



Web based collaborative decision making in flood risk management: Application of TOPSIS and visualisation techniques for ranking of alternatives

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Development of flood risk management (FRM) plans is ideally carried out in a participatory process with relevant stakeholders. Integrating stakeholders knowledge and information in the decision making process creates trust amongst decision makers and stakeholders that often leads to a successful implementation of measures. Stakeholder participation however does not come without challenges and hindrances (e.g. limitation of resources, spatial distribution and interest to participate). The most challenging type of participation is Collaborative decision making (CDM).

A web-based mobile or computer-aided environment offers an innovative approach to address these challenges and hindrances. Moreover, this also enhances participation.

Different phases or steps of a CDM process are addressing relevant management objectives, identify scenarios and sets of proposed alternatives, individually rank these alternatives in order of preference and present an aggregated rank to view the groups position. In individual ranking, formulation of judgement should combine scientific facts with stakeholders' beliefs and attitudes.

This paper presents a developed web-based CDM framework and its implementation, highlighting the application of a Muti-Criteria Decision Making (MCDM) method for individual ranking of alternative, the method Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) with Fuzzy logic. Moreover, an innovative visualisation technique for stakeholders' group ranking is also presented. Case studies are the Alster catchment (Hamburg, Germany) and Cranbrook catchment, (London, UK).

A series of stakeholders' workshops was done to test and evaluate the environments. It shows that the TOPSIS method provides a close representation of the stakeholders' preferences regarding the measures and alternatives. Overall the evaluation shows that web-based environments can address the challenges and hindrances and it enhances participation in flood risk management.

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