit in Rio, Sustainable Development became a leading political paradigm; and it was instrumental in reshaping the political and regulatory landscape in the UK at the end of the 20th century, as well as approaches to environmental management (Baker, 1997). There are two important shifts associated with this period that are relevant here. The first is the shift away from hard engineering to 'softer' approaches to flood management, or the idea of 'working with nature' rather than 'against' it. The second is the decreasing value placed on agriculture and farming by wider society; rather than being the

heroic stewards of the landscape and the providers of the nation's food supply, farmers came to be seen as environmentally damaging and over-subsidised through the provisions of the Common Agricultural Policy (Lowe *et al.*, 1997). These shifting priorities are partly reflected in the transition from the National Rivers Authority to the Environment Agency (of England and Wales) in 1996, and from the Ministry of Agriculture, Fisheries and Food (MAFF) to the Department for Environment, Food and Rural Affairs (Defra) in 2001. Both reflect an increased concern for the environment and a diminished concern for the protection of farming and agricultural production. With such changes the influence of the 'rural voice' on policy-making was overtaken by that of scientists, conservation organisations and an urban population with an increasing detachment from traditional agrarian values (Lowe *et al.*, 1997) and growing environmental awareness.

The shift from hard to soft flood management solutions recognised that heavily engineered flood defences were expensive, could exacerbate flooding elsewhere (an expanded spatial consideration), were detrimental to river ecology, and could not offer a long-term solution on account of the expense of continual repairs and the increasing magnitude and frequency of flooding anticipated under climate change (an expanded temporal consideration). In other words, they were seen as unsustainable. Softer approaches, therefore, sought to 'work with nature' by accepting flooding in certain parts of a catchment and allowing floodplains to act as 'natural' stores of floodwater. This would be a low cost and low maintenance approach but would still protect more vulnerable/densely populated areas downstream as well as enhancing the ecological quality of the river. In terms of policy, this approach is perhaps best exemplified by Defra's (2005) *Making Space for Water* flood strategy document which explicitly sought to root the concept of sustainable development 'in all flood risk management and coastal erosion decisions and operations' (Defra, 2005: 14).

Affected communities and the here and now of environmental controversies

While 'natural flood management' works toward the more far-reaching goals and objectives of sustainability, it runs into difficulty when it comes up against the political imperative to respond to the very immediate and locally felt impacts of particular environmental events. For, the more acutely felt is the impact (as the case in the Somerset Levels), the louder are the voices of dissent; and the more immediate and tangible are the solutions that are demanded. Hence, when homes are being destroyed and livelihoods threatened, dredging can be seen as an immediate and tangible cause of, and solution to, the current problem. This is particularly true for the farming community, which for many years has valued drainage activities as indicative of good farming practice (Gray, 1996; Gravsholt Busck, 2002; Urban, 2005), and as essential in maintaining the productive capacity of their land. Blaming and targeting climate change in these circumstances, however, does not cut the political mustard. This is because, due to uncertainty, there is reluctance from the scientific community to pin individual weather events on climate change and the challenges of tackling climate change are equally beset with scientific and political complexity. In such circumstances, therefore, whether or not dredging will alleviate the problem in the future becomes almost secondary. The government is compelled to be seen to be taking action which prioritises a response that is immediate, locally targeted and tangible (Emery *et al.*, 2013): sustainability is temporarily suspended.

The real issue, though, is not that sustainability thinking is oppositional to dealing with emergency events. It is that in the move from hard to soft flood management solutions the

longer term and spatially remote implications were perhaps elevated above those of the contemporary and local. Yes, sustainability requires us to extend our horizons, but this should not come at the expense of the needs and interests of local communities. Despite policy documents (such as *Making Space for Water*) including 'public participation' as a central element of sustainable approaches to flood management, the rural communities affected by the current crisis have been clearly arguing that their voices have not been heard and that their local knowledge has been disregarded in favour of implementing solutions that protect downstream urban populations (whereby sustainable development gets squarely equated with a more economically led approach to cost-benefit analysis). We might ask, therefore, to what extent were rural communities consulted during the shift to 'natural flood management'? To what extent were their concerns listened to? And, more importantly, what provisions were made to protect those communities given that the new management approach would likely lead to an increased frequency and magnitude of flooding in rural areas? Answers to such questions should, and likely will, be the subject of a formal inquiry into the 2013-2014 winter floods. A brief review of the academic literature on the matter, however, is in itself revealing. In searching *Web of Knowledge* using the terms flood* AND rural OR farm* OR agric* several trends became apparent. Firstly, a significant majority of the publications that looked at the impact of flooding on rural communities or agriculture came from research in developing countries (for instance Arnall *et al.*, 2013 [Mozambique]; Nguyen and James, 2013 [Vietnam]; Phalkey *et al.*, 2012 [India]; Rotberg, 2010 [Bangladesh]). Secondly, when narrowing down the search to research undertaken in the UK, the majority of papers considered the impact of agriculture and rural land-use management on flooding, rather than the other way round (for instance Boardman, 2003; Marshall *et al.*, 2009; Wheater and Evans, 2009; O'Donnell *et al.*, 2011; Bulygina *et al.*, 2013; Ewen *et al.*, 2013). Thirdly, in the few UK examples that do give consideration to the impacts of flooding on rural communities (e.g. Dennis *et al.*, 2003; Posthumus *et al.*, 2009; Oven *et al.*, 2012), very limited attention is given to measures needed to protect rural communities from the increased likelihood of flooding associated with 'natural flood management'. Could this lack of research reflect a wider political indifference to the effects of flooding in rural areas? Whilst it can rightly be argued that rural populations are relatively much larger, and that rural areas are economically more important in developing countries than the UK, how sincere and effective have been the attempts to involve rural communities in flood management? Again, this is a question that would benefit from more detailed analysis but research does exist to suggest that the involvement of local rural communities in flood management has been deficient. The Ryedale Flood Research Group (2008), for instance, argued that in the UK government's haste to 'make space for water' they had neglected their obligation to 'make space for people'. Sultana *et al.* (2008), meanwhile, have argued that England could learn a lot from Bangladesh in terms of participatory floodplain management. In a study of Scottish farmers' response to a natural flood management project, Howgate and Kenyon (2009) have demonstrated a disjuncture between the expectations upon landowners to participate in such schemes and the availability of incentives to encourage them to do so. They demonstrate the very real concerns of farmers associated with the increased threat of flooding and that hostility to the project arose because of poorly developed participatory mechanisms.

Re-evaluating and revaluing the role of rural communities in flood management

The foregoing discussion suggests that the consequences for farmers and rural communities of the management shift from hard to soft approaches were given insufficient attention. To explain this, we suggest that it reflects the wider shift in values attached to agriculture that were occurring at this time as well as a tendency to promote floodplains as 'natural' which

serves to obscure the needs and interests of their bipedal residents. The title of the current flood strategy in England and Wales *Understanding the risks, empowering communities, building resilience* (Defra and Environment Agency, 2011) would suggest that the need for participatory approaches to flood management has been recognised by the government. When looked at in detail, however, it is apparent that the strategy promotes a greater distancing of flood risk management planning and targeting (and spending) away from the local level. Hence, government funding and resources are prioritised to achieve the greatest reduction in risk possible at the national level (inevitably areas with high population density) and, in spite of promoting partnership working at the local level, local communities are encouraged to take 'greater responsibility for managing their own risks', to have 'greater accountability' for the approaches adopted and to 'invest in flood risk management measures' (Defra and Environment Agency, 2011: 14-17). It is impossible to look at this policy outside the context of the UK Coalition government's tightening of the public purse strings in the wake of the economic recession since 2008. In this context, it appears that sustainability has increasingly been equated with cost-efficiency and local empowerment has been equated not with local concerns being taken on board, but an increasing expectancy on local communities to pay for their own flood mitigation. This is clearly not the rhetoric employed by policy-makers in light of the current crisis. Instead, they will do 'all that they can' to help communities affected with as much money as needed made available. This imperative for short-term, highly visible solutions is of course necessary for political reasons, but did the government under-estimate the funding needed for flood protection in rural areas, or did they merely under-estimate the strength of political dissent from those communities? In the short-term, it appears the government is willing to address the vocal dissent, but the extent to which politicians, and indeed scientists, turn their attentions to the longer-term strategies needed to protect rural communities and businesses remains to be seen.

We argue that the integration of hydrology and the social sciences requires more than just a translation of societal parameters into quantitative models (cf. Sivapalan *et al.*, 2012). Above all it requires a responsibility and sensitivity to the communities affected by hydrological processes, politics, economics and culture. It requires of us the ability to take a step back from the dominant paradigms and the policy signals that instruct our scientific endeavours, and to subject them to critical reflection. This is not to suggest that hydrologists should *become* social scientists, or to direct their primary research away from the scientific understanding of hydrological processes. It is to acknowledge that the opinions and judgements of hydrologists are increasingly seen to matter in realms outside of their traditional disciplinary boundaries. One only has to look at the clamour for hydrological representation in the media in the wake of the 2014 winter floods. Yes, hydrologists (along with climatologists) were asked to explain the phenomena behind the floods, but they were equally encouraged to offer judgements on their management and governance. But to what extent have we seen the same judgements and sensitivity used to *inform* the design and conduct of hydrological research? Does the imperative to flow with the current in some way hinder the ability of hydrological research to lay challenge to dominant discourses and to be responsible and sensitive to the communities living in floodplains? Whilst these are rather searching questions we might ponder how things might have been different in our particular case discussed. Would, for instance, a critical reflection on the implications of changing political priorities have led hydrologists to view rural communities as vulnerable to flooding, and to therefore design and implement research aimed at addressing this vulnerability? Of course, scientific evidence is just one factor taken into account in political decision-making but this does not prevent hydrologists proposing solutions that are sensitive to *both* local communities and the political constraints under

which decisions have to be made. The recent media coverage suggests that society takes hydrology (or more specifically hydrologists) very seriously indeed. With this comes a heightened responsibility for hydrologists to fully consider the implications of the research they design and conduct, as well as that they do not design and conduct. In short, it requires that hydrology, in return, takes society very seriously too.

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