

Engaging and Conflict-Resolution preference elicitation in

Multi-Criteria Decision Analysis for Localized Mitigation Actions in Disaster Risk Management

Mohammad Reza Yeganegi¹, Nadejda Komendantova¹, and Mats Danielson^{1,2}

¹International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria, ²Department of Computer and Systems Sciences, Stockholm University, Kista, Sweden

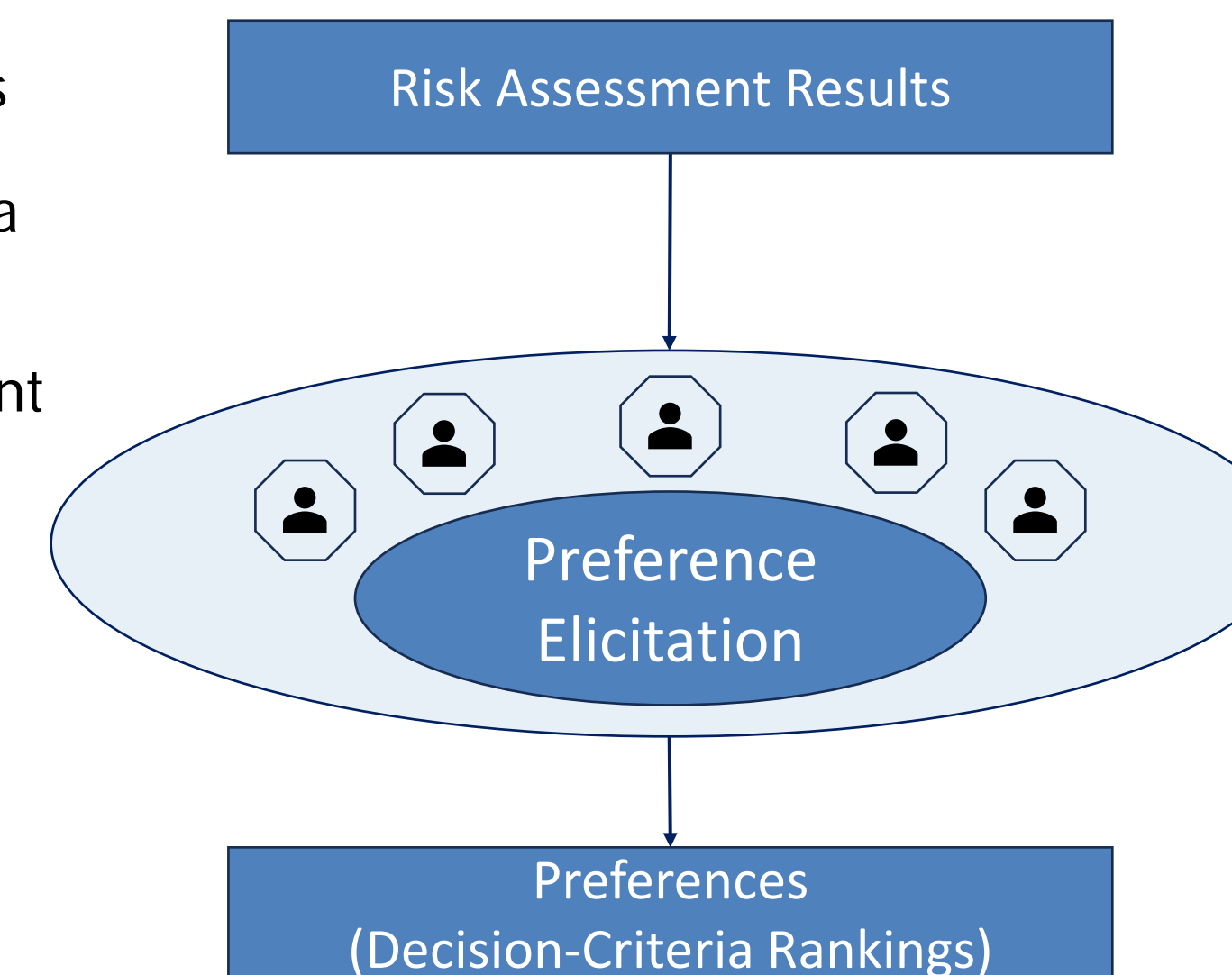
Multi-Criteria Decision Analysis; Integrating risk assessment with local communities' priorities

- Risk Assessment models estimate the cascading impact of multiple natural hazards, under different scenarios and combination of mitigation strategies.
- The decision-makers can use these information to choose suitable combination of mitigation strategies to mitigate the risk of multiple natural hazards.
- The question is which issue should be address first.
- Different experts with different background and different filed have different perception on important issues.
- This is one common source of conflict.



Expert opinion of importance of issues: Preference Elicitation

- The preference elicitation procedure aims to derive the decision-maker's perception of important criteria in the form of criteria ranking.
- Different stakeholders might have different opinions on important criteria.
- Stakeholders should understand each other's reasons for preferring different criteria as more important ones.
- Collaborative preference elicitation can help participants reach a shared understanding of the importance of each criteria.



Individual preference elicitation and averaging

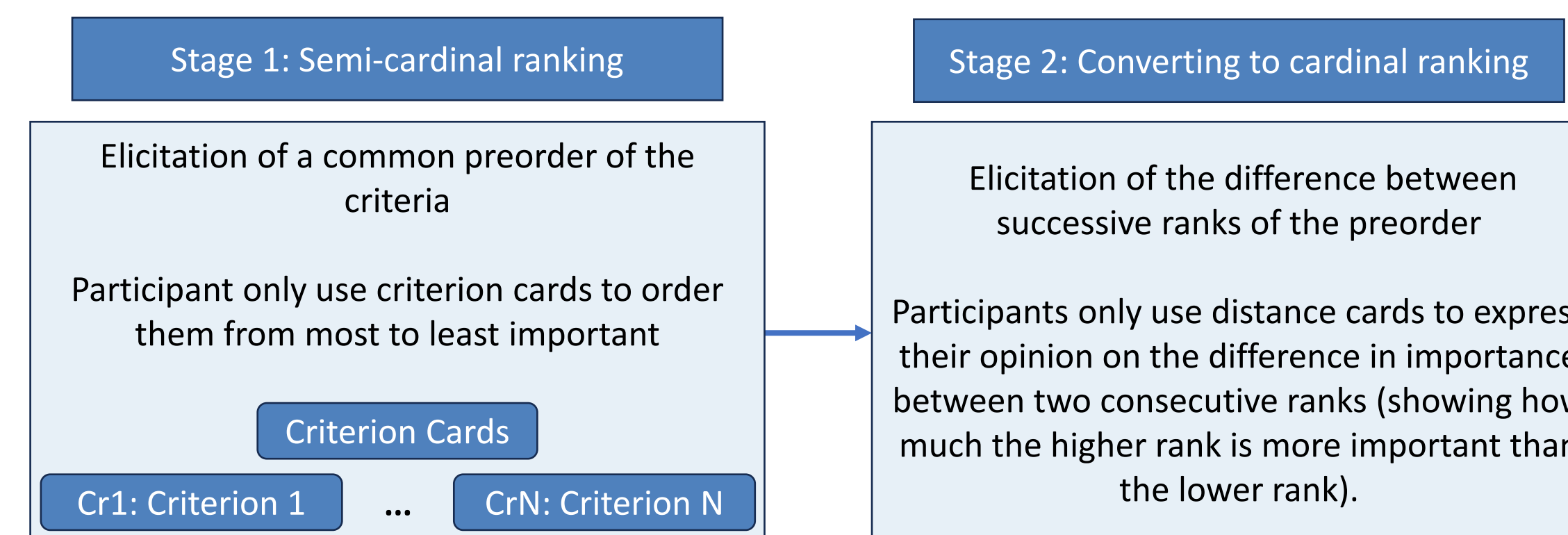
- One comment method for finding experts and decision-makers preferences is to ask them rank the criteria individually.
- The collective ranks will be calculated by averaging among all stakeholders.
- Individual ranking usually is being done by pairwise comparison, since it is easier for participants to compare two criteria at a time.
- The main issue in this approach is the high chance of inconsistency in the final result.
- Furthermore, the existing conflicts will go unaddressed in decision making process.
- Concerns from communities and experts can not be discussed during ranking.

Preference Elicitation with Silent Negotiation

- An alternative for individual ranking is to design negotiation among experts and community representatives.
- In this approach, not only every one can express their opinion, they can understand other's opinion, have a chance to build compromise, and address concerns.
- Negotiation does not guarantee conflict resolution, however, it creates the platform for addressing such conflicts.
- Undesired influences should be prevented during negotiation
- Participants need to be directed to compromise building.
- The process should create equal opportunity to all participants

Serious Game: Silent Negotiation

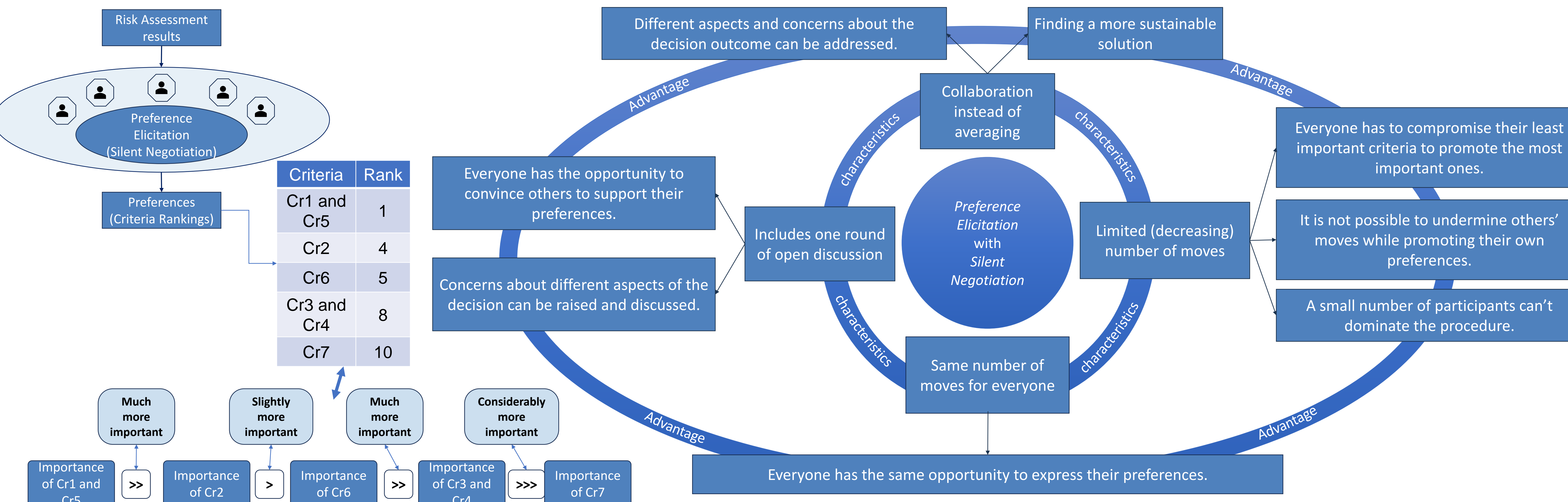
- The Serious Game is designed based on silent negotiation, in two phases.
- The game is designed to systematically direct the participant to compromise less important issues to promote More important ones.
- Th serious game has rounds of open discussion to create equal opportunity for sharing concerns and opinions.



MCDA: Integrating risk assessment with local communities' priorities



Preference Elicitation with Silent Negotiation: Advantage



Implementation for disaster risk management

MEDiate is a Horizon Europe project aimed to co-design and develop a platform for multi hazard disaster risk management. It is being implemented in 4 testbeds (Oslo, Nice, Essex and Múlaping).

The project provides a state of the art DSS with advanced MCDA layer.

The serious game of silent negotiation is designed and implemented as part of the MEDiate's MCDA layer.

The serious game is implemented in different testbeds. In each case different discussion was formed and a common solution was found based on local characteristics.

