

## Decision Support Systems

**C10: An educated guess: decision making towards strategies for the most vulnerable**

**Setting the scene**

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- 1. Framing the debate - Sönke Kreft, Munich Climate Insurance Initiative**
  
  - 2. Bridging the knowledge practice gap in climate response at city region scale in Africa – The case of climate knowledge co-production in the City of Lusaka – Gilbert Siame, University of Zambia**
  
  - 3. Coping with climate related environmental changes in Pacific SIDS – Katharina Beyerl (IASS)**
  
  - 4. Good practice for multi-stakeholder decision making: a case study in Marocco using the Economics of Climate Adaptation (ECA) approach**
- + Poster (Baba Adam; Alicia Dipierri)**

# the why – Introduction to DSS

- **Climate Change** has widespread impacts on human and natural systems (IPCC, 2014a)
- **Incidence and magnitude** of naturally induced **disasters** is **rising** globally (Guha-Sapir & EM-DAT, 2016)
- Poses an eminent threat towards societies:
  - National economies
  - Communities livelihoods
  - Health (Hallegatte, 2014; UNISDR, 2015)

“Responding to climate-related risks involves decision making in a changing world, with continuing uncertainty about the severity and timing of climate-change impacts and with limits to the effectiveness of adaptation” (IPCC, 2014b, p.9)



To better manage climate risks →  
well-functioning **Decision Support  
Systems (DSS)** are essential

# the why – Relevance of DSS for climate risk management



problem statement -> research -> information -> decision -> implementation

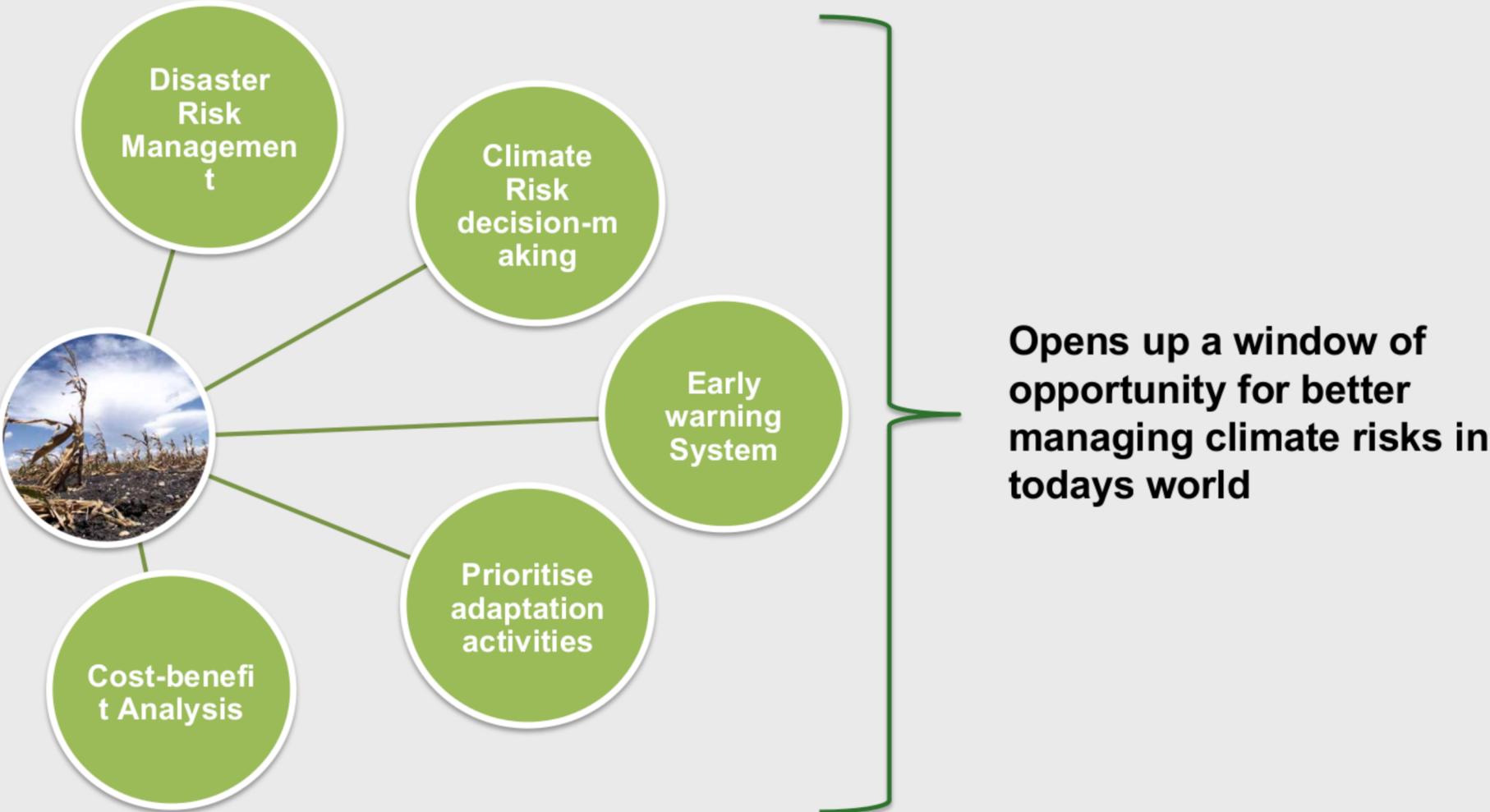
“In order to increase adaptive capacity and empower people to cope with their changing environment, it is imperative to develop decision-support tools that help people understand and respond to challenges and opportunities” (Nay, Abkowitz, Chu, Callagher, & Wright, 2014)



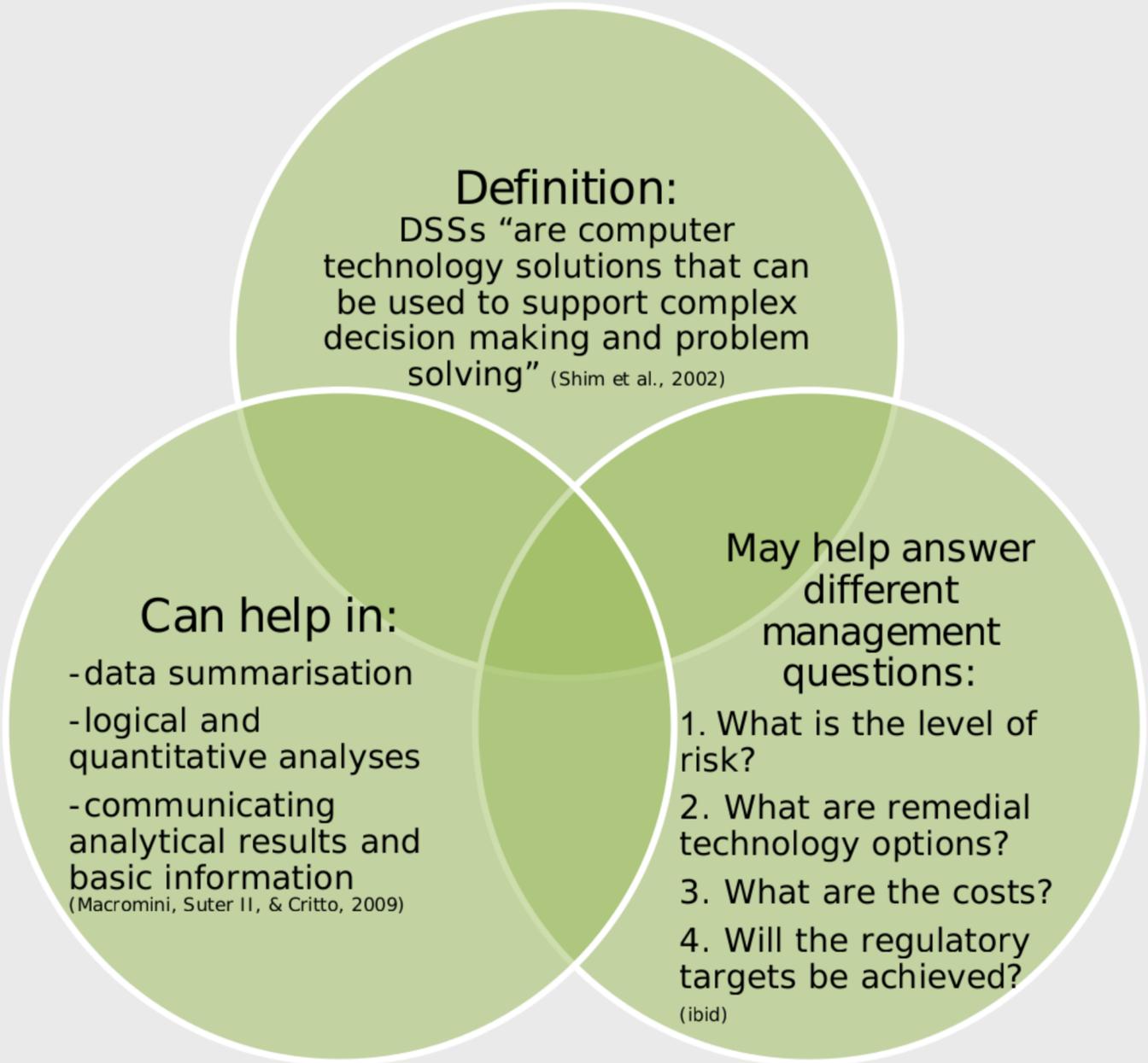
➤ **DSSs are important for prioritising, understanding, and assessing climate risks** (Nay et al., 2014)

➤ **Of high relevance for developing economies that depend more on climate sensitive- activities** (Hertel & Rosch, 2010)

# the why – Relevance of DSS for climate risk management



(Funk & Verdin, 2010; Kumar & Pathan, n.d.; Nay et al., 2014)



## Information-Based DSS

- Include information upon which decisions are supported
- **Simplest form:**
  - Offers access to textual information and can include static tables, pictures, and graphics
  - Information is used qualitatively to enhance decision-making
  - Examples: web-searching & checklists
  - Does not include numerical information or data and therefore does not include explicit quantitative analysis
- **The next level:**
  - In addition to information → Numerical data that may be used in summary form for support-decision making (NOT used for inferences, predictions, or decision analysis)

(Marcomini et al., 2009)

## Model-Based DSS

- **Adding a quantitative component**
  - This step can be described as building a decision model and making use of an inference engine to process the model
  - Provides numerical solutions
  - Solutions do not necessarily include decision analyses and might instead incorporate inference or predictions

(Marcomini et al., 2009)

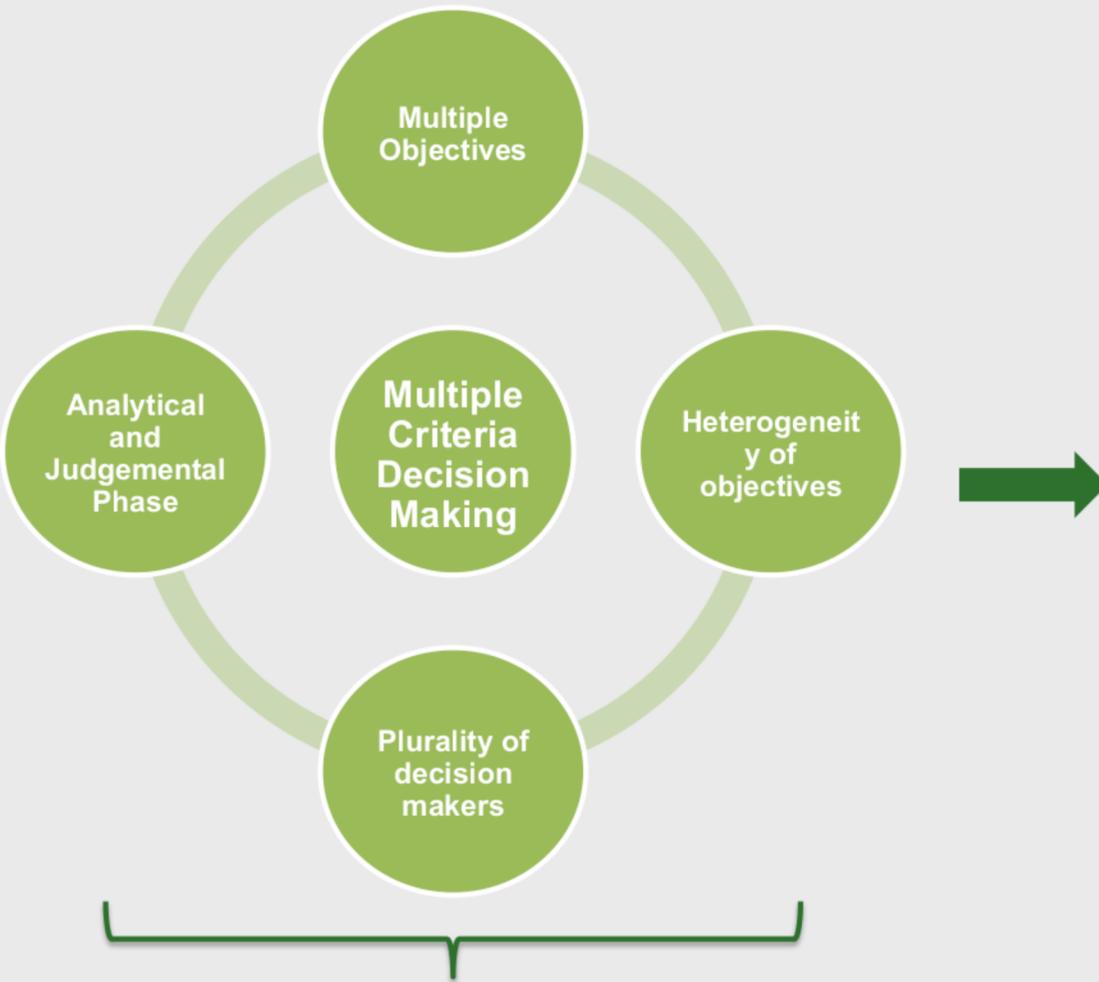
## Challenges in implementation

- **Inadequately tailored to user needs**
- **Not specific for a given problem**
- **Too complex or complicated**
- **Lack of suitable data, and challenges in capturing uncertainties**

Wenkel et al. 2013

# the what - Examples of Decision Support Systems

## in Climate Risk Management



Multiple Criteria Decision Making (MCDM) presumes the existence of a policy maker and has the purpose to support his decisions by providing information with better quality (Seo & Sakawa, 2012)

- Multiple Criteria Decision Analysis (MCDA) tools in environmental science have grown in the last decade
- **It is used in different sectors:** waste management, water quality, air quality, energy, natural resources, stakeholders, strategy, engineering, restoration, spatial analysis (GIS), and environmental impact assessment
- Applications require strategy development, stakeholder engagement, and integrated environmental assessments
- Despite its usefulness, it is a complex process (Huang, Keisler, & Linkov, 2011)



How does your contribution facilitate better decision making for Climate Risk Management? What is your entry point/target group for the information provided?

Climate change brings a deep uncertainty of future conditions: What's your perspective to achieve robust decisions in the context of high variable climate and socioeconomic scenarios?

How does your contribution help to better safeguard the perspective of most vulnerable people?

**Thank you very much for your attention!**



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