Cross-disciplinary working for flood risk management: the challenge for effective flood warnings

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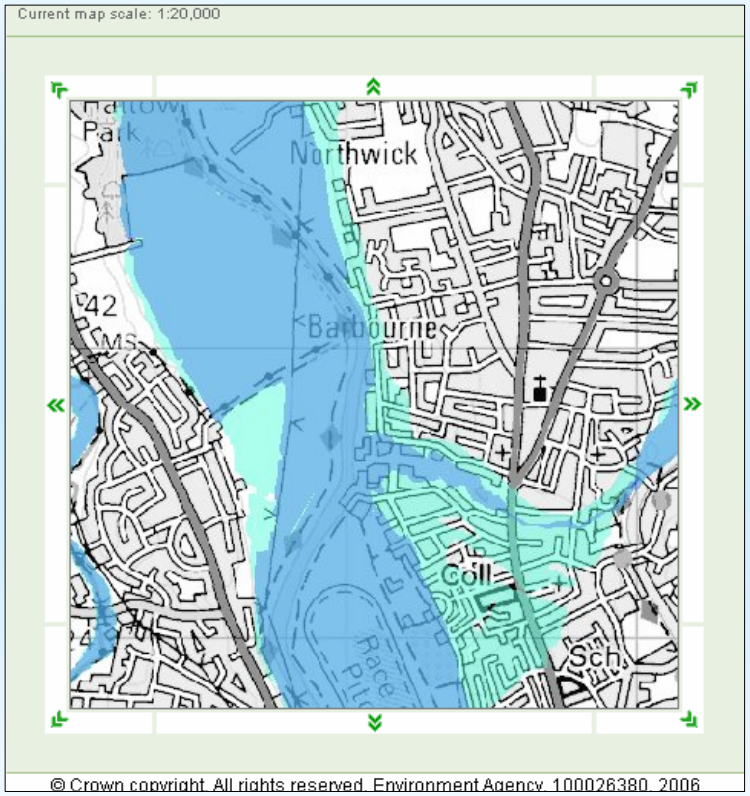
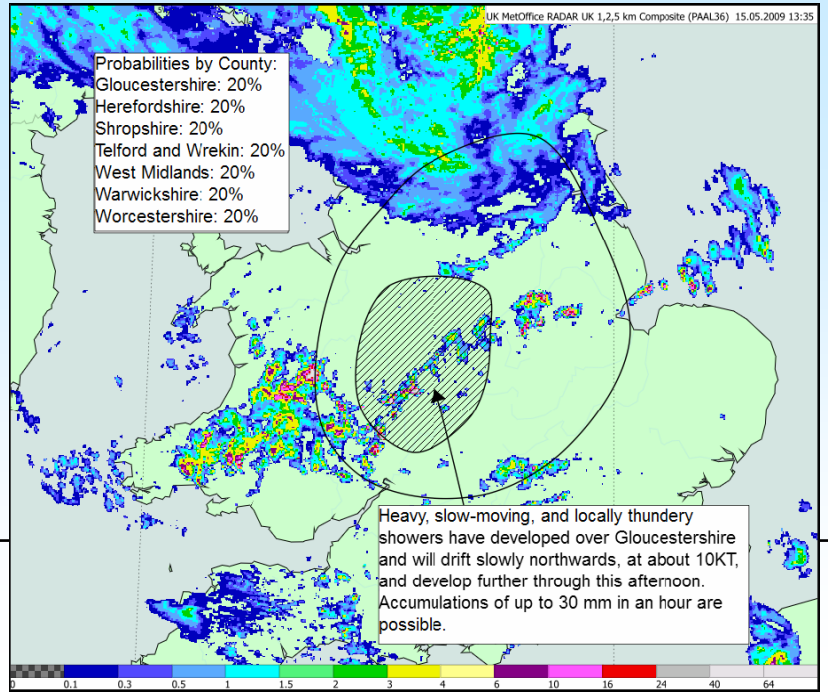
Structure of presentation

- Improving response to flood warnings
- A change of approach?
- Working towards more integrated and interdisciplinary approaches to hazard management: constraints and challenges



Prague, 2002



- Following major European flood events such as those in 1995, 2002, and the summer 2007 floods in the UK, there has been a major emphasis on improving operational flood forecasting and warning systems
- New methodologies for forecasting weather and flood events, including ensemble prediction systems, coupled precipitation forecasting and hydrological models generated by meteorological, hydrological and engineering sciences
- Extreme Rainfall Alert system

Currently in UK ...

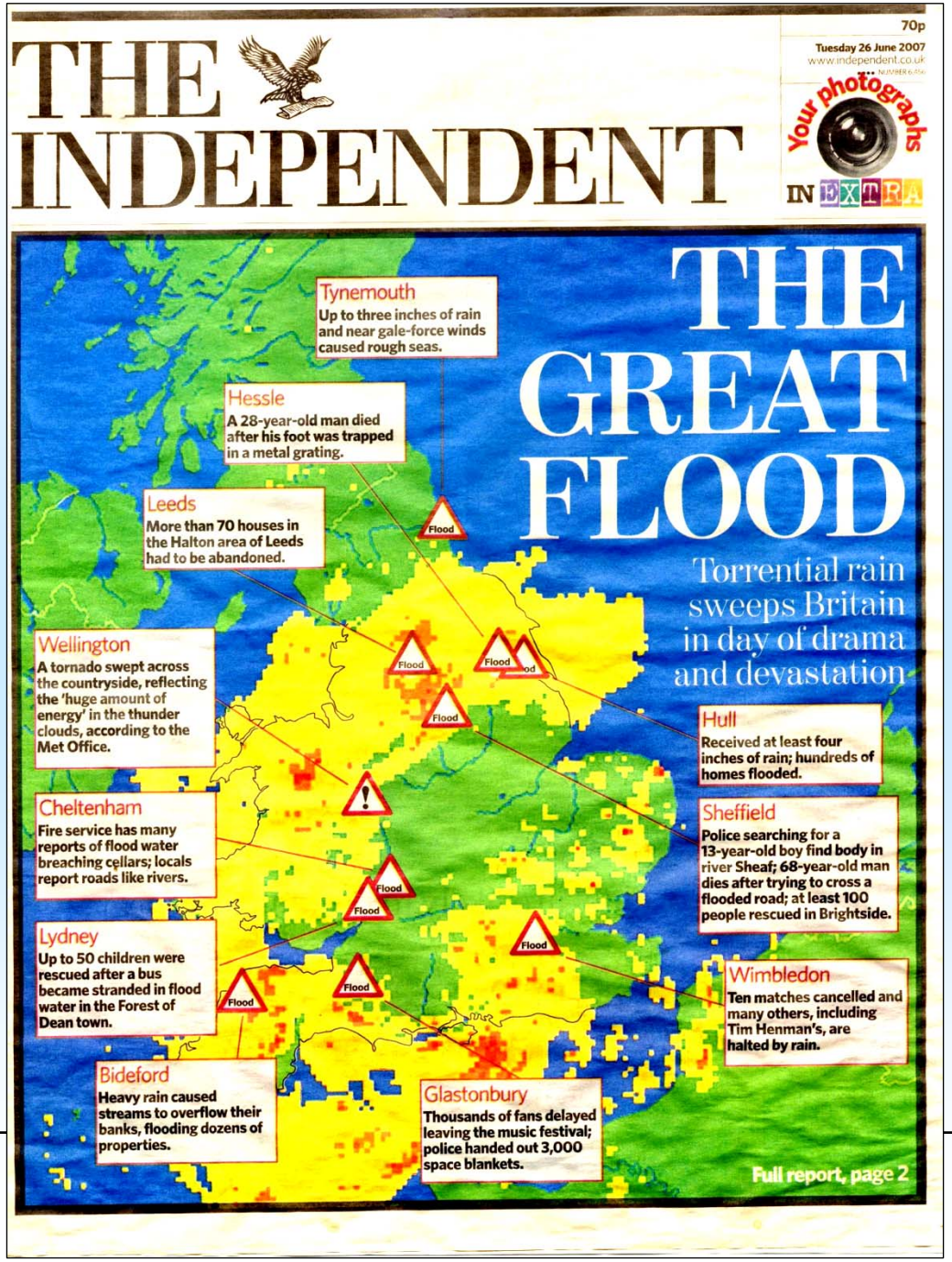
- Good advances in forecasting rainfall and severe weather
- Increasing ability to give more accurate flood warnings
- But, it's not just about giving people a warning
- It's also about how people ***respond*** to that warning and what actions they take
- Therefore needs an inter or cross-disciplinary approach

Challenges for Flood Risk Managers

- evidence of increased risk of future flooding and more extreme events
- increase in economic and human losses due to natural hazards reflects the need for improved risk characterisation, communication and mitigation.
- challenge of: different types of flooding e.g. pluvial, more people living in floodplains, more diverse, urban, mobile society, low general awareness of flood risk, high expectations for protection
- low levels of preparedness
- poor knowledge, inability or desire to respond

Tuesday 26th June 2007

Most severe floods in 200 years



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Pitt Review– some key issues raised

- Need to consider climate change and *how society can adapt*
- Need to focus on reducing flood risk: *better understanding of processes*
- Lack of flood *risk awareness* and confusion over conflicting advice given
- *Communications* and sharing of information needs to be improved
- Need to focus on *communities and people* impacts

All of these require social science input and multi and interdisciplinary working

Risk awareness and flood warnings

- Evidence from England and wider Europe (EC FLOODsite project) shows that even if people are aware of flood risk it does not mean that they take actions to prepare themselves
- Few people take effective individual damage avoidance measures on receipt of a flood warning.
- Thus the best forecasting and warning technology can be rendered ineffective if recipients respond inappropriately or do not respond
- Perceptions and behaviours are related to people's social constructions and evaluation of the risk
- Need better understanding of factors that influence flood awareness and of how flood risk is constructed by those at risk, of why people do or do not take actions
- Information deficit model – give people information and they will act appropriately – more complex than this – people do not respond in a mechanical 'stimulus-response' manner

Lower Thames Survey (McCarthy, 2006)

Number of preparedness actions taken before and after 2003 flood		
Number of preparedness actions undertaken	**Percentages (Number of cases) Before the flood**	**Percentages (Number of cases) After the flood**
0	19% (54)	22% (60)
1	30% (84)	20% (55)
2	21% (57)	21% (57)
3	11% (30)	11% (31)
4	5% (15)	9% (26)
5	5% (13)	7% (19)
6	4% (11)	4% (10)
7	1% (4)	2% (6)
8	1% (4)	4% (11)
9	1% (2)	0% (1)
12	1% (2)	1% (2)
Number of cases	276	278

Improving Institutional and Social Responses to Flooding Project (SC060019)

- Current flood warning system is not reaching enough at risk people - more specifically it is not reaching people who are most vulnerable
- Research in UK and Europe indicates that on average only around 40% of people receive an official warning, and often informal systems are in place
- The ‘one-size-fits all’ approach (same methods, messages for all etc.) is not effective - is in contrast with a key view that all floods and communities are *different*
- Current national approach works best for a ‘typical’ flood: slow rising river flood or events that can be forecast with current system i.e. not designed for other types of flooding (e.g. pluvial) nor for different recipients and needs

- Current system designed from technology perspective - communication context ignored
- Needs to be re-focused as a *response*-based service focusing on actions i.e. motivating and enabling people to respond effectively
- Need to shift emphasis to address problems of FCRM rather than e.g. achieving key performance targets
- Need to review how data, evidence, expertise is valued, delivered and used
- The communication context (i.e. trust and credibility of the source) needs to be considered or it will undermine attempts to improve warning methods and messages

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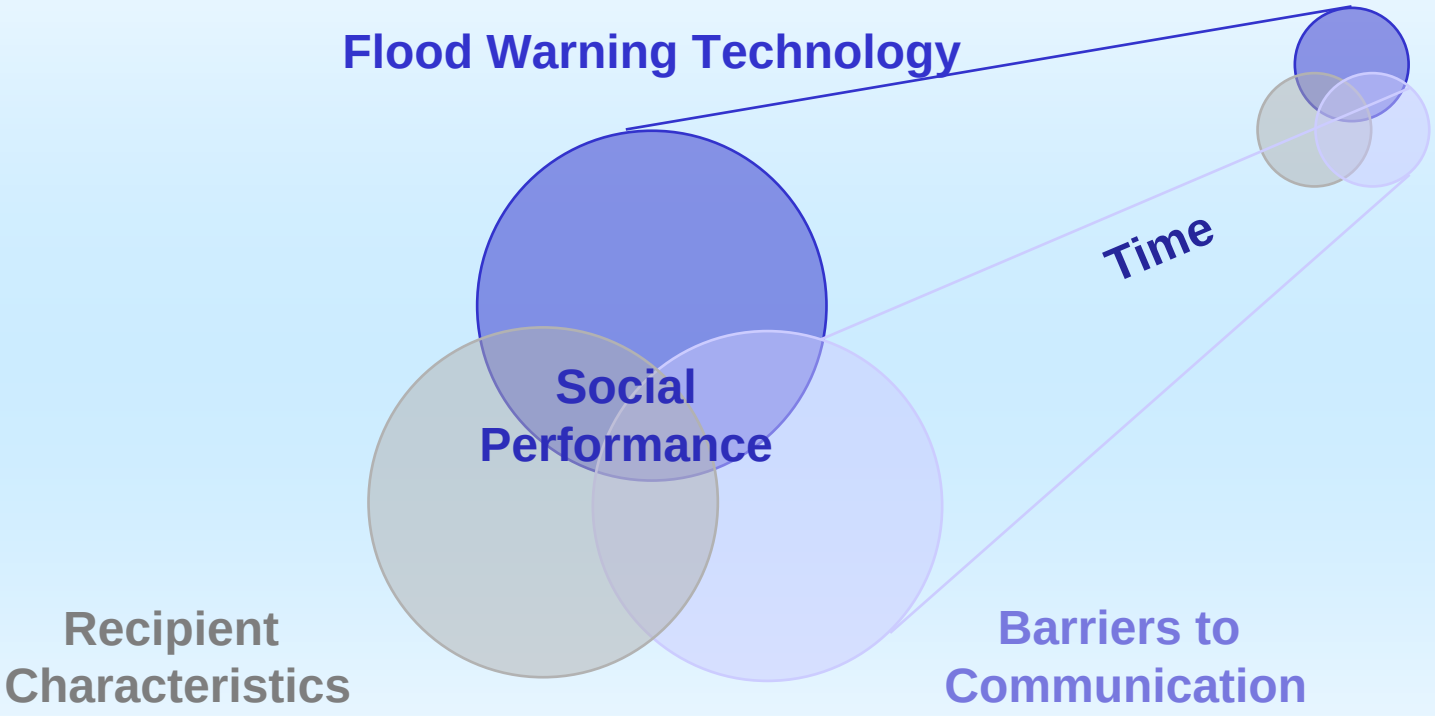
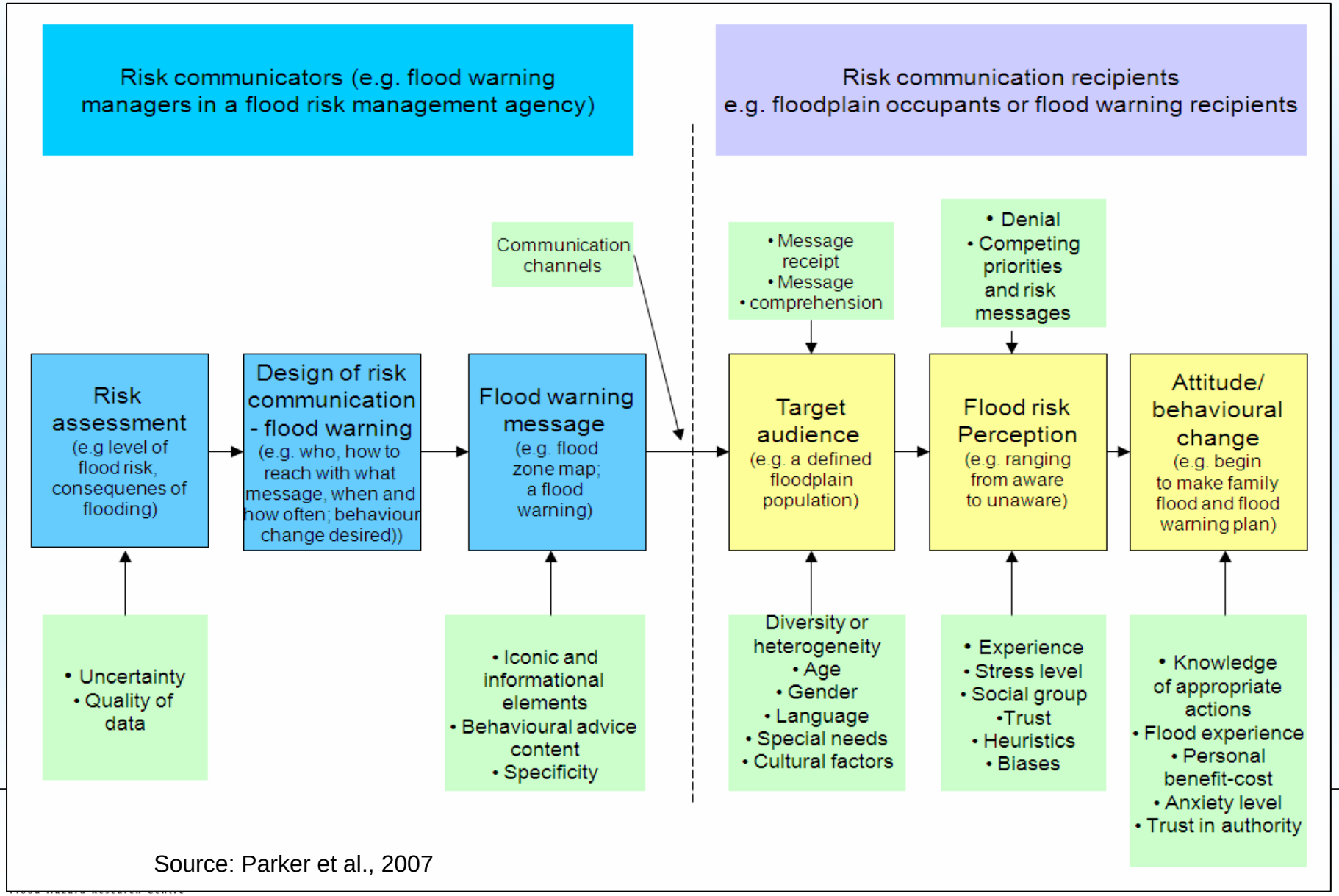
Factors affecting take up of warnings



Source: Tapsell et al., 2004

Flood warnings viewed as a process of risk communication designed to influence recipients' perceptions, attitudes and warning response behaviours



Source: Parker et al., 2007

A change in focus?

- The overall philosophy of FCRM in many locations is still one of a technical fix
- Resistence and recovery geared towards preserving and re-instating ‘normality’. ‘Putting things back to normal’ may simply re-produce existing vulnerabilities embedded in social structures and practices: need to develop a new resilience and normality
- Need to understand the social and psychological processes in why and how people respond to warnings
- Need a re-balancing of FCRM policy, with more emphasis given to resilience-building adaptation, while recognizing that more traditional strategies designed to resist flooding and provide emergency relief will continue to be needed
- ‘Old’ flood defence was engineering focused – now need adoption of a socio-technological approach to FCRM.

New skills and resources

- Still need engineering and technical approaches but *non*-technical approaches need to be better reflected in the allocation of resources and in skills and training
- Resources and skills need to be re-thought in terms of balance between technical and social activities
- Need to assess the cost-benefit of socio-psychological measures vs technical measures; the former may often be cheaper and provide longer-lasting benefits for community safety
- Socio-psychological measures are equally as important as technological measures for emergency preparedness and coping with flood impacts
- Need to build up relevant skills in engagement, communication and collaboration

New approaches in FCRM?

- The shift in FCRM strategies, along with societal change, requires a shift in approach
- Europe, Australia, US: experience indicates 'bottom-up' community-focused strategies designed around detailed understanding of socio-economic and institutional characteristics of each area work – context is key
- Are we in a transition to a more socially accountable, engaged and collaborative form of FCRM?
- How do we encourage that shift?

Why do we need an interdisciplinary approach?

- The frequency and size of losses due to natural disasters are increasing dramatically all over the world - managing such losses requires a holistic approach
- The complexities and magnitudes of multi-hazard events are too great to be studied in individual disciplines
- *Making Space for Water* (Defra, 2005) strategy aims at putting people and the environment at the centre of policy making and delivering the greatest economic and social benefits
- New ways of thinking needed in light of this strategy direction and recent flooding (Summer 2007)
- Scientists work in their disciplinary silos, not seeing the synergistic effects of working together, and often remain ignorant of very similar work in different disciplines

Benefits of such an approach

- To allow wiser investments and choices by governments, the private sector and society
- Decision making through the sharing of knowledges and values between science, technology, experts, policy makers and civil society (co-production and knowledge transfer)
- Interdisciplinary research addresses gaps through widening perspectives and cooperation across disciplinary boundaries
- Interdisciplinary research is an iterative process where the researchers are continually learning and adapting
- Development of mutual trust and respect for expertise
- Approach to risk reduction can operate at a range of time and space scales

Constraints to integration

- Differing epistemologies, ontologies and methodologies
- Need to develop a variety of tools and techniques to allow framing and development of problems
- Currently no guidelines for shared methodological frameworks
- Appropriateness (or necessity) of an interdisciplinary approach may differ for varying contexts and scales
- Building stronger relationships and better understanding takes time and funding should allow for this

Funding and publishing

- Scientists often think negatively about interdisciplinary research, perhaps due to difficulties in securing funding and publication
- Value of research is assessed by impact in publications, yet there is a lack of interdisciplinary scientific journals
- Need to publish in quality journals, but disciplinary tradition is entrenched and interdisciplinary science is hard to publish
- Research councils interested in funding for publication, but shift needed by funding bodies to adjust priorities towards more integrated programmes
- Recent ESRC-NERC-DEFRA expert workshop aimed at constructing an inter-disciplinary research agenda to address the characterization, communication and mitigation of risks from multiple hydro-meteorological hazards

Constraint from lack of understanding and value of social sciences

- Perception that social science is ‘woolly’ and fluffy and is just common sense
- Natural scientists often unaware of the range of social science techniques available
- Use of “jargon” and issues of language (all disciplines?), ‘wordy’ reports
- Often seen as a ‘bolt on’
- Misperception of costs and skills involved

Project on Supporting the development of a social sciences strategy for Flood and Coastal Erosion Risk Management R&D (FC2604/TR)

Project tried to de-mystify social science research in FCRM through capacity building activities: seminars, networks, good practice examples, resource CD-ROM

What is social science?

- *"Social science is, in its broadest sense, the study of society and the manner in which people behave and impact on the world around us".*

  Economic and Social Research Council, 2007

The use of social science approaches, methods and tools could provide benefits in a number of ways:

- by highlighting business efficiency and effectiveness measures
- by complementing research from the natural, engineering and physical sciences in order to give a wider multi and inter-disciplinary perspective on problems to be addressed and their possible solutions
- by addressing some of the interesting and complex questions at the *interfaces* between disciplines, which cannot be addressed satisfactorily by a single discipline
- by building new knowledge and ways of thinking e.g. by involving other stakeholders along with their knowledge

Remaining challenges I

- Integration of predominantly quantitative understanding of the probability and magnitude of natural hazards phenomena with social science perspectives on the central importance of social, political, economic and cultural processes in risk characterization and communication
- Complexities and difficulties with language across the knowledge domains
- Few examples of a genuine integration of the different theoretical and methodological approaches and little in the way of a shared methodological framework

Remaining challenges II

- Need examples of successful interdisciplinary approaches and research
- It is important to control the quality of interdisciplinary research and set standards for excellence

Excellent interdisciplinary research should have all or some of the following qualities:

- demonstrate conceptual or methodological innovation
- show innovation in the practice of science and in the relationship between traditional disciplines
- demonstrate the success of a project through uptake
- be demonstrated through high level publication in journals of different disciplines

Finally

- Need to recognise that interdisciplinary research and an integrated approach may not always be appropriate
- It is useful when it has the potential to benefit over the work of single disciplines – flood warnings is one such example
- Why not come out of your silos and give it a go?

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