

# Beliefs and Values on the Suitability of Different River Restoration Options as Nature-based Solutions (NbS) Insights from Participatory Multi-Criteria Analysis (MCA)

Mario Brillinger<sup>1</sup> and Sebastian Scheuer<sup>2</sup>

<sup>1</sup> Ruhr-Universität Bochum, Institute of Geography, Universitätsstr. 150, 44805 Bochum, Germany  
<sup>2</sup> Humboldt-Universität zu Berlin, Geography Department, Rudower Chaussee 16, 10099 Berlin, Germany

## 1. Problem Statement: the concept of NbS implies a problem of collective decision-making

- From a set of alternatives, a group of actors decides which action is a NbS (meet the NbS criteria)
- **NbS criteria:** Challenge-orientation, Ecosystem process utilization, Practical viability
- Each actor perceives and judges the NbS criteria differently, based on their knowledge, beliefs and values
- Involved actors will have difficulties agreeing on the same action as NbS
- Multi-criteria analysis (MCA) as an aid to deal with these problems in a structured way

## 2. Research Aim

- Understanding how government representatives judge and discuss the suitability of alternatives as NbS for a concrete problem at stake

**(1) Which alternative do individuals believe is most suitable as NbS?**

**(2) How does the personal values of representatives change the personal preferences on suitable NbS?**

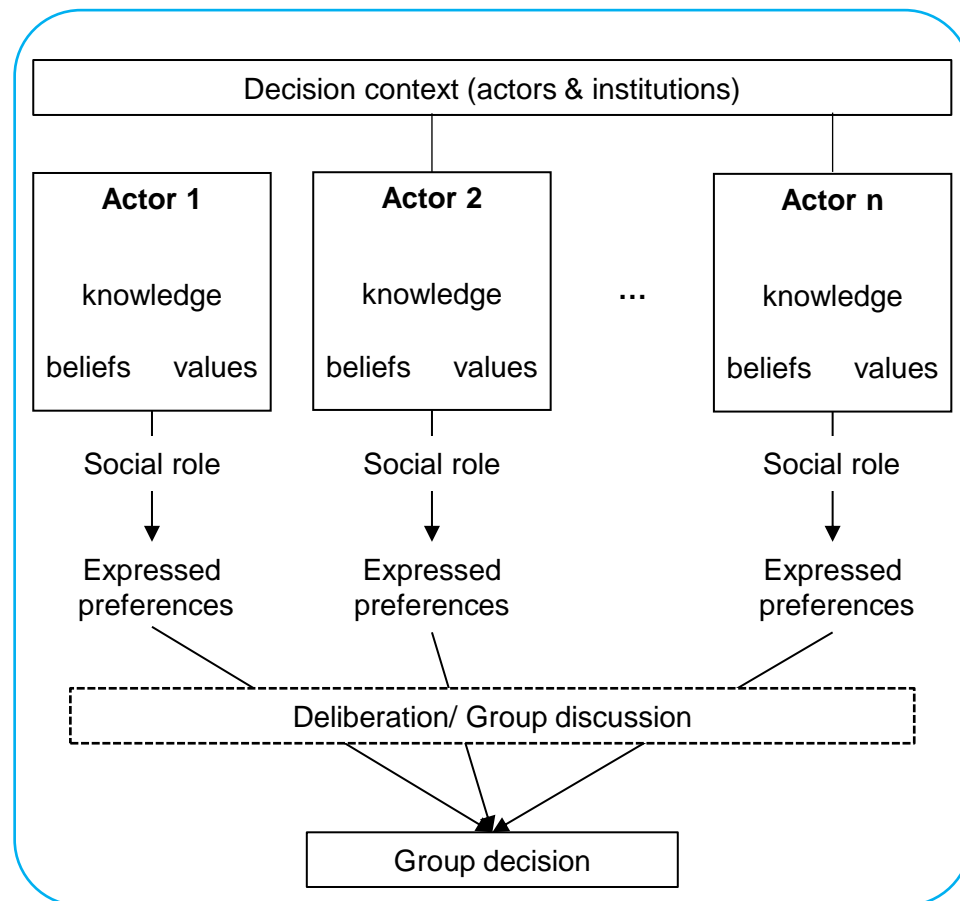


Figure 1: Collective decision-making process adapted from Elster (2005)

## Definitions

- **Beliefs:** what a person holds to be true, and what is certain or not
- **Values:** what a person holds as important and what is desirable
- **MCA:** assessment techniques that combine information about the performance of alternatives in relation to different criteria (performance scoring) with subjective judgements of the relative importance of these criteria (weighting) in order to compare and rank the alternatives.
- **Beliefs are expressed in the subjective judgements of the performances**
- **Values are expressed in the criteria weighting**

## 3. Participatory MCA for a Lahn river section in Germany

- **Decision problem:** to find the preferred restoration option for a weir, which best considers different stakeholder interests (→ *Challenge-Oriented*) and implementation constraints (→ *Practical viability*)
- **4 Alternatives:** doing-nothing (A0), small ecological measures (A1), near-natural bypass channel (A2), restoration of cut-off meander (A3); degree of human intervention increases from A0 to A3 (→ *Ecosystem process utilization*)
- **9 Criteria** including stakeholder objectives (e.g. flood protection, navigation, biodiversity, water quality) and implementation constraints (e.g. investment costs, acceptance)
- **Evaluation** during a one-day workshop with 11 representatives of various water authorities, done by each representatives and in small groups

## 4. Preliminary results

- When ignoring personal values, doing-nothing or small restoration interventions are often preferred
- When considering personal values, in tendency, higher degrees of restoration interventions are preferred
- Excluding criteria performances with stated uncertain knowledge, decisions are more often made for higher degrees of restoration interventions

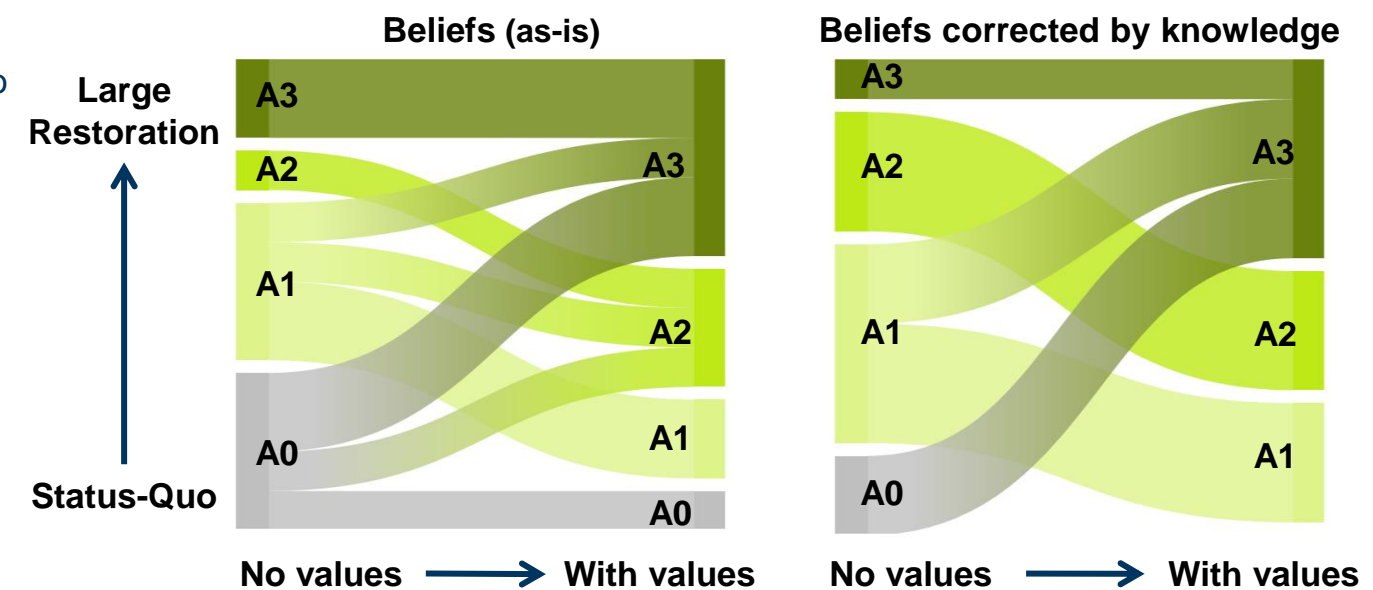


Figure 2: Sankey diagram showing the shift of personal preferences for the alternatives

## References

- Albert, C. et al. 2019. Addressing societal challenges through nature-based solutions: How can landscape planning and governance research contribute? *Landsc. Urban Plan.* 182.  
Elster, J., 2015. Explaining social behavior: More nuts and bolts for the social sciences, *Explaining Social Behavior: More Nuts and Bolts for the Social Sciences*. Cambridge University Press.  
Nesshöver, C. et al. 2016. The science, policy and practice of nature-based solutions: An interdisciplinary perspective. *Sci. Total Environ.* 579, 1215–1227.  
Munda, G., 2008. Social multi-criteria evaluation for a sustainable economy, *Social Multi-Criteria Evaluation for a Sustainable Economy*. Springer.