



Management of Disaster Risk and Societal Resilience (MADIS)

Workshop: Next Steps for Future Disaster Research

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Introduction

- Management of Disaster Risk and Societal Resilience (MADIS) is an internationally-funded project through Belmont Forum and EPSRC.
- MADIS aims to improve insights into the interaction and interdependencies between different risk, resilience, and vulnerability indices and their relationship to the impacts of droughts and evolution of infrastructure systems.





Research Team

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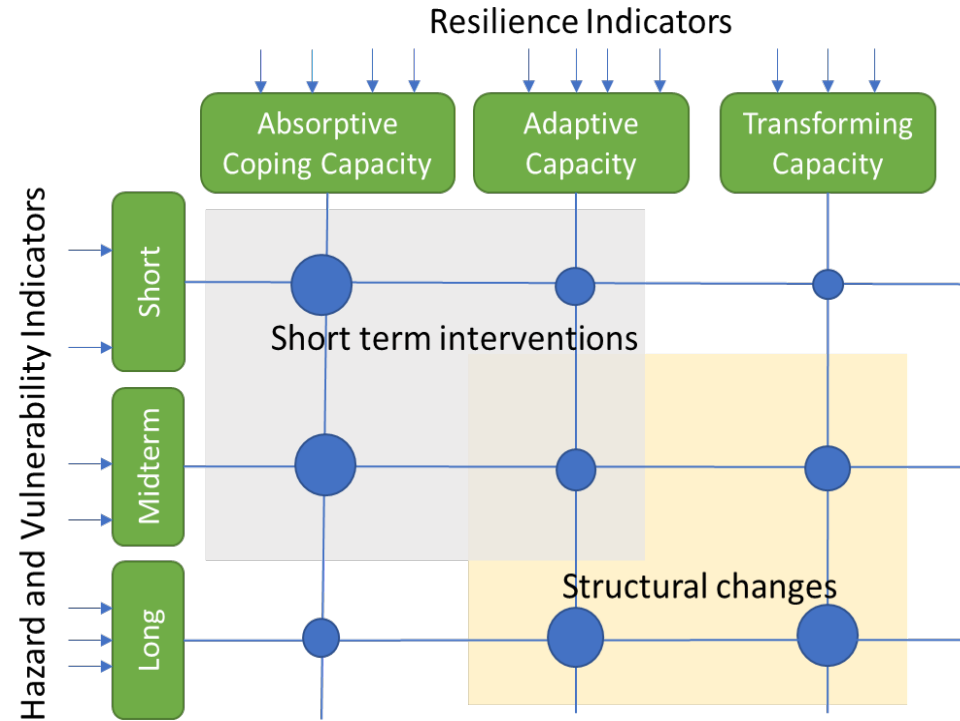


Elisabeth Shrimpton
Governance
Disaster Risk



MADIS Approach

- Better identify and represent the linkages between hazard, exposure, sensitivity, and resilience indicators.



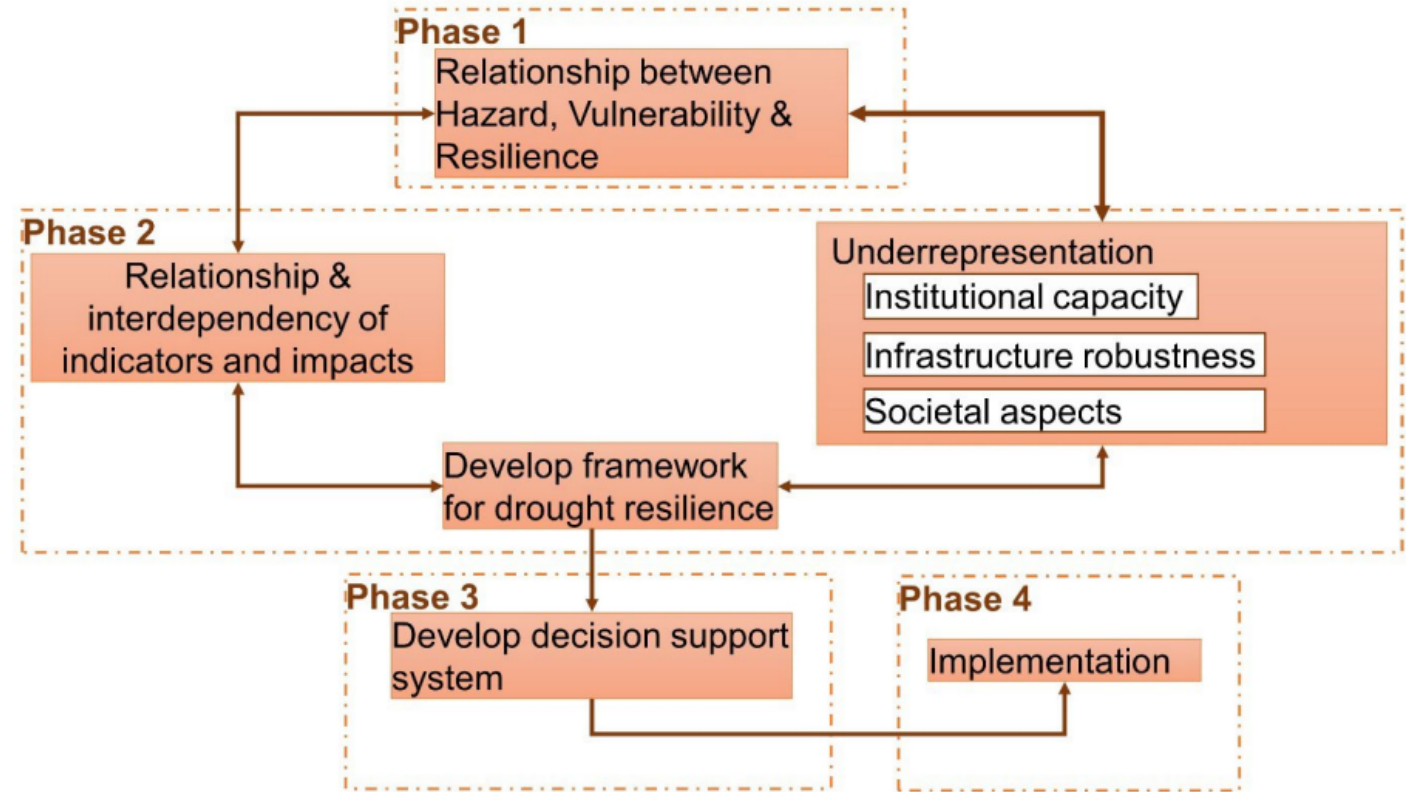
versus the current linear approach





Objectives of MADIS

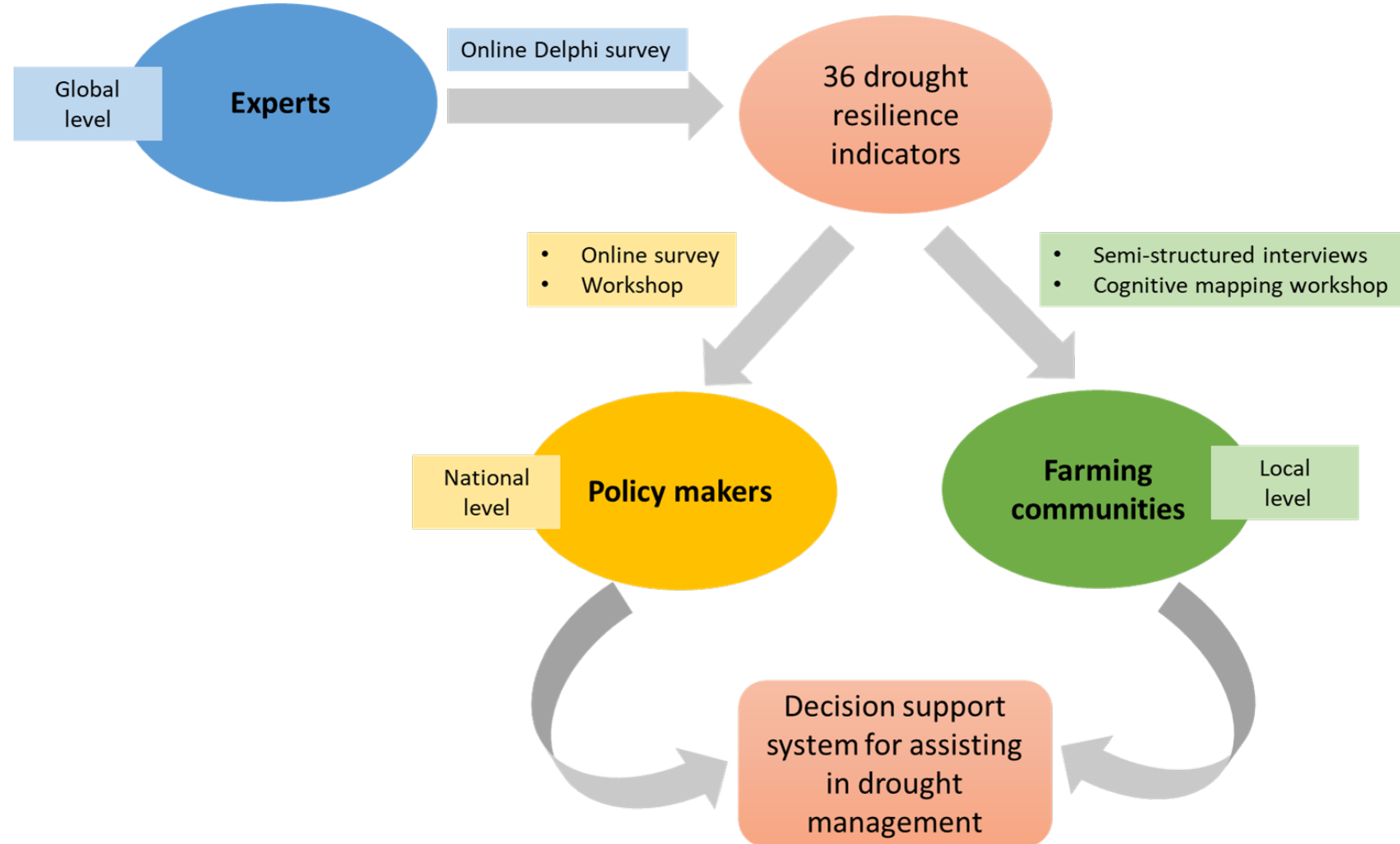
- Relationship between drought hazard, vulnerability, and resilience
- Role of institutional, infrastructural, and societal dimensions to improve drought resilience
- Linkage between droughts indicators and their impacts
- Drought management using socio-technical tools for decision making





Overview

- MADIS looks at drought indicators from different perspectives.
- Experts
- Policy makers
- Small scale farming communities





Global Online Delphi Survey with Experts

36 drought vulnerability and resilience indicators were evaluated in terms of its relevancy, easy of understanding, data accessibility, data objectively, data consistency over time.

Scale: low, medium, high, and don't know.

Resilience

Category	Indicators
Agricultural (crop)	Cultivation of drought-resistant crops (%)
Agricultural (crop)	Farmers use different crop varieties (%)
Agricultural (land)	Land rights clearly defined (yes/no)
Government & policy	Existence of drought management policies
Government & policy	Technical assistance from local entities
Government & policy	Farmers with crop, livestock or drought insurance (%)
Government & policy	Water use rights clearly defined
	Availability of drought prediction and warning systems or climatic predictions
Infrastructure & Technology	Transportation network
Infrastructure & Technology	Access to electricity (Access to energy)
Socioeconomic	Food source reliability and diversity
Social	Public participation in local policy
Social	Participation in farming cooperatives or associations
Socioeconomic	Access to financing and credit
Water/stream	Integrated land and water management policies
Water/stream	Percentage of retained renewable water
Water/stream	Total dam capacity

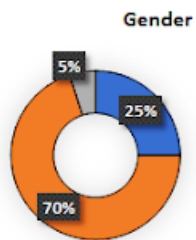
Vulnerability

Category	Indicators
	Percentage of participation of crop and livestock production in the income of smallholder farming
Agricultural (crop)	Crop Damage & Sensitivity (Crop Loss)
Agricultural (general)	Area protected and designated for the conservation of biodiversity (%)
Agricultural (general)	Use of Insecticides and pesticides (Use of agricultural inputs)
Agricultural (general)	Crop water use efficiency (WUE)*
Agricultural (land)	Degree of land degradation and desertification*
Social	Prevalence of conflict/insecurity
Social	Population without access to (improved) sanitation (%)
Social	Gender inequality (categorical)
Social	Rural population (% of total population)
Socioeconomic	Unemployment rate (and/or proportion of formal work)
Social	Population ages 15-64 (% of total population)
Social	Percentage of population displaced internally or transboundary
Social	Presence of drivers of migration and displacement
Socioeconomic	Poverty Rate
Socioeconomic	% of the population employed in small farms
Water/stream	Baseline water stress (ratio of withdrawals to renewable supply)
Water/stream	Water quality
Water/stream	Groundwater level/sources

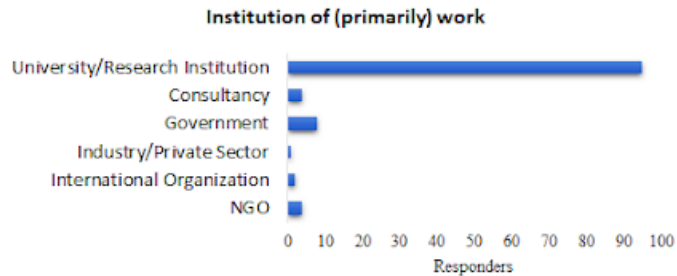


Online Delphi Survey with Experts: Demographical Overview

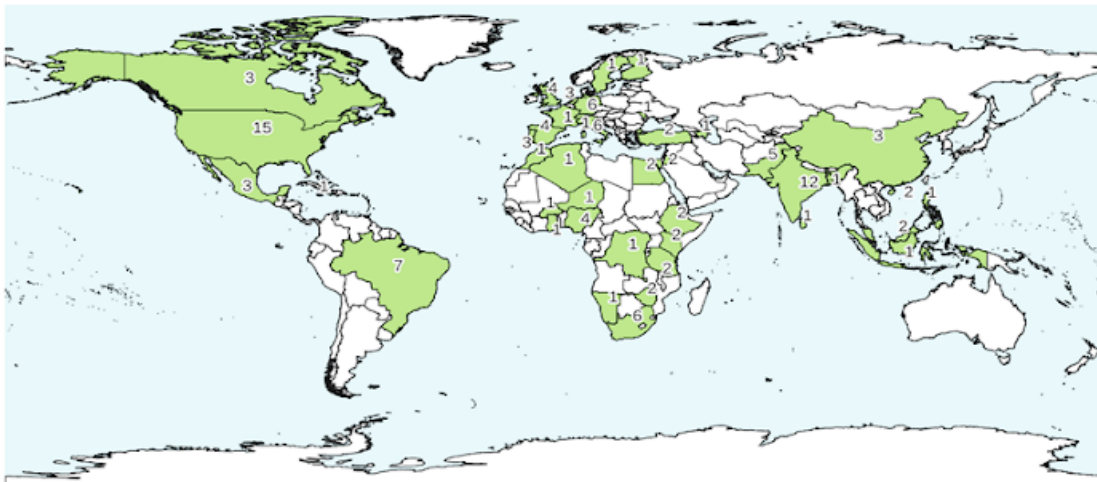
Primary information



■ Female
■ Male
■ Other/NA

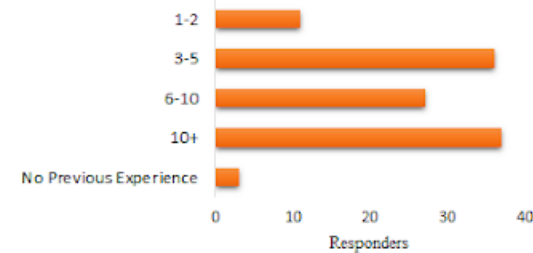


Location

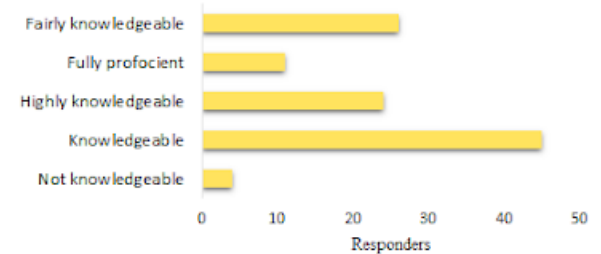


Expertise in drought

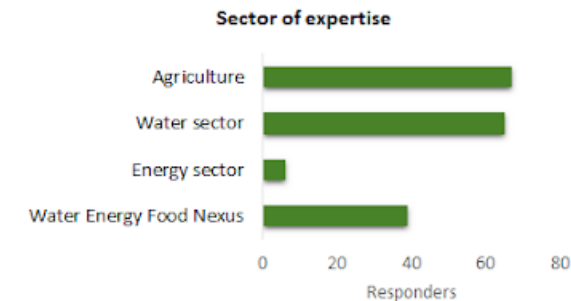
Years of experience working on drought



Level of expertise in disaster risk/resilience



Areas and sectors of expertise





Online Workshop with Experts & Policy Makers:

To investigate the relationships between vulnerability and resilience indicators

Place ONLY the pink-colored resilience indicators into the most appropriate box based on how they help decrease vulnerability resulting from:

Resilience

Technical assistance from local entities (e.g., cooperatives/NGO/government)	Total dam capacity	Food source reliability and diversity	Very effective
Existence of drought management policies (mitigation/adaptation/prevention/preparedness)	Access to financing and credit	Water use rights clearly defined	Somewhat effective
Availability of drought prediction and warning systems or climatic predictions	Percentage of farmers with crop, livestock, or drought insurance	Produce storage and transportation capacity	Not Effective
Percentage of retained renewable water	Percentage of drought-resistance crop varieties cultivated.	Percentage of farmers who use different types of crops	
Access to energy	Level of public participation in local policy	Land rights clearly defined (yes/no)	Participation in farming cooperatives or associations

Crop water use efficiency (WUE)

Vulnerability

	Integrated land and water management policies	

Coping: Ability to minimize the immediate impacts, be stable, bounce back

Adaptive: Ability to adjust behaviors and practices in response to the impacts

Transformative: Ability to transform or create systems that can withstand the impacts in the long term

Capacity



Survey with Policy Makers

- Survey done in Morocco and Turkey
- Structured questionnaire used – for online as well as in-person survey
- 80+ responses gathered in total
- Policy makers from → water, energy, agriculture, environment, disaster management, soil, etc.
- Output → Policy makers perception of supports that exists and further needs to manage droughts



Overview of questions

Crisis management

- Communicating via drought early warning system; Steps taken to help farming communities adapt to drought

Good governance

- Availability of drought disaster management plan; Criteria of water distribution during droughts

Knowledge dissemination & management

- Role of technology in drought management; Short-term & long-term impacts of drought in the region

Mainstreaming Disaster Risk Reduction & Climate Change Adaptation

- Medium to spreading awareness and preparing the farming communities from ensuing drought



Semi-Structured Interviews with Small-Scale Farmers

- 30 participants across 4 regions of Morocco interviewed
- Interviews explore the impacts of drought and adapting to drought
 - Current irrigation, energy source, and crops used
 - Planned or hoped for changes to those systems and triggers for change
 - Support used and support required





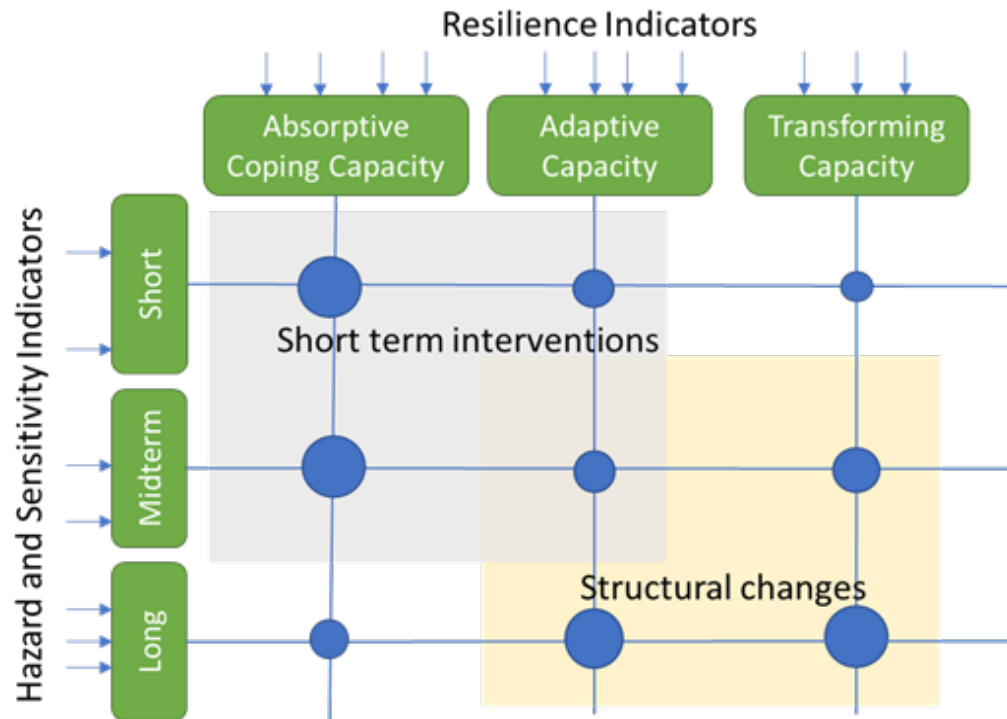
Fuzzy Cognitive Mapping with Small-Scale Farmers

- Conducted in Morocco, South Africa, Turkey
- Used to capture views on the connectivity between impacts of drought and adapting to drought through indicators

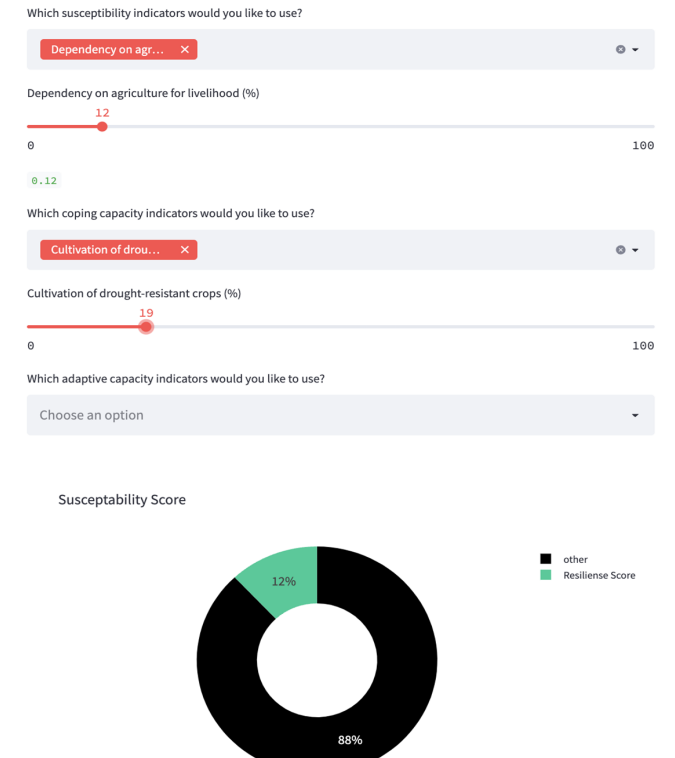


Final Objective of MADIS

- Develop an easy-to-use dashboard application for decision-makers to select usable and contextual drought vulnerability and resilience indicators



Drought Resilience DSS



Time	Activity	Speaker
10:00-10:15	Registration and networking tea & coffee	
10:15-10:30	Welcome and objective of the day	Nazmiye Ozkan, Cranfield University
10:30-11:00	Global expert survey on multidimensional indicators	Abdullah Konak, Penn State Berks
11:00-11:30	Learnings from small scale farmers in South Africa	Elisabeth Shrimpton, Cranfield University
11:30-12:00	Systemic risk and low probability high impact events	Gianluca Pescaroli, University College London
12:00-12:30	Co-Developing a balance scorecard for just resilience with experts in islands and coastal cities	Priscila Carvalho, University College London
12:30-12:45	Discussion (Q & A)	
12:45-13:30	Lunch	
13:30-14:00	Emerging indicators of ecosystem resilience	Ron Corstanje, Cranfield University
14:00-14:30	Earth observation, geomorphology, and soil surveys for drought early warning systems and risk management	Richard Teeuw, University of Portsmouth
14:30-14:45	Discussion (Q & A)	
14:45-15:00	Tea & coffee break	
15:00-15:30	Irrigation, schistosomiasis, and droughts	May Sule, Cranfield University
15:30-16:00	Sustainable food systems through water-energy- food nexus	Mike Jacobson, Penn State University (Online)
16:00-16:15	Multi-hazard risks of compound hydroclimatic extremes under uncertainty	Yurui Fan, Brunel University London
16:15-16:30	Discussion (Q & A)	
16:30-17:15	Break out discussion and reporting back	
17:15-17:30	Closing remarks	
18:00-21:00	Networking dinner	Cardington Restaurant, Mitchell Hall



Housekeeping & ground rules

- No fire drill planned
- Keep your phone on silent mode
- No attributes to individuals





Today's Focus

- MADIS findings
- Research insights
 - Gather and share knowledge
 - Discuss findings
- Collaboration areas
 - Identify common interests
 - Explore potential collaborations
- Next steps
 - Determine actionable items
 - Plan for implementation





Thank You

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