Participatory Climate Vulnerability Analysis of Watershed Communities: An Indicator Approach

Raghavan Sathyan A[1], Aenis T[2], Breuer L[1, 3]

[1]Institute for Landscape Ecology and Resources Management, Justus Liebig University of Giessen, Germany

[2]Extension and Communication Group, Humboldt University of Berlin

[3]Centre for International Development and Environmental Research, Justus Liebig University of Giessen, Germany

Introduction

- 100 million people will be back to poverty in the world by 2030 without rapid, inclusive, climate-informed development
- Watershed Development Programmes (WDP) have the capacity to reduce risk associated with rainfed agriculture and climate variability
- It is still questionable whether these programmes could enhance co-benefits and opportunities to increase resilience at bottom level
- This study assesses and compares climate vulnerabiliy of three Indian watershed communities implemented by different agencies : Grama Panchayath, Non Governmental Organisation and Soil Survey & Conservation Department

Material & Methods

- Study area: Palakkad district, Kerala
- Tools: Household survey and Focus Group Discussion (FGD) in 07-12/2015
- Sampling: Multistage cluster sampling
- Sample size: 215 households & 6 FGDs

➢Climate Vulnerability Index (CVI)

- Theory driven and deductive
- Location specific indicators
- Standardisation of subcomponents
- Balanced weighted approach

$$CVI = \frac{\sum_{i=1}^{10} W_{mi} M_{wi}}{\sum_{1=1}^{10} W_{mi}}$$

Fig. 1 A sensitive household with weak adaptation strategies to water scarcity

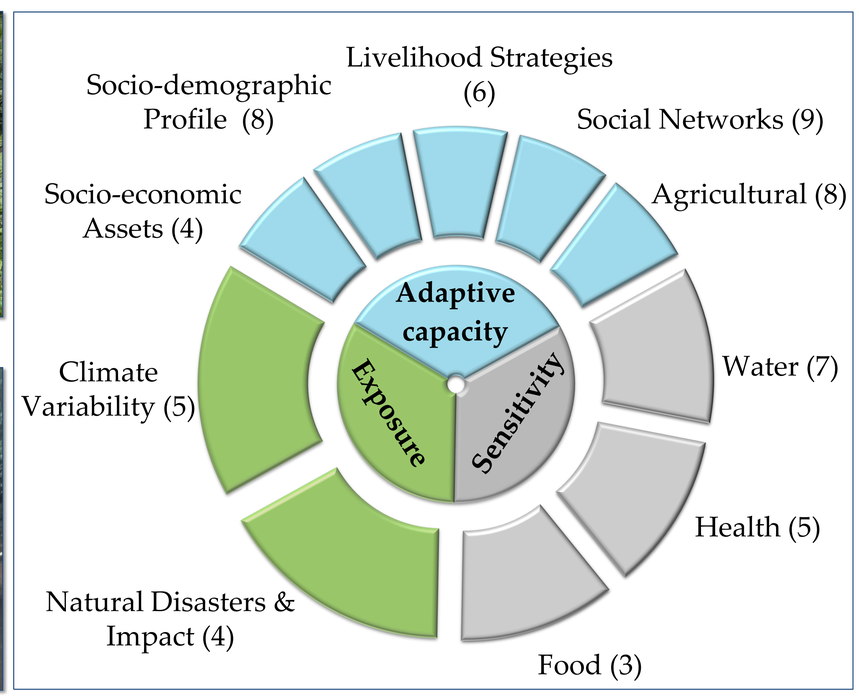

Fig. 2 Dimensions and major components of CVI

Results & discussion

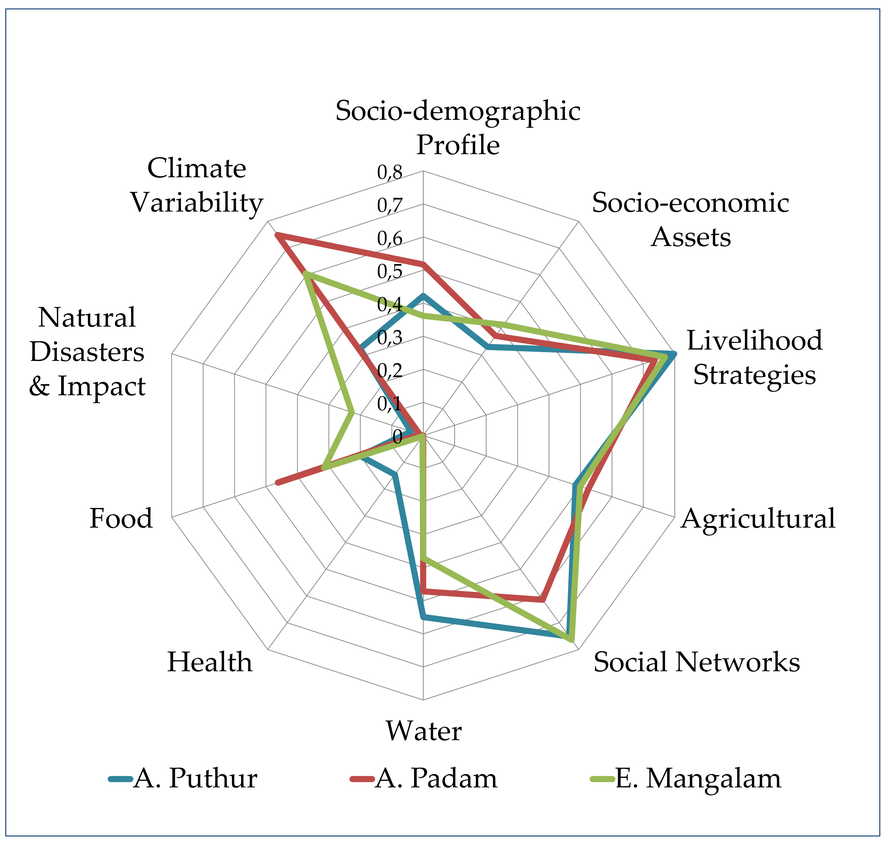

Fig. 3 Indicator values of three dimensions of vulnerability

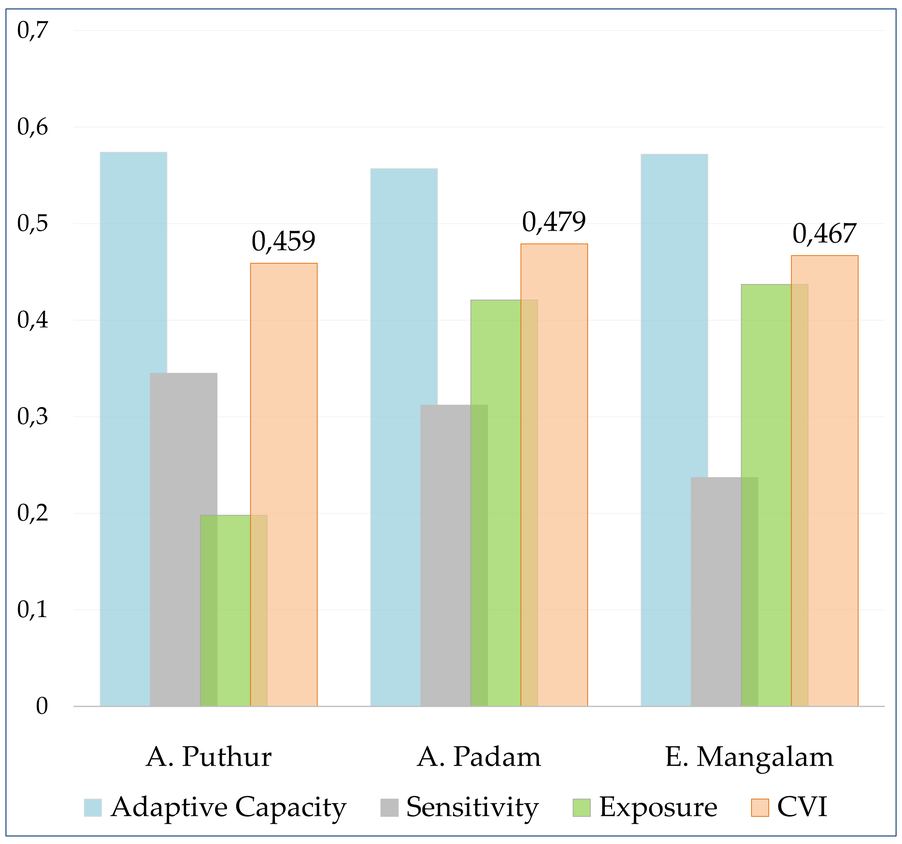

Fig. 4 Dimensions of vulnerability and the resulting CVI

1. Major components **Livelihood Strategies, Social Networks, Water** and **Climate Variability** exhibited high values.

2. The highest Adaptive Capacity and Sensitivity vulnerability were exhibited in **A. Puthur** implemented by Soil Survey & Conservation Department (Fig. 4).

3. At the same time, the **most resilient** was **A. Puthur** because of its lowest Exposure to climate variabilities and extreme events.

4. **A. Padam,** implemented by Non Governmental Organisation was the **most vulnerable**.

5. Vulnerability due to Exposure was the highest in **E. Mangalam**.

Conclusion & Recommendations

- Climate vulnerability is a function of Adaptive Capacity, Sensitivity and Exposure
- Participatory-location specific-flexible planning and implementation of WDP
- Rainwater harvesting should be promoted to tap 3,000 mm of annual rainfall in Kerala
- Timely and accurate weather forecasting services at local level are needed
- Prompt and effective collective action for mitigating natural disasters are required
- Wetland Conservation is important as it provides numerous ecosystem services

Future directions

- ➢ Uncertainty analysis of CVI – Bootstrapping method
- ➢ Inclusion of climate resilient activities by using CRiSTAL (Community-based Risk Screening Tool – Adaptation and Livelihoods)
- ➢ Elucidation of indegenous technologies followed by the community

Acknowledgements : We would like to gratefully acknowledge funding from DAAD, Bonn, Germany (ST42- for Development- Related Post Graduate Courses, 50077057 & PKZ: 91538032) for conducting this research. We honour the valuable time and contribution of inhabitants in the watershed areas for their kind support and participation during the data collection.

References

Raghavan Sathyan, A., Aenis, T., & Breuer, L. (2016). Participatory vulnerability analysis of watershed development programmes as a basis for climate change adaptation strategies in Kerala, India. *J Environ Res Develop*. 11 (1): 196-209.

Email: Raghavan.S.Archana@agrar.uni-giessen.de