

Nils Riach & Rüdiger Glaser

Institute of Environmental Social Sciences and Geography

Physical Geography

University of Freiburg

Typologies of community risk to climate change: fostering climate adaption networks

EGU General Assembly 2022

27.05.2022

What hinders small communities from adapting to climate change?

1. Lack of evidence base for planning
2. Lack of adequate capacities to engage in adaption
3. Lack of analytical tools and planning instruments

Hirschnitz-Gabers (2011), Prutsch et al. (2014), Campos et al. (2015), Kind et al. (2015), Schüler et al. (2015), IPCC, 2022 among others

Climate adaption networks

- pool resources
- develop solutions
- Exchange knowledge

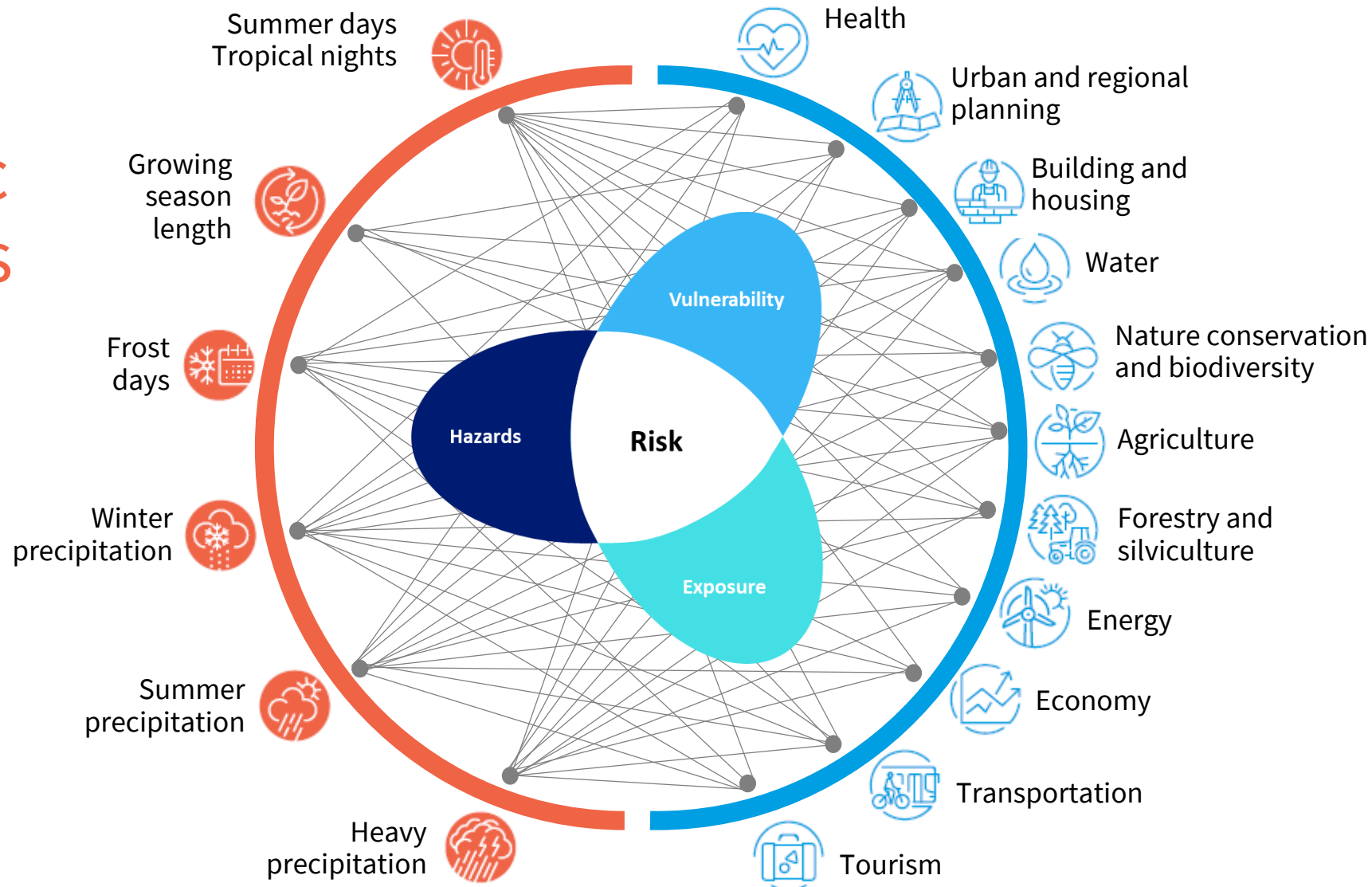
Bidwell, Dietz & Scavia (2013), Stiller & Meijerink (2016), Woodruff (2018) among others

Can we foster climate adaption networks by focusing on data driven typologies of community risks?

Understanding similarities of community risks = risk typologies

Climatic
hazards

Hazard
patterns



Fields of
action

Vulnerability and
exposure patterns

Hazards

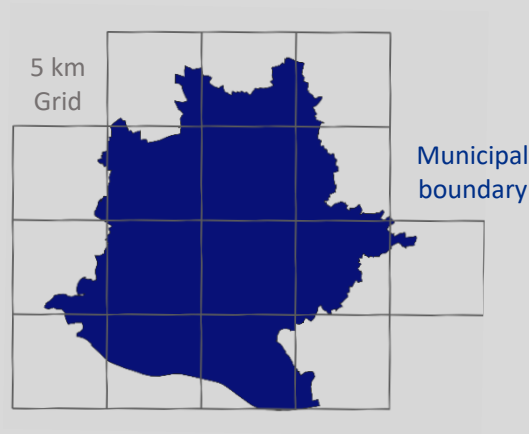
10-member RCM ensemble

ReKLiEs-DE
RCP8.5
5 km Grid
2021-50
2071-100

Calculate mean
of adjacent grid cells

*Climatic parameters
per community*

How do we assess similarities in community risks?



Exposure & Vulnerability

Community statistics

*Fields of action
Per community*

Missing data imputation
Outlier treatment
Normalisation
Aggregation

Kaiser-Meyer-Olkin (KMO) Test

PCA

K-Means Cluster Analysis

4 climatic clusters

3 fields of action clusters

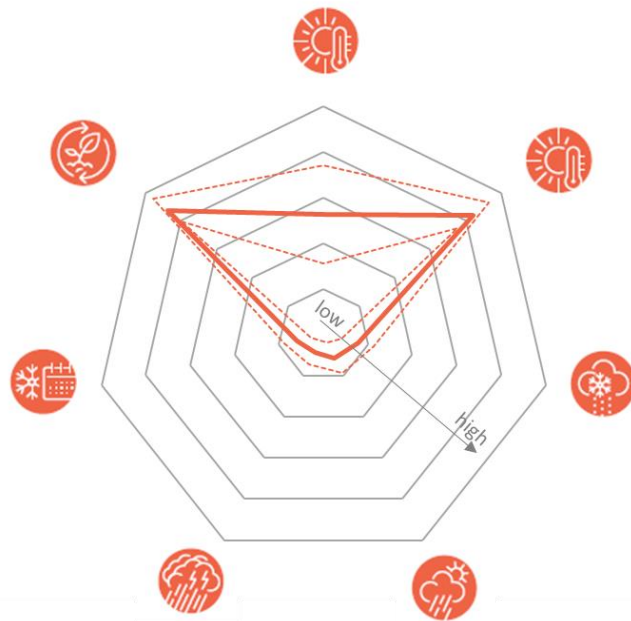
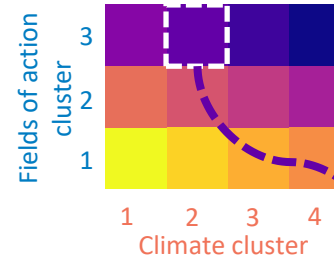
= 12 risk typologies

Deriving risk typologies

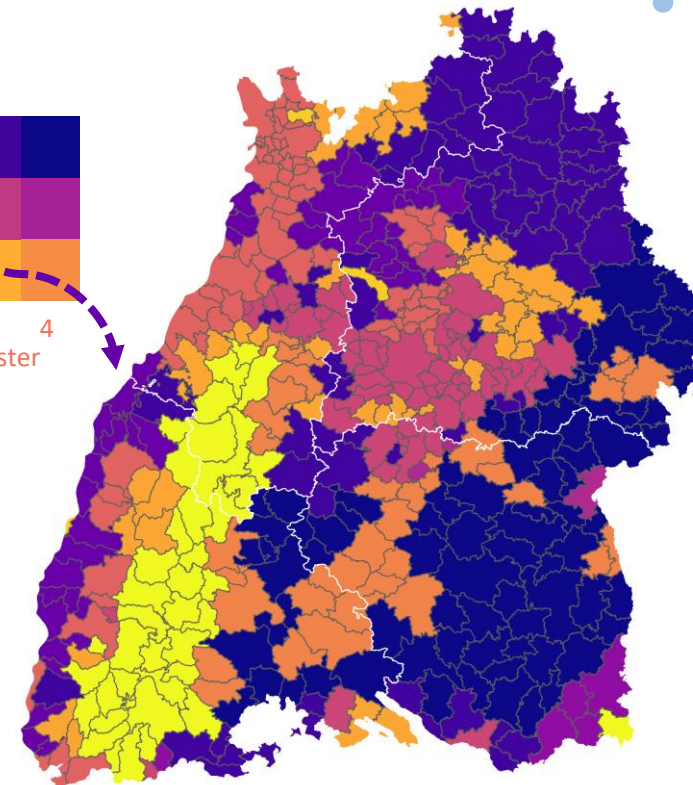
- 12 data driven cluster combinations
- Cluster specific vs. universal adaption needs
- Develop qualitative adaption storylines based on typologies



Fields of action cluster #3



Climatic Cluster #2 (2021-2050)





Open questions and wrap-up



- Risk typologies can help be helpful for the formation of climate adaption networks
- They can serve as starting point for the highly contextual challenges of climate change adaption, especially in small communities
- Storylines may help prioritize scarce resources



- Simplification of highly complex and contextual relationships between hazards, exposure and vulnerability
 - » How comparable are risks within each typology
- Dealing with uncertainties
 - » Climate data (RCM-ensemble)
 - » Indicators always have limited explanatory power



Thank you for your attention

Contact:

Nils Riach

Email: nils.riach@geographie.uni-freiburg.de

Web: <http://geographie.uni-freiburg.de/de/team#Riach/Nils>

<https://lokale-klimaanpassung.de/>