

A framework for Decision Support Systems for flood event management – application to the Thames and the Schelde Estuaries

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ABSTRACT: There is a clear need for flood event managers to be able to improve the coordination of their response to flood events. The development of a flood event management Decision Support System (DSS) could assist flood event managers in this by providing information on the flood hazard, the receptors at risk and evacuation routes. This paper describes the development of a general framework for DSSs for flood event management. This framework has been piloted in the Thames Estuary in the UK and the Schelde Estuary in the Netherlands, resulting in the development of two prototype DSSs. Consultation with end users in the UK and the Netherlands indicated that a DSS for flood event management should provide the following: a database of “pre-run” flood events; mapping of the flood hazard; location of the receptors at risk (e.g. people, buildings, critical infrastructure); and details of safe havens and evacuation routes. The two DSSs allow users to compare hazards and risks related to flood event management, using the outputs from hydrodynamic and traffic management models.

1 INTRODUCTION

During a flood emergency, the responsible authorities need to make key decisions relating flood event management and evacuation/rescue strategies. Flood event management focuses on the short term actions during or just before a flood incident occurs. For example depending on the area at risk temporary flood defences might be deployed or people may be evacuated from the area in advance of a flood.

There is a clear need for flood event managers to be able to improve the coordination of their response to a flood event (Berghouse, 2006). A review carried out of Decision Support Systems (DSS) (Maaten et al, 2007) indicated that there are few DSSs that have been specifically developed for flood event management. The development of a flood event management Decision Support System (DSS) could assist flood event managers in improving emergency planning by providing information on the flood hazard, the receptors at risk and evacuation routes. This paper describes the development of a general framework for DSSs for flood event management. This framework has been piloted in the Thames Estuary in the UK and the Schelde Estuary in the Netherlands, resulting in the development of two prototype DSSs.

2 USER REQUIREMENTS FOR A DSS

For any DSS to be successful it is important that the potential end users are fully consulted. From the review on existing DSSs, as well as from interviews with end users, the most important user requirements were established (Logtmeijer, 2006). These can be summarised as follows:

- Pre-run results for various flood scenarios (e.g. differing breach locations and characteristics and differing hydraulic conditions);
- The flood hazard at vulnerable locations;
- Details of the receptors at risk (e.g. people, properties and critical infrastructure);
- Safe havens and exit routes;
- Coordination of all event response personnel;
- Storage of other relevant site-specific data;
- User friendly in terms of presentation of results.

Other requirements, like what kind of tasks should be included, heavily depend on the responsibility of the end-user, on the type of area and on the presence of related systems in each specific country/region. As part of the development of the prototype DSSs a generic methodology for the DSS was developed. This is described below.