



giving
nature
a home

Flooding in focus

Recommendations for more
effective flood management
in England.

“ It will take time, but together we will deal with these floods. We’ll get our country back on its feet and we will build a more resilient country.”

Prime Minister of the United Kingdom, February 2014

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Dr Mike Clarke
Chief Executive of the RSPB

Working together is our best defence

During the 2013/2014 winter, as flood waters rose in the UK so too did speculation about why the floods were happening. Apportioning blame is natural in such disasters – but it can shield an uncomfortable truth. Extreme weather events are beyond anyone’s control, and are likely to be more severe in the future.

As countless families, landowners and businesses endured the devastating floods and then the frustrating, exhausting months of slow recovery, a sense of wide-scale public loss and anger was clear. The resounding reaction broadcast in the media and communicated by politicians was that flooding on this scale must not happen again.

Flood victims felt let down, and in early 2014 the blame for the floods and the damage caused was levelled at, among others, the Environment Agency, farmers, environmental regulation, wildlife land management and reductions in river dredging.

In reality, the cause and management of flooding is a complex problem that can’t be summed up in a media sound bite. In recognition of that, this report brings together a collection of essays and accounts from engineers, economists, conservationists, flood victims, academics, government advisers and farmers. They are personal and professional observations about recent flood events, which reflect on the possible causes, impacts and reactions to flooding in England. But crucially they also present key recommendations for how we might work together to shape flood policy, in a way that offers people and wildlife a secure future. It makes for fascinating reading, and I am proud that we as a charity have brought so many viewpoints together to inform the public debate on flood management.

The accusations that wildlife charities such as the RSPB were somehow responsible for the 2013/2014 floods in Somerset was a blow to staff and supporters. From an RSPB viewpoint, such accusations greatly misrepresent our work on flooding, which is underpinned by practical experience, implementing schemes that reduce

risk to people and benefit wildlife. Helen Dangerfield’s essay on page 22 – and the successful protection of hundreds of homes in 2013/2014 – shows us how much promise there is in natural flood defences.

“Flood management for wildlife and people can be one and the same.”

The account from John Hebditch, a Somerset farmer, on page 8 outlines the common ground he shares with the RSPB in his passion for the special landscape and wildlife of the Levels and Moors. His vision for the future is one of continued management for food production and wildlife – which reflects our long history of shaping the moors for both people and wildlife. Our vision starts from the same place: water level management and the hard work of independent graziers are the foundation of our conservation success.

On page 14, David Thompson from the Adaptation Sub-Committee of the Committee on Climate Change highlights the sheer scale of the challenge posed by rising sea levels and increased storminess, while Fola Ogunyoye from the Chartered Institution of Water and Environment Management (CIWEM) reminds us on page 12 of the scale of investment needed to manage flood risks. Against this backdrop, we need to ask some difficult questions about what level of flood defence can be offered, and at what cost. And what else can we all do to help communities and landowners facing ever greater flood risks?

The Somerset Levels and Moors are not unique – such questions are posed and choices faced across large swathes of England at risk of flooding. The theme of choice comes through clearly in Colin Green’s essay on the role of economics in decision making, on page 18. I was struck by his comments about the necessity of helping stakeholders, including flood victims and taxpayers, to make informed choices, and the need for justice in economic decision making – he clearly feels both elements are absent from the current system. The fact that stakeholders increasingly want and expect to be involved in decisions that affect their lives is evident in the essay by Paul Cobbing of the National Flood Forum, on

page 24. People who have been flooded feel marginalised in decision making and frustrated by the lack of co-ordination during and after flood emergencies. Indeed, on page 16 Katharine Knox’s essay shows this is not an academic problem, but one that affects tens of thousands of people across the UK, many of whom have few resources to fall back on.

During and in the aftermath of recent flood events, social media has offered new ways for communities to organise themselves, reach out to national media and co-ordinate emergency responses. It has helped to link up grass-roots goodwill with those who are really in need of help, and Rebecca Sandover’s analysis of this on page 10 offers hope of a better local and national response to floods.

“With positive planning and change, we will better weather the storms ahead.”

Extreme flooding events of recent years have tested the UK’s current flood management systems and found them wanting. I would suggest that those failures are less to do with our understanding of floods and how we prioritise limited funds to best effect – Jaap Flikweert confirms on page 20 that we remain a world leader in flood risk management. Rather it is more to do with our failure to come to terms with the social, environmental and economic upheaval that adapting to flood risks entails. In the absence of leadership, accountability and funding, people who face increasing flood risk understandably feel abandoned and angry when the waters hit.

This failure to positively plan for the future is not just bad news for people. It also constrains our ambitions for habitats, which as well as serving an important role in reducing flood damage and impacts on people, are vital homes for the birds and other wildlife that enrich our lives.

The essays in this report focus the mind on the increasing issue of flooding in England, and the vital importance of basing flood policy on sound evidence. It’s clear that individuals, organisations and public bodies must act now and address these problems together – and that government must provide the leadership to make that happen.

5–6 December 2013

A huge tidal surge

Highest tides in 60 years led to two deaths in England. 18,000 people were evacuated and around 1,400 houses flooded. 800,000 homes were protected from the water.

23–31 December 2013

Christmas storms

A series of heavy storms and high tides. The Somerset Levels began to flood. 1,400 houses flooded; 320,000 were protected from the water.

1–6 January 2014

New Year coastal storms

High tides and coastal storms affected the South West and south coast of England, Kent, the Welsh coast and Cumbria. 300 houses flooded.

24 Jan–5 March 2014

Whole village floods

A major flood incident was declared in Somerset.

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Rising levels of threat

In recent years, widespread flooding has become a more common phenomenon in the UK.

Over the 2013/2014 winter, a combination of severe flood events – highlighted in the timeline above – contributed to devastating impacts across the country. Flood waters caused millions of pounds of damage and in some cases destroyed homes, businesses and infrastructure. The considerable personal loss, despair and emotional stress that many victims suffered are unquantifiable.

In just six months, from December 2013 to March 2014, floods impacted on the east and south east coasts of England, East Anglia, the Thames Valley, Kent and South West England. Those further north did not escape: there was major flooding in Boston and around the Humber in Yorkshire, in North Wales and along the Welsh, Cumbrian and Scottish coasts.

The Environment Agency estimates that over a six month period (Dec 2013–May 2014), 11,000 properties in the UK were flooded.

More than a decade in the making

Major flood events have occurred almost every year since 2000 in the UK. Looking back, it is clear that large-scale flooding is becoming a regular, frequent occurrence. Whilst the last flooding disaster to occur stays freshest in the national consciousness, when looked at as a whole, the cumulative impact of all these events, and the aftermath, paints a very worrying picture for the future.



Since 2000, over **140,000** properties have flooded in the UK.



Over a third of families that are flooded suffer health problems as a result.



A whole year after the 2007 floods, thousands of people were still unable to return to their homes.



From 2001 to 2011, **40,000** properties were built in high flood risk areas in England.



50 protected wildlife sites flooded on one night, including every coastal habitat for bitterns between the Humber and Thames.



Flood events like those during the 2013/2014 winter are now likely to happen once every ten years.



Right now, four million homes and one million businesses are at risk of flooding.

The average annual costs associated with flooding in the UK are **£1.1 billion.**



Floods classed as “once a century” events today will hit us every 10–20 years by 2080.



John Hebditch
Farmer in North Curry, Somerset

Management is key to protect land, for all, from floods.

On a wet evening in the early spring of 2014, a farmer's representative and a gentleman from the RSPB were stood in their wellies in the flood at Thorney, about to be interviewed by Channel 4 News.

Just as we went on air, the reporter realised that, far from having a heated argument to broadcast, he had two organisations more or less in tune. This may have been "bad telly" but it was good for the Somerset Levels.

The RSPB had that afternoon come out in support of the proposed dredging that the locals had been asking for, for years. The Somerset Levels and Moors are a managed environment and clearly they had not been managed properly for some years. This had contributed to the flooding, which had destroyed both the meadows that the farmers relied upon for summer grazing of their cattle, and the habitat needed for the winter wading birds found on Currymoor.

I farm at North Curry on the edge of Currymoor and our cattle enterprise is dependent upon our cattle spending the summer on the verdant grass. It keeps growing all summer due to the high water table and plentiful supply of running water. Just before Christmas 2013, this land was flooded for the third time in two years: not just the normal winter "splash-over" needed for the birds, but flooding to a depth of over five feet.

As Currymoor has no natural drainage, any flood water has to be pumped back into the river. Pumping was not possible because there was no capacity in the River Tone and the pumping



Floods across the Somerset Levels

Holmes Garden Photos / Alamy

station itself was flooded. As the rain continued to fall, the moors continued to fill up like never before. Communities were flooded and the Great Somerset Lake was created.

I can, of course, only talk about Currymoor, but the following principles apply to all the Levels. Firstly, what is the principal purpose of moor ground? Fields have been bought by farmers to grow food. Some years ago this would have been to milk cows out on the Levels, but currently this grassland is used to bring on young cattle over the summer to fatten for beef. Do we still need food? The UK is only 60% self-sufficient in food production so the answer is yes. It follows that land that grows food must have a value and this should be taken into account when budgets are drawn up for flood prevention.

Another use of Currymoor is as a flood prevention pond for the Taunton Deane. Water comes over the spillway and all the houses built on the floodplain then don't flood. There has been talk of restoring the river to the levels of the 1960s. In reality, the number of houses saved from flooding in the present day Taunton has probably doubled from that period. All this property has a value and that should go into the flood prevention budget.

The moor is designated a Site of Special Scientific Interest (SSSI) and has great value for wildlife. Assessing the SSSI value is amazingly difficult and each individual has their own opinion. Flooding to the depths we have seen recently has had a devastating effect on the populations in the soil and in the water ditches for which others will be able to provide scientific evidence. I can see in my fields that the grasses indigenous to these moors have

not survived and the herbage is just weeds. The cost of maintaining the SSSI is far greater than previously thought. Pumps have to work, rivers have to flow, and it's made more difficult because this is needed the most in winter when it rains!

I believe the moors need managing. They were created by society and need to be maintained by society. For far too long the value of the fields and communities on the levels has been drastically undervalued from a national point of view. Some of this value must be returned by way of regular maintenance. Funding channels must be flexible, so when the climate throws a wobbly the Environment Agency cannot hide behind Treasury rules. Capital expenditure should reflect the importance of the area nationally.

I cannot say £X million should be spent on dredging and £Y million on a barrage. These issues need to be debated locally by people who understand the moors, and the outcomes passed up the chain to government, not the other way round. It's extremely important that those with hands-on knowledge and experience of the Somerset Levels should have a voice that is valued in the decision-making process.

Anyone who has walked across the moors on a summer's day will realise how this man-made landscape is special and somewhere that needs to be maintained for future generations. ■

Recommendation
Agriculture and wildlife must exist together, so that the character of the Somerset Levels can be maintained.



Dr Rebecca Sandover
University of Exeter

The role of the media and social media in the Somerset floods

The devastating floods on the Somerset Levels over the 2013/2014 winter generated widespread media interest. Their longevity and impacts resulted in sustained national media coverage.

Whilst a number of homes were badly flooded, the scale of the flooding resulted in wider disruption, with many road closures lasting several months. In the case of Muchelney in Somerset, access to shops and schools was only possible via water-borne transport. A Google search for media reports produced approximately 3,000 results. The months of January, February and March 2014 had the most widespread coverage, but national media channels didn't begin regular reporting until the middle of January, despite the floods impacting around the Somerset Levels from before Christmas, as evidenced in local reports.

The widespread coverage of the floods didn't cover the diversity of experiences of local residents, nor did it mirror the range of activities occurring in the affected areas in response to the unfolding events. Yet the rise of online social media networks has provided mechanisms for the public to self-broadcast their experiences. Social media networks are increasingly seen as a vehicle for public debate and for sharing and broadcasting experiences to the wider world or within online groups. Academics are exploring how platforms such as Facebook and Twitter are used to engage the public and to share information in response to disasters. Recent research on this has covered The Arab Spring, The London Riots of 2011 and the flooding in Queensland, Australia, in 2010–2011.

Through social media platforms, communities in Somerset were able to generate and organise public aid and assistance. The role of FLAG (Flooding on the Levels Action Group) in managing volunteer response is evident from its large social media presence and significant local media coverage (Sandover 2014). This well co-ordinated group began campaigning for dredging and better river maintenance from the onset of the previous widespread floods of summer and winter 2012. The composition of the group – which included experts in water maintenance and farming matters – enabled the dissemination of local agencies' strategies, such as the flooding strategy prepared by Somerset County Council in 2013. Outward-facing connections to authorities enhanced the lay-knowledge of the group, which drew on the history of generations of people living and working on the land in the area.

The group created a Facebook page in 2013 that quickly grew as the floods impacted. With a significant number of local residents joining the group, they began to respond in a co-ordinated way to the crisis situation. Using hashtags and capital letters to demonstrate urgency, such as #FLAGSHOUTOUT, members could post calls for help in moving animals, moving furniture upstairs, co-ordinating donated goods, mobilising sandbagging activity, etc. Meanwhile the Twitter feed, established in early 2014, became instrumental in linking with a range of experts on flooding and rural land management. This process developed the group's position on a range of flood prevention strategies and the role of agriculture in water management.

Facebook and Twitter are indispensable for FLAG as a tool for advocacy and to share information on flood events and river



Rebecca Sandover

Muchelney Road,
Somerset, February 2014

maintenance. The public and semi-public nature of these platforms brought in help from people such as Khalsa Aid, a Sikh charity from Slough, and #forageaid, a farmer-based response to the urgent need for feed for evacuated livestock. Through the posting of photos, the group generated support and sympathy worldwide. Organising this response via online social media tools empowers community resilience and provides a forum enabling debate. Experts were included in the core group of FLAG, which meant informed public debate could take place.

Local residents opened their doors to national media crews to share their experiences, but social media engenders a forum where mutual support can be offered and community resilience developed. The progress of FLAG has provided local residents with a platform from which to act in the face of emergency, and to engage with agencies in forming strategies for the future. The role of relationships between well co-ordinated local groups, such as FLAG, and local and governmental agencies has fostered dialogue and understanding. Online social media forums have enabled communication and community knowledge to grow. ■

Recommendation

However, greater recognition is needed from public bodies of the benefits of social media in community response to floods, with strategies implemented to achieve this.

References

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Fola Ogunyoye
Chartered Institution of Water and
Environmental Management (CIWEM)
and Royal Haskoning DHV

The future of flood risk management funding and prioritisation

Flooding causes significant loss worldwide and is often described as the most damaging natural hazard.

At a global scale, flooding represented 35% of all economic losses during 2013. As an island, the UK enjoys the beauty and resources of the water that surrounds and flows through it, while trying to minimise its risks from flooding during extreme weather events. One in six properties in England are estimated to be at flood risk. In July 2007, 55,000 homes and businesses flooded, at an estimated cost of £3.2 billion. More recently, record breaking rainfall and coastal storms in 2012, 2013 and 2014 remind us of the scale of this risk and the devastating impacts it can have on people, property, infrastructure and the environment.

The challenge of flooding is expected to increase due to factors including climate change, ageing drainage and flood defence infrastructure, urbanisation and impacts of new development. It's estimated that annual flood damage could exceed £27 billion across the UK by 2080.

UK flood risk management legislation is largely permissive (not mandatory) and there is no specified standard. Funding from government is linked to delivery of agreed national outcomes, and the investment in individual schemes is based on the extent to which they generate benefits in relation to their costs. In contrast, in The Netherlands the Government funds a legal requirement to provide fixed standards; in the USA the flood insurance programme is linked to the reduction of flood to a fixed standard. In the UK, the primary responsibility for flood risk lies with the owners of land next to water bodies. While government has powers to carry out flood



A flooded street in Yorkshire

Robert Harding Picture Library Ltd / Alamy

risk management, it has no legal duty to provide it, subject to a few limited exceptions.

In England and Wales, flood risk management is primarily funded by the Government through taxes. Their investment in flood risk management is split between capital (for new assets) and revenue (including operating and maintaining existing assets, flood mapping, modelling, awareness, emergency planning and response, staff, offices and advice on spatial planning). Capital schemes are funded for meeting national outcome measures, which determine the amount of capital funding allocated for each scheme. Any funding gap must be financed by external contributions. The relative impact of each outcome measure reflects government priorities – risk to life, homes and deprived communities, and to a lesser degree, economic activities, business, infrastructure, agriculture and the environment. But revenue budget allocation does not seem to follow a clear objective process.

The *Foresight Future Flooding* report published in 2004 recognised that flood defence funding (£439 million in 2003/4 for England and Wales) was inadequate to address the risks. It identified the need for year-on-year (until the 2080s) increases of £10–£30 million in funding for new and improved flood and coastal risk management assets for England and Wales, on top of inflation, to respond to climate change. Government funding increased from £461 million in 2007 to £670 million in 2010, but there was a significant cut in 2011. Despite increases since and one-off additions to deal with emergency response and recovery, the total spend in the current spending review period (2011/12 to 2014/15) will still be less than the previous four years in real terms. Defra in England has committed to increasing

the capital part of its flood risk management investment from £344 million in 2014/15 to £370 million in 2015/16, and to maintain it at this level in real terms until 2020/21. But even this would still be below the funding peak in 2010/11 in real terms. No such commitment has been made for the revenue budgets; conversely, that seems to be a never-ending target area for efficiency savings.

Assessments by the Environment Agency have consistently shown that the flood risk management programmes in England deliver about eight times more benefits than the investment, a much higher return than achieved by most other government spend. Given that, we needed to play catch up to reduce, instead of increase, the current level of risk. With government funding reducing in real terms, we are increasingly reliant on partnership funding from local sources, as well as efficiency savings and more effective working to bridge the gap.

The partnership funding arrangement launched in 2010 seeks to encourage more local investment in flood defences, supplementing national government funding. The external funding contributions remain very low, but are increasing year on year. ■

Recommendation
Flood risk management investment needs to be stepped up and sustained. We need to ensure best value from the investment by removing the artificial capital and revenue divide.

References

This article was based on data from the House of Commons Library: *Flood defence spending in England*, 12 February 2014, and from CIWEM's emerging paper on flood risk funding, due to be published soon at www.ciwem.org/flooding



David Thompson
**Adaptation Sub-Committee,
Committee on Climate Change**

Adapting to flood risk in a changing climate

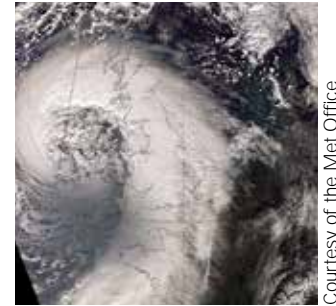
Is current policy helping to address the expected increase in future flood risk?

The storms and floods of the 2013/14 winter showed the cost of a lack of resilience to extreme weather.

Thousands of people were forced to leave their homes and Britain's infrastructure suffered significant disruption. Climate models suggest that extreme weather events may become more frequent and severe in future, along with more gradual changes in average temperature, patterns of rainfall and ongoing sea level rise. There is a clear need for the Government, and society, to consider how to increase the nation's resilience to flooding and extreme weather.

As the Government's statutory adviser, the Adaptation Sub-Committee (ASC) of the Committee on Climate Change (CCC) assesses how prepared we are for a changing climate. Our latest report found that though some progress has been made in flood forecasting and early warnings, in many areas vulnerability to flooding and extreme weather is increasing.

Firstly, we have concerns about the amount of investment in flood risk management. Despite the injection of £270 million to repair last winter's damage, three-quarters of flood defence structures are not being maintained at an optimal level. Hundreds of new flood protection projects won't be delivered until 2019 at the earliest and future investment is set to flatline to the end of the decade. Previous advice from the Environment Agency suggests such an investment profile will lead to a near doubling in the number of properties in England at significant flood risk, from 490,000 today to more than 800,000 by the mid-2030s. And that doesn't account for new houses being built.



Courtesy of the Met Office

The British Isles face a stormier future

Secondly, we are building in areas of flood risk at a faster rate than elsewhere. In Sedgemoor District in the Somerset Levels, 900 new homes have been built this century in areas with a significant chance of flooding. Across England, around 40,000 new properties were built in significant risk areas between 2001 and 2011. Even if new properties are designed to be resilient, developing on the floodplain increases both reliance on flood defences, and the consequences if they fail.

Thirdly, green spaces in our towns continue to be concreted over. The proportion of urban front gardens paved with impermeable surfaces jumped from 28% in 2001 to 48% in 2011. As a result, rainwater is running off, straight into our sewer system, which struggles to cope. Half the national sewer network is reported to be currently at, or beyond, capacity and Ofwat estimates that climate change and urban infilling will increase sewer flooding by around 30% over the next few decades.

There are ways to reduce local flood risk: sustainable drainage systems (known as SuDS) mimic green space, and permeable paving looks and performs like traditional paving, but allows rainwater to infiltrate the ground underneath. However, we have found low uptake of these adaptation measures; only 10% of all paving sales were permeable in 2013.

Since 2010, local authorities have been responsible for local flood risk management, but only 24 of 152 councils had published local flood risk management strategies by April 2014. The Government has repeatedly delayed introducing provisions in the 2010 Flood and Water Management Act that require developers to implement SuDS in new development.

Sir Michael Pitt's review made a clear recommendation to remove the automatic right to connect surface water run-off from new homes to the public sewer network. But that right remains to this day.

Finally, the way we manage the land in the countryside may increase flood risk in some areas. A survey of over 3,000 sites in south-west England found that the soil structure of three-quarters of fields under maize cultivation is damaged to the extent that rainfall cannot penetrate the surface. As a result, in an average storm event, every 10-hectare block of damaged land under maize will shed over a million litres of silt-laden, muddy water, which clogs rivers downstream. The need to dredge rivers is, in part, due to some farming practices, and while taxpayers' money is used to de-silt rivers with little benefit, good value projects and flood defence maintenance can't be afforded elsewhere.

The Government is aware of the need to adapt to a changing climate. A National Adaptation Programme (NAP) was published in 2013 that contains a list of policy objectives and actions. Having such a programme is welcomed. However, the test will be whether the NAP makes a difference in addressing the risks from a changing climate, particularly from increased flooding. The ASC will be reporting to Parliament in the summer of 2015 with our assessment of the NAP and the action being taken. ■

Recommendation
The outstanding recommendations of the 2008 Pitt Review on sustainable drainage and local flood risk management need to be taken forward urgently.



Katharine Knox
Joseph Rowntree Foundation

Flooding, climate change and social justice

What is the problem and how can we respond?

At a time of austerity and diminishing public resources, prioritising climate change is not easy, but the risks it poses to public health and well-being are urgent.

Flooding was identified as the top national risk in the *UK Climate Change Risk Assessment (2012)*. Since then, severe weather events in the UK have shown the severity of flood risk. But not everyone is equally affected, and we need a more nuanced understanding to target our flood responses.

The Joseph Rowntree Foundation's (JRF) research programme on Climate Change and Social Justice set out to examine who and where in the UK might be most affected by the impacts of climate change, including flooding. Our research suggests that those most vulnerable to the worst effects on their well-being face problems due to a mix of personal, social and environmental factors. These factors come together to cause particular problems for more disadvantaged people and places.

The level of risk is not just to do with whether people live in a floodplain. The nature of the built environment where they live is also important. People living in a basement or ground floor flat are particularly at risk – they may be less able to escape flood waters or save belongings. Conversely, areas within a supportive natural environment and green spaces that can temporarily store water, may be better protected.

Other factors are also important in increasing or offsetting vulnerability. Older households, people in poor health and tenants face more problems in their ability to prepare, respond or recover from floods. Some wider social issues that affect



Tidal surge damage on the Norfolk coast, winter 2013

Roger Tidman (rspb-images.com)

people's ability to deal with extreme weather are less obvious. For example, social networks are an important source of support and can be critical to how people respond. And income is an important factor. Low-income households are less likely to take up flood insurance and at a time of austerity, financial strains may make it even less of a priority for hard-up households.

Work by the University of Manchester has enabled us to start to quantify and map social vulnerability, considering these factors, and see how it compares with exposure to different forms of flooding. Areas where high social vulnerability and high exposure to flooding coincide are the most "flood disadvantaged" areas that will need particular attention from policy-makers.

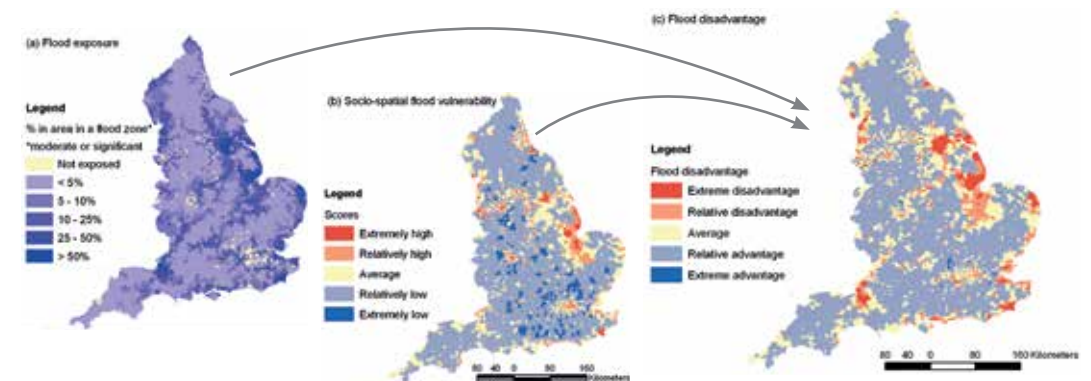
JRF is keen to support local action to respond to these problems. We will make these maps (below) and maps of surface water flood disadvantage available for analysis, at a neighbourhood level,

through the ClimateJust website (to be launched and hosted by Climate UK in early 2015).

We hope this information will serve as a catalyst for local planners and flood risk managers to come together with health and social care providers and others to develop responses to support vulnerable communities. JRF will be working with Climate UK to run engagement workshops to help this process.

Building climate resilience locally will be a vital part of the journey to ensure that climate change does not exacerbate social inequalities or create new forms of disadvantage. It's time for political leadership to avert this potential crisis.

Recommendation
Social vulnerability needs to be better considered in responses to climate change.



The above maps give a snapshot of Manchester University's analysis for England, showing (a) river/coastal flood exposure maps from the Environment Agency, (b) vulnerability in relation to river/coastal flooding and (c) how these coincide to create flood disadvantage.

Map source: Boundary data: EDINA UKBORDERS, flood-exposure data: Environment Agency, Crown copyright.



Colin Green
Flood Hazard Research Centre,
Middlesex University

The challenge of choice

We face the enormous challenges of adapting to climate change and achieving sustainable development. Together these mean we need to fundamentally change the way we use the environment.

Confronted with these challenges, we need to make better choices, and the simplest definition of economics is: “ the application of reason to choice” ; so the social value of economics is the extent to which it enables better choices to be made. What should we demand from economics?

Firstly, the economic framework has to be suitable for the physical problem; we are making changes to systems and need to be able to assess how the system will respond as a whole. In particular, a flood as a shock propagates through economic and other systems. We need to be able to understand these effects if we are to promote resilience.

Secondly, economics need to address the nature of choice itself. Choices are inherently difficult because a choice only has to be made when the available options are mutually exclusive and there are good reasons for preferring one of two, or more, different options. Thus, making a choice involves giving up something else. What is sacrificed may be very specific; we used to sacrifice wetlands in order to increase food security by increasing arable farm production. Or the sacrifice may be indirect; the money spent on one flood alleviation scheme cannot simultaneously be spent on another flood alleviation scheme, or on cancer treatments. Economics has to recognise that choices are about conflicts of



A digger deepening River Valency, Boscastle

Justin Kase zrinez / Alamy

different kinds; we don't start with consensus, we can only hope to reach an agreement.

Another condition for the existence of a choice is doubt. Uncertainty is not being able to differentiate. Uncertainty is not probability; probability is a lot easier. The choices are attempts to choose the future. The future can't be known and depends upon the choices made now and in the future, and the interaction between those choices. Therefore, a demand placed upon economics is to help determine both how to choose and what option to choose in the face of this uncertainty. For example, through adaptive management, where measures are adapted over time, as needs become clearer.

All except the simplest choices involve comparing between options whose consequences differ in terms of their nature, who bears those consequences, and when they occur. Whilst apples and oranges proverbially cannot be compared, all choices involve comparing the options, and choosing between an apple and orange is a very simple choice compared to those that often must be made in flood risk management. Whilst we may strive to make rational choices, in practice we are very bad at doing so, and economics could provide a clear framework to help us to avoid getting lost in the complexities. The two dangers are that the framework does not match the particular problem, or that the framework itself is misleading.

Thirdly, decisions will increasingly be made by the stakeholders. Those stakeholders include the taxpayers who pay the costs. When decisions were made by scientific bureaucracies, a key role of benefit-cost

analysis was to ensure that decisions were made upon a consistent basis and an audit trail was created. When decisions are made by stakeholders, the economics become a way of providing an understanding of what the choice involves, and of some of the consequences of the options.

Fourthly, important decisions are inescapably tied in with questions about what social relationships ought to be. Notably, how much should taxpayers be prepared to pay to reduce the risk to other people, or should those at risk of flooding bear some of the costs?

An economics that excludes the question of justice is not fit for purpose. Justice is about how we choose as well as what we choose. A basic requirement of justice is that the same procedure is applied to all cases, that all are treated equally on the same basis. We may choose to make distinctions between cases but need to choose to do so rather than act on an arbitrary basis.

How does economics currently perform against these criteria? Rather badly at present, but the problems we face are so extreme and the issues so important that we cannot afford to give up on economics; instead we have to make it fit for purpose. ■

Recommendation

The purpose of economics has to be to help the stakeholders to decide which course of action to adopt.



Jaap Flikweert
Royal Haskoning DHV

Flood management in the UK – an informed Dutch perspective

The winter floods led to calls from communities, politicians and the media to “bring in the Dutch” to sort out the flooding.

Makes sense: most of The Netherlands is at risk of flooding and they still manage to keep it dry, and this has earned the Dutch a worldwide reputation. As a Dutch flood management advisor who has lived and worked in England since 2004, I can confirm that elements of Dutch practice could improve UK flood management. However, it is not as simple as just copying Dutch methods: the context is fundamentally different, and there are things the Dutch can learn from UK practice too.

First a few facts to compare the level and nature of the risk. Two-thirds of The Netherlands is at risk, including the four largest cities and the main airports and seaports; this means it is a matter of survival. Not so in the UK: only about 15% is at risk, even though this does include city centres, regional towns, important agriculture and critical infrastructure. The number of people at risk is about the same: 10–11 million for both. Recent calculations for both countries show that the economic risk of flooding is also similar: the statistically expected annual damage is about £1 billion per year. This is because risk is defined as the likelihood of flooding times the potential damage. In The Netherlands the consequences could wreck the nation, but there is a very small chance because of the strong flood defence system. In the UK, the likelihood is much higher, but the consequences are “only” at a regional scale.

For The Netherlands, in simplistic terms the alternative is to move to Germany. In the UK,



Municipality of Nijmegen

The ambitious Room for the River project

regions may be under threat, but nationally speaking there is always the possibility to “move up the hill”. This difference explains why in The Netherlands there is public and political support for funding flood risk management. The Netherlands spend about twice as much as England on flood risk management: approximately €1.4 billion (£1.1 billion) versus £600 million in England. But most other countries only invest after floods: at least the UK does have a structured programme of flood risk investment.

Arguably the flooding problem is more complex in the UK. The geology and hydrology are much more diverse: it rains more (especially in the west), and there are hills! It is therefore more difficult and expensive to reduce flood risk by a certain amount than it is in The Netherlands. The UK has a more complex problem, but the sense of urgency is much lower. This is the heart of the challenge faced by communities at risk and by flood management professionals in the UK.

The Dutch system is all about prescribed flood safety standards and a rigorous system of enforcing them. Government is committed by law to investing in achieving these standards. This works in The Netherlands, where flood risk is paramount. In the UK, it is the other way around: Government decides how much to spend on flood risk management, balancing its priority against other areas, and this budget is topped up by funding from those who benefit directly. The UK is actually world-leading in how it maximises return on this investment, but the money does not stretch far enough. I cannot see the UK switching to the Dutch system: no government wants to make that commitment. But the Dutch example does show that investment in risk reduction pays off: that is the main governance lesson from The Netherlands.

At a technical level, the geography and system have pushed Dutch flood engineers to excellence: they are very good at big solutions, and “making it happen”, finding the best possible compromise solution that provides adequate flood protection. The massive Room for the Rivers programme is a great example: widening the river bed throughout the country to reduce flood levels, while improving spatial quality.

The British situation, with its regular floods but limited funding, has produced experts that excel at maximising the return on flood risk investment, and also at dealing with floods through emergency planning and an advanced approach to flood insurance. Both countries lead the world with their evidence-based approaches to strategic flood risk planning. The Dutch are strong in innovation. A good example is the Sand Engine, which uses natural processes to distribute sand, protecting the coast and creating space for habitats and amenity. The Dutch accept the risk that an innovative solution might turn out less cost-effective in the short term, as long as it helps develop these better approaches for the long term. The UK approach ensures the best possible short- and medium-term return on investment, but sometimes stifles innovation.

Alongside the need to increase funding, this is perhaps the main opportunity: make use of the innovative methods and tools that the Dutch have invested in, as long as they are applied with the British context in mind. ■

Recommendation
Invest in more innovative flood management.



Helen Dangerfield
The National Trust

We need to work with nature, not against it

Recent winter floods have deepened the conversation about land, river and floodplain management.

Our experience of significant flooding over the last 15 years has resulted in a number of reviews. Consistent themes from these have been the need for partnership working, to plan flood risk management over longer time scales and at catchment scale, and to work with natural processes (the way in which we work with the land, rivers and floodplains and the way they function). Delivering these themes needs understanding of the challenges they present, and collaborative working to overcome them.

Flooding has had a big impact for the National Trust. For example, over 60 homes in National Trust villages were flooded in 2007 and overall costs to the Trust of the floods were estimated at £1.5 million. The *Pitt Review*, which followed the 2007 floods, resulted in comprehensive recommendations including the need to work with natural processes [Recommendation 27]. This was not the first time this recommendation had been made. The *Learning to Live with Rivers* report (2001) concluded that "sustainable flood risk management can only be achieved by working with the natural response of the river basin and providing the necessary storage, flow reduction and discharge capacity". Following on from these, the National Trust set out the need to work with natural processes at a catchment scale in *From Source to Sea* (2008).

Since 2007, we have suffered significant flooding, but there are a number of barriers preventing the uptake of measures that work with natural processes. First, the perception that only traditional infrastructure can defend against

flooding. Second, designing and promoting natural measures that on their own seem small-scale, but together can reduce flood risk. Finally, the lack of recognition of the multiple benefits of natural flood management measures: for wildlife, amenity and water quality, and protecting communities.

To begin to tackle some of these barriers, in 2009 Defra invested in three Flood Management Demonstration Projects, to show the multiple benefits of working with natural processes. The National Trust, in partnership with others, has led one of these projects at our Holnicote Estate, Exmoor. The Estate has two main rivers, the Horner and the Aller, with a catchment area of 40 km². A combination of measures to slow flow, store water and reduce conveyance were employed. These included moorland restoration in the headwaters, heather restoration, grip blocking, surface drainage management; encouraging the development of in-channel woody debris dams; working with tenant farmers to change land management and creating flood meadows.

Five years on, the work has demonstrated a reduction in downstream flood risk. During last winter's unprecedented rainfall in Somerset, there was no flooding in villages that have regularly flooded in the past. There was a 12% reduction in flood peak in late December 2013 on an already saturated catchment containing 90 properties at risk. It has resulted in a change in public perception with increased support from local communities for the project. Small-scale measures in combination have had a significant effect where a single scheme would not necessarily work (or be economic). Demonstration has been important. However, simplifying the language used about this work is a vital next step for people to really understand



Small-scale dams to hold water on Holnicote Estate

Nigel Hester, National Trust

what is needed to look after land, rivers and floodplains and the services they provide.

We need to recognise the value of restoring the natural functioning of rivers and floodplains. Payment for the services nature is providing is now being investigated at Holnicote. The properties' catchment have an insurance value of £30 million; the cost of natural flood management was £138,000. Demonstrating the financial benefits will aid understanding of what is needed to look after our land, soil and water for downstream benefit. There is also value in healthy, productive land rich in wildlife and culture, with access to nature. Around 1.2 million people visit Holnicote each year. If just 10% of them gave £1, this would generate £100,000 each year to invest in land management.

There is real opportunity to show those who love outdoor places what could be delivered by working with nature. The National Trust is looking at how the Holnicote model could be scaled-up through further work with our tenants and with natural processes. ■

Recommendation
We need to engage people in catchment-scale work, to manage land and rivers through continued active demonstration and clear communication.

References
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Defra Symposium (May 2014) Demonstration Projects, University of Manchester.
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The Pitt Review (2008) *Learning Lessons from the 2007 floods*; an independent review by Sir Michael Pitt.
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With thanks to partners in the Holnicote Flood Management Project: Penny Anderson Associates, JBA Consulting, the Environment Agency, Defra and the University of Exeter.



Paul Cobbing
The National Flood Forum

Flood victims must be heard and changes made

Twelve months after the winter 2013/2014 floods, hundreds of families had still not returned to their homes. Many others suffered from intense rainfall events in summer 2014.

The trauma of being flooded is difficult to imagine. People feel that their lives have been violated and, unlike most other crises, flooding can and does return. That fear often dominates people's lives. What is more, people frequently feel ignored and disempowered. We need to listen to local opinion and knowledge and stop disregarding those that live with a flood risk.

The National Flood Forum (NFF) is a UK charity supporting and representing flood risk individuals and communities. We:

- **Support people to prepare for flooding.**
People who are prepared suffer less. NFF supported Flood Action 4 Buckingham to work with Churches Together and a range of partners to develop a Community Flood Action Plan, one of dozens of examples.
- **Help people to recover after flooding.**
People often tell us that recovering from flooding is far worse than the flood itself. NFF supports people through the recovery, which typically takes 12-18 months. In West Sussex, we are working with communities flooded in 2012, moving from recovery to positive action to tackle flood risk.
- **Work to put flood risk communities at the centre of policy making.**
All aspects of government affect flood risk. We are working to ensure that Flood Re – the new flood risk insurance for householders – offers affordable protection.



Geoff Abbott / Alamy

Meeting flood victims and local consultation are vital

NFF's success is based on helping people to take control of their flooding issues, working with agencies and authorities. Our survey of people's concerns, and what they want government to do, reveals these needs:

Listen to what people are saying – they have critical local knowledge that is often ignored.

Co-ordinate – organisations need to work better together to deliver real synergies.

Co-operate – make sure that everyone knows each other's role so there is no duplication of effort. Involve local communities in planning.

Action – flood risk management is complex, but communities get frustrated by delays.

The impact of flooding will get worse, due to population growth, suburbanisation, rising sea levels, ageing sewerage and drainage infrastructure, increasing wealth and property (that could be damaged) and changes in agricultural practice. That's without considering changing weather patterns and climate change.

What does this mean for Government?

Most people surveyed don't believe that the Government is taking flooding seriously enough. Politicians are rolled out, there's a media frenzy, Defra, the Environment Agency and the local authority are blamed, and things return to normal. People want flooding to be a government priority. At the moment it feels as if each department is working in competition.

What is needed:

- **A review of how the planning system operates**
From development plans to building inspections.
- **An holistic approach to land and water management**

From policy to delivery involving people in communities; including the Water Framework Directive, Flooding Directive and Common Agricultural Policy.

- **Flood plans for organisations in high flood risk areas**
Especially for vulnerable people. Flooding can be a bigger risk than fire.
- **Sort out the mismatch during a flood**
Who has the lead responsibility, skills and resources?
- **Building regulations are inadequate**
People pay the price through insurance premiums and the trauma of flooding.
- **Sustainable drainage systems (SuDS)**
The lack of SuDS in England increases flood risks.
- **Implement the minimum budget requirements proposed by the Commission on Climate Change Adaptation Sub-Committee Progress Report 2014.**
- **Improve maintenance of flood assets.**
- **Flood Re must work with the public sector**
To share data, raise awareness of risk, help them to reduce it, and take strategic decisions on flood risk.

We need a step change in approach to meet the increasing challenge, one that involves communities at its heart. Otherwise, people will continue to feel that they are being ignored and left to fend for themselves. ■

Recommendation

Listen to what people want and make flooding a priority for the whole of the Government, not just Defra.

Recommendations in summary

The nine essays in this report each make a key recommendation for more effective flood management and recovery.

They draw on evidence from past flooding and severe weather events, research, and observations of how other countries deal with such events.

Some of these nine recommendations, summarised on the opposite page, are made in the context of specific events or areas of England, but they are applicable to many, across all areas where flooding occurs.

They suggest ways that, with the leadership and backing of the Government, individuals, organisations and public bodies can better equip and defend themselves against a future of increased floods.

1 Agriculture and wildlife must exist together, so that the character of the Somerset Levels can be maintained.

John Hebditch
Farmer in North Curry,
Somerset

2 Greater recognition is needed from public bodies of the benefits of social media in community response to floods, with strategies implemented to achieve this.

Dr Rebecca Sandover
University of Exeter

3 Flood risk management investment needs to be stepped up and sustained. We need to ensure best value from the investment by removing the artificial capital and revenue divide.

Fola Ogunyoye
CIWEM and Royal
Haskoning DHV

4 The outstanding recommendations of the 2008 *Pitt Review* on sustainable drainage and local flood risk management need to be taken forward urgently.

David Thompson
Adaptation Sub-Committee,
Committee on Climate Change

5 Social vulnerability needs to be better considered in responses to climate change.

Katharine Knox
Joseph Rowntree
Foundation

6 The purpose of economics has to be to help the stakeholders to decide which course of action to adopt.

Colin Green
Flood Hazard Research Centre,
Middlesex University

7 Invest in more innovative flood management.

Jaap Flikweert
Royal Haskoning DHV

8 We need to engage people in catchment-scale work, to manage land and rivers through continued active demonstration and clear communication.

Helen Dangerfield
The National Trust

9 Listen to what people want and make flooding a priority for the whole of the Government, not just Defra.

Paul Cobbing
The National Flood Forum



To find out more about the RSPB's policies on flooding and flood management, please contact **Jack Rhodes, Water Policy Officer**, by e-mail jack.rhodes@rspb.org.uk or phone **01767 680551**.

The RSPB is the country's largest nature conservation charity, inspiring everyone to give nature a home.

rspb.org.uk

The RSPB would like to thank all those who have contributed to this report, including:



Front cover photograph: flooding across the Ouse Washes by Nigel Blake (rspb-images.com), back cover: storms hit Porthleven in Cornwall © Apex News and Pictures Agency / Alamy.

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