

R&D Technical Summary W5C-016/TS

The Social Performance of Flood Warning Communications Technologies

Background to R&D project

It is increasingly accepted that flood risk cannot be eliminated. However, flood risk management activities can reduce the probability of flooding and can reduce the impacts of floods (Environment Agency, 2003a). Since 1996 the Environment Agency has accepted the role of delivering flood warnings in England and Wales where a service can be provided. The aim of flood warnings is to reduce the impacts of floods on people and to lessen property damage. This is achieved by providing a warning service that is accurate, timely and reliable, so that the benefits of flood detection and forecasting are captured as fully as possible.

The Agency is seeking to improve both the communication of flood warnings, and the public response to them, in other words it seeks to improve the ‘social performance’ of flood warning communications technologies.

New technologies are constantly emerging, particularly in the media, information, space and communication sectors. This potentially presents citizens with unrestricted access to information. Fast, inexpensive communication has enhanced people’s opportunities to provide others with information and to obtain information themselves, not just from regional or national sources but from global ones.

One social effect of this ICT revolution is to create a new community of ‘haves’ and ‘have-nots’ based on whether or not people have access to these new technologies at a time when the government is emphasising and introducing new policies and laws relating to inclusiveness (e.g. human rights legislation, new legislation covering the disabled). There is currently insufficient knowledge about how these trends are interfacing with and affecting flood warning communication, or how they are likely to in the near future (i.e. the next ten years), although there are already some indications within various R&D reports and survey data available to the Agency.

Currently not enough is known about the take-up and ‘adoption’ of flood warning communication technologies. Take-up includes whether or not people have ‘access’ to these new technologies. Those with access will fall into two categories: those who adopt the use of the technology, and those who choose (for one reason or another) not to adopt its use. The history of technological innovation indicates that the degree to which the population has access to and adopts technologies varies according to a range of factors. These include the nature of the technology; the manner in which the technology is introduced and promoted; the degree of perceived benefits and disbenefits to users; and other social and psychological factors such as fear of new technology or its perceived negative impacts. In addition, a variety of social, economic characteristics may act as barriers to access and adoption of technologies (e.g. age, educational attainment level and income).

How people respond to these technologies, how receptive they are to them, is also crucial to their ‘social performance’. Not much is known about the receptiveness of flood prone communities to different communication technologies.

The barriers to the receipt and effectiveness of flood warnings need to be explored further in order to find the best ways of maximising the social performance of communication and dissemination in flood warning technology, both now and in the future.

Aims and Objectives of the research

With greater knowledge about the various barriers, i.e. access to and adoption of warning technologies, it should be possible to target the deployment of these technologies more effectively to improve their 'social performance'. Therefore, the aims and specific objectives of the study were as follows:

- to review the flood warning technologies currently available, and likely to be available in the near future in relation to both fluvial and tidal flooding;
- to gather evidence on take-up, use of, and social performance of existing/recent and recent/future technologies;
- to analyse the information gathered in order to identify barriers to effective communication and lessons to be learned;
- to identify the best way to use the various warning technologies to improve their social performance in delivering the Agency's flood warning service.

Results of R&D project

Although existing research into the social performance of flood warning communication technologies is limited, we have found evidence that social performance is a considerable factor in governing the effectiveness of warning technologies and is primarily determined by four factors: the flood warning technology itself; recipient characteristics; communication barriers and variation over time.

Considerable research has been found regarding the availability, technical performance and functionality of the various warning dissemination technologies. The new and emerging technologies offer significant benefits to the operator, from better speed of dissemination to improved cost effectiveness, yet take up of new warning technologies is poor and international surveys confirm UK experience that warning recipients prefer the tried and tested traditional methods. There is evidence of increased community acceptance of 'new' warning technologies with increased time and experience of operation, but this needs to be underpinned by a community communication strategy and preparedness planning.

An individual's perception of risk is a communication barrier that directly affects their access to and willingness to use flood warning dissemination technology. Various recipient characteristics may be used as indicators of an individual's perception of risk, the primary ones identified through the research being; age; SEG, experience and special needs. Previous experience of flooding appears to be a dominant factor, because of the associated increase in perception of risk to the individual. There are also a number of other locally specific physical and political barriers to communication including hydrology, ICT provision and the presence of change agents.

The complex interaction of all of the above factors results in what is defined here as 'Social Performance'. We have found however that social performance is not a constant measure as it varies over time due to changes in technology, improvements/deterioration in infrastructure, and changes in risk perception, socio-cultural influences, and familiarity with technology due to experience and learning within the community.

The primary social performance factors have been used to create a simple model of social performance, the Social Performance Matrix. The Matrix confirms that the challenge for the Agency is to improve the social performance of the new and emerging technologies. It further supports the concept that a heterogeneous approach to flood warning dissemination is required utilising a number of complimentary communication methods.

Recommendations

The following recommendations are made:

1. Future selection of flood warning methods should be based on achieving optimum technical *and* social performance across a range of dissemination scenarios. This will entail adoption of a heterogeneous approach to flood warning dissemination using a selection of complimentary methods based on the specific characteristics of each community.
2. In terms of social performance, it is necessary to distinguish between individuals and communities of high and low perceived flood risk.

3. In light of the above, continue a public awareness programme that increases the public's perception of flood risk, and particularly target campaigns to those living in high risk areas.
4. Seek to increase the social performance of new and emerging technologies available through Floodline Warnings Direct by:
 - making access to flood warning technologies more desirable/essential by 'demand aggregation' initiatives with other agencies;
 - encouraging the diffusion of warning technology innovations by targeting campaigns at the 'early adopters' and the 'early majority' so that the take up of the new technologies is as fast as possible. Such campaigns may include identifying and engaging 'Local Champions', 'Change Agents', 'Change Aids' and 'taskforce campaigning'.
 - Creating more awareness of warning technologies among the later adoptees, perhaps by tailoring messages especially for these groups using appropriate communication channels.
5. Monitor the social performance of flood warning methods over time to input into future decision-making. This could be done by collecting relevant data in future at risk, post event and omnibus public opinion surveys e.g. access and willingness to use different warning methods by age, SEG, special needs, experience, gender, ethnicity, educational attainment and at different times of the day.

This R&D Technical Summary relates to R&D Project W5C-016 and the following R&D outputs:

- **R&D Technical Report - *The Social Performance of Flood Warning Communications Technologies***. Published May 2005.
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