The role of multi-criteria analysis (MCA) in flood risk management decision making

Paul Hudson, phudson@uni-potsdam.de

1. Decision rules

In risk management decision making, various policies and options must be evaluated against one another. Common decision rules are:

1) Cost-benefit analysis (CBA)
2) Cost-effectiveness analysis (CEA)
3) Multi-criteria analysis (MCA)

Most common is CBA as it is sometimes legally required.

2. What is an MCA?

MCA is a broad family of methods that support the decision-making process by taking into account multiple and conflicting criteria and objectives through a structured framework. The common theme of the approach is that different outcomes (criteria) across interventions are weighted against one another and aggregated. Then the intervention with the highest overall score can be selected.

3. Integrated Risk Management…

…calls for all risk management stakeholders to share responsibilities and actions where suitable. Therefore, a more detailed and involved engagement is required. This is risk management decisions may be designed alone, but cannot be implemented alone. Therefore, carrying out the decision making process in a participatory process from the beginning creates trust between the actors helping to create more successful projects. This interaction is a fundamental part of the MCA approach.

4. Decision rule Advantages…

Important advantages are:

1) Subjective outcomes (e.g. equity concerns) can be better accounted for without additional methodological complexity as compared to CBA.

2) Participatory learning process with many of the same steps as a CBA. So it can be used as a wrap around method to add extra nuance to decision making.

… & Disadvantages

Important disadvantages are:

1) Widespread & representative stakeholder consultation is resource intensive. Therefore, likely too expensive for all but the largest policy interventions.

2) The final value doesn't tell you if the investment is a good/bad idea just that it is the preferred outcome. This is a problem as we only have limited resources. We must justify their use.
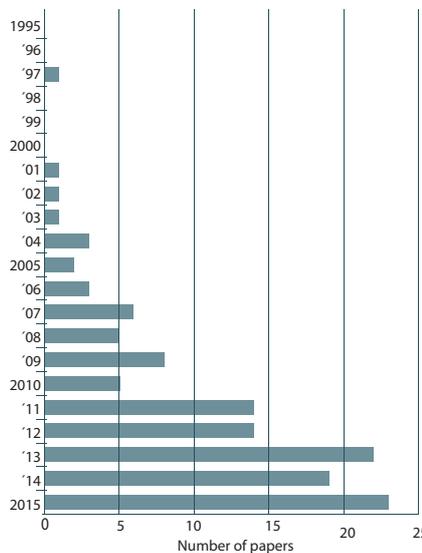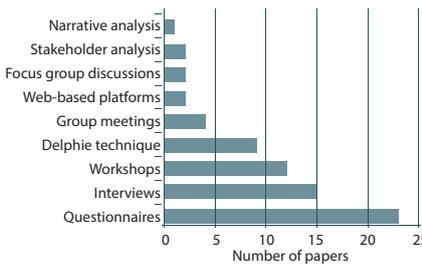
Fig. 1: Number of published papers linking flooding & MCA
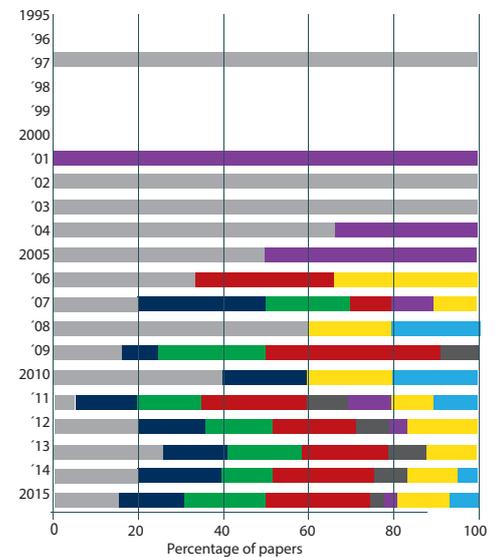

Fig. 2: (mainly Expert) Stakeholder engagement methods

Fig. 3: Topics currently studied using MCA approaches

Should MCA be used as the key decision rule?

By itself no, yes as a complement to cost-benefit analysis from the start of the project.

Comments, suggestions, other opinions, etc., please send to 'phudson@uni-potsdam.de' if I am not here

System-Risk Conference
17.–19. September 2019

SYSTEM RISK ETN

Universität Potsdam