SUMMARY OF WORKSHOP SESSION

RainGain 3rd National Observers Group Meeting, UK

Friday 21st March 2014, 09:30 to 16:00, WSP House, 70 Chancery Lane, London, WC2A 1AF

Attendees were split into three groups of approximately 15 people each. Each group comprised a mix of professionals, including rainfall experts, engineering consultants, flood risk managers, academics, amongst others. Each group was asked to carry out two activities: (1) identify the variables which would affect a decision to implement and operate a local surface water flood forecasting and warning system and (2) discuss and provide recommendations about key aspects which should guide the design of the interface of a local surface water flood warning system. Afterwards, a reporter from each group presented the group's findings to the audience.

In what follows the instructions provided to participants for each of the activities, as well as the outcomes, are summarised.

1. ACTIVITY 1: SCOPING ANALYSIS OF A LOCAL SURFACE WATER FLOOD FORECASTING SYSTEM

Instructions: In this exercise we would like you to consider the key variables which would affect a decision to implement and operate a local surface water flood forecasting system for a city (at county or district level). This information will help us to construct the economic argument for developing and implementing such system. In the table below we have started off the sort of variables you might consider. Please discuss these variables within the working groups and (a) add new items to the lists on either side and/or (b) if you feel our suggestions are a bit broad, please add more detail as you consider appropriate.

Main conclusions:

All the costs and benefits initially listed were considered important by participants. Moreover, participants expressed the view that all the listed variables, especially the work required/costs were highly linked and, as such, should be analysed together. Participants also suggested a number of new cost and benefits, and added some details to the variables initially proposed. These additions are **shown in blue fonts in the table below**.

Regarding the required tasks for the implementation of the system, the most important one was considered to be the business case, which is closely related to the scoping study and budget (in fact, participants suggested grouping these three variables). In addition, depending on their background, different tasks/cost variables were ranked differently by participants. For example, important activities for local authorities include staff training and provision of a communication and community engagement plan. In contrast, the implementation of local monitoring equipment (including siting, procurement, etc.) was considered critical by hydrologists and meteorologists. With regard to the benefits, many new aspects to be considered were suggested by participants, including avoided loss of life and harm to human health, possibility of selling the technology later on, increased confidence in the work done by local authorities, amongst others.

Work required or cost	Benefits or positive impacts
Scoping study for implementation of system (including definition of the type of system to be implemented (e.g. is it a kit system or a tailored one?), its capabilities, accuracy, etc.) – This activity must be carried out together with budgeting and preparation of the business case.	Avoided damage to roads
Preparation of business case to elected members, based upon scoping study and budget.	Avoided interruption to services such as health or public transport
Relevant permissions and consents	Avoided damage to private property
Seeking support funding from central government	Quicker response times in emergencies
Design and actual implementation of forecasting and warning system	Better prepared emergency services
Cost of procurement, installation and maintenance of monitoring equipment (including raingauges, water depth, flow gauges, cameras) – this must include cost of site survey and land negotiation	Better prepared and educated property owners
Training of staff for using the system	More opportunities for area based flood protection initiatives
Continuous acquisition of radar rainfall estimates and forecasts in real time for feeding into the system. This may include radar purchasing (depending on whether or not purchasing a radar is considered necessary/worthwhile)	Better protected critical infrastructure – need to clearly define what critical infrastructure is
Continuous cost of staff to operate and use forecasting and warning system	Avoided damage to businesses
Continuous cost of hydraulic software licenses	Business opportunities to provide support services
Regular maintenance and upgrades of forecasting and warning system – including upgrades of hydrological/hydraulic models when major changes take place in the system	A concrete example of better resilience and adaptation to climate change
Design and implementation of communication and public engagement strategies aimed at raising awareness and convincing people about the benefits and capabilities of the system. These strategies should also aim at teaching the public what the system means and what can be done upon receipt of alerts	More opportunities for proactive flood management – therefore, reduced vulnerability and resilience requirements could be reduced
Assessment of data and sensors currently available (from EA, local authorities, water companies, academic institutions, etc.)	More informed contribution to the development control and planning process – more evidence for planning
Analysis of existing tools and of the possibility of duplication: Will other people come back with similar systems?	Protection of people on the move and livelihoods, including avoided loss of life and negative health impacts (both physical and mental)
Research needed to better quantify and understand the uncertainties associated with the forecasts	Avoided damage to the environment
Assessment of the cost of false alarms (this is closely related to uncertainty estimation and understanding of model limitations and confidence)	Avoided damage to recreational assets / facilities (including bathing waters)
Real time update/calibration of hydraulic model	Potential reduction on insurance premiums, in case the warnings were available to the general public
	Avoided disruption to transport operations and other services
	Partnership opportunities
	Increase in confidence in the work of the local authorities and increased confidence in the forecasting system as a whole, as a result of more science behind it
	Better use of assets (benefit for water utilities)
	Possibility of selling the system/ technology to someone else

2. ACTIVITY 2: DESIGN OF AN INTERFACE FOR A LOCAL SURFACE WATER FLOOD WARNING SYSTEM

Instructions: With the background information in mind, we would like you to answer the following questions, which will guide you through the preliminary design of the interface of an **online local (i.e. district or county level) SWF warning system**. It is the interface of the website whereby information about surface water flooding in the near future will be presented (with the purpose of supporting decision making). This system will of course be linked to an automated warning system (e.g. with warnings sent to relevant stakeholders via email, sms, etc.), but what we want you to focus on is the **interface of the website**.

(a) USERS:

- Within Local Authorities, who will be the main users of a local SWF warning system?

Answer: Users may be different at each local authority. Potential users include: emergency planners, business continuity teams, planning teams, resilience officers, highways and drainage engineers.

(b) PURPOSE:

- What will the system be used for?
- Will users only access the system once flood warnings are in place? Or would it also be used on a regular basis for supporting asset management or other activities?

Answer: in addition to the obvious warning / event management use at the local authority level, other potential uses were identified by participants, including: as learning tool, to analyse and review the management of past flood events; as database, for storing data which can support planning decisions later on; for informing the public; on a regular basis for improved asset management.

(c) VARIABLES AND DISPLAY:

- **Which key variables** would you like to find in a local SWF warning system and **how** you would like these variables to be presented? What special functionalities would you like the system to have?

(Participants were provided with a preliminary list of potential variables to be included in the SWF warning system. *They were asked to indicate whether or not each of these variables should be included in the system and to rank them according to their importance/usefulness).*

Answer: there was not enough time to discuss this question in depth. Some general conclusions reached by the groups were the following:

- **Variables to be displayed:**
    - The two main variables that users would like to find in the local SWF forecasting and warning system are expected flood depth and expected flood risk (including magnitude, extent and location of these). It is worth mentioning that there was confusion amongst some discussion groups regarding the difference between flood depth/hazard and risk; this is consistent with previous findings of the RainGain project and highlights the need for properly training future users on the contents and science behind the system.
    - Moreover, many participants expressed the view that it would be useful if the system allowed switching the display between risk and depth.
    - The display of expected rainfall depths in the next few hours was considered useful by some participants, but confusing by others.
    - The display of cumulative (observed) rainfall depths throughout the area of interest in the recent past was considered unnecessary by most participants. It was thought not to provide significant added value, but instead it was considered to add more complexity than required. However, some participants mentioned that such information could be useful and that it could be complemented with information about soil moisture deficit and the like.

  - The display of water levels at gauging stations was considered useful by some participants, but not by others. Issues associated with this source of information include potential malfunctioning of the gauges, erroneous data due to incorrect placing of the sensors, amongst others.
- **System structure, display and desired functionalities:**
  - Consistent with the findings of the previous NOG meeting, participants concluded that the local SWF forecasting system should be nested within the national flood forecasting system.
  - However, the interface of the local SWF forecasting/warning system should be bespoke to users. It would be ideal to have a configurable interface (to be configured by each user), while ensuring consistency in the data and processes behind it.
  - Colour coded maps should be used for displaying flood depth and hazard.
  - Mobile/smart phone compatibility was identified as a must by most participants.
  - It would be ideal if the system included information and links about other sources of flooding. It would be good to have information from all sources of flooding in one place.
  - Participants emphasised the need to quantify uncertainties in the forecasts and to find a 'sweet spot' or balance between warning lead time and uncertainty. Interesting conclusions on this topic were drawn from the local authorities online survey conducted by RainGain partners (a paper summarising these conclusions can be found in this link).