Reducing the human misery and financial cost of future floods

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Summary

Detailed evidence on future flood risks and their management has helped identify solutions that would be more cost-effective in reducing the likelihood and impacts of floods.

A manual for developing the most effective flood risk management schemes in local areas has influenced national spending and policy on flood and coastal defence in the UK.

Challenge

Flooding has disastrous consequences for British households and businesses, causing large-scale disruption, distress and financial costs. For example, flooding in winter 2015/2016 alone cost the UK around £1.6 billion and it is feared that flood frequency, magnitude and durations will all increase in future. Understanding the nature of flooding is essential to manage future flood risks and respond to flood events effectively.

Solution

Professor Colin Thorne (University of Nottingham) and Professor Edmund Penning-Rowsell (Middlesex University) were two of the experts contributing to the government's Flood Foresight programme, which published its *Future Flooding* report in 2004.

The report set out a long-term (30 to 100 years) vision for flood and coastal defences in the UK and has provided an evidence base for flood management policy to the present day. The 2004 report was updated in 2008, as part of the review of summer floods in 2007 that was led by Sir Michael Pitt.

The Flood Foresight team used computer modelling to show the potential flood risk across the whole of the UK, based on an analysis of the geographical distribution of physical and human factors likely to influence the extent of flood impacts.

The research showed that increased spending on an appropriate combination of engineered and natural flood management with societal measures such as mapping risk, changing planning rules for floodplains, raising flood awareness, and developing community flood plans, would be far outweighed by the long-term cost-savings and benefits.

Benefits

Managing risk

Flood Foresight (2004, 2008) continues to inform analyses of flood risk and mitigation planning. The reports were cited in the Environment Agency's first national assessment of flood risk, and also informed the 2014 & 2019 Long-term investment scenarios (LTIS) for flood management in the UK.

The LTIS reports are part of the Environment Agency's long term planning for investment strategies in flood risk management, and as such are important to defining UK policy and approaches to flood mitigation.

In addition, the Flood and Water Management Act (2010) and resultant national flood and coastal erosion risk management strategy were partly designed to address issues identified by *Flood Foresight* (see part 1.2).

The research contributed to a body of evidence and policy scrutiny around flooding, that includes the RGS-IBG policy briefing, *UK flood risk management – policy recommendations (2016); and the Future flood prevention inquiry* (2016), after which the Government committed to investing £2.5 billion in capital funding for flood defences for the period 2015-16 to 2020-21.

Better decisions

Flood Foresight's research forecast changes in flood risk under different scenarios up to the 2080s, and estimated the costs and benefits of moving away from 'business as usual' flood risk management practices.

Over £200 billion of assets and 4.5 million people were estimated to be at risk from flooding, with annual costs running at £2.2 billion. The proposed, integrated approach to sustainable flood risk management was estimated to cost £30 billion less than relying on hard flood defences alone. Analysis suggested that for every £1 spent on sustainable flood risk management, £8 would be saved to the economy.

The UK's implementation of flood management policy was significantly influenced by this geographical research; the total expenditure on flood defences in 2010-11 was doubled to £0.75 billion.

In 2010, Professor Penning-Rowsell led the team that developed the latest version of the 'Multi-coloured Manual', a revolutionary method for developing flood risk management projects using a combination of solutions to maximise the greatest economic return.

The manual is widely used by the Department for Environment, Food and Rural Affairs and the Environment Agency. The Manual supports local implementation of national policy and ensures that increased spending is targeted in the most effective areas.

The research and expertise of Professors Thorne and Penning-Rowsell have also been recognised and adopted internationally, with the techniques they developed and championed being applied to quantify and manage future flood risks in Australia, China, Russia and the USA.

Further reading

Future Flooding report (2004)

An update of the Foresight Future Flooding 2004 project (2008) Evans, E.P., Simm, J.D., Thorne, C.R., Arnell, N.W., Ashley, R.M., Hess, T.M., Lane, S.N., Morris, J., Nicholls, R.J., Penning-Rowsell, E.C., Reynard, N.S., Saul, A.J., Tapsell, S.M., Watkinson, A.R., Wheater, H.S. (2008). Cabinet Office, London. The work was carried out as part of the Pitt Review of the lessons learned from the 2007 floods in England and Wales.

Multi-coloured Manual (2010) https://www.mdx.ac.uk/our-research/centres/flood-hazard/projects/multi-coloured-manual

Mid-term review of the Flood and Coastal Defence Foresight Project (2012)

Future flood prevention inquiry (2016), undertaken by the Committee for Environment, Food and Rural Affairs

House of Commons Library's research briefing on flood defence funding (2017)

Videos and resources from a 21st Century Challenges event on 'Achieving Sustainable Flood-Risk Management in the UK (2016)

RGS-IBG online lectures on Flood Risk in the UK