Empirical Analysis on Perception of Climate Change Risks in the Mt. Everest Region, Nepal, Himalaya

Sonam Futi Sherpa*, School of Sustainability, Arizona State University

sonam.sherpa@asu.edu

Introduction

- Climate risks such as droughts, glacial floods, heavy rain, blizzard have increased alarmingly in the recent decades in the Himalaya region.
- Climate Change (CC) risk perception is important as it derives different adaptation, prevention measures as well as facilitates in the development of generic and specific capacity at the individual and household level. (Frondel *et al.*, 2017, Dai *et al.,* 2015).



Hypotheses

- To understand the perception of climate change risks ,this paper employs following hypotheses.

- **Hypothesis 1**: *Perceived experiences with extreme weather events are positively related to global climate change as a serious problem.*
- **Hypothesis 2***: Older people have weaker knowledge on global climate change problems.*
- **Hypothesis 3**: *Males have stronger global knowledge on climate change problems.*

Data

- This study uses unique survey data set of total 138 sample size based on face to face household survey. The interviews were conducted in Summer of 2016 in *Khumjung, Namche* and *Chaurikharka* Village Development Committees (VDCs), Nepal as shown in fig.1.
- **The dependent variable** of this analysis was the CC risk perception based on the following question: "Is climate change risks a severe problem, Not serious problem and inappropriate?"

Dependent variable used in the analysis

Categories	Definition	Frequency	Percent
Serious	*Yes=1, No=0*	67	48
Not serious	*Yes=1, No=0*	63	46
Inappropriate	*Yes=1, No=0*	7	6

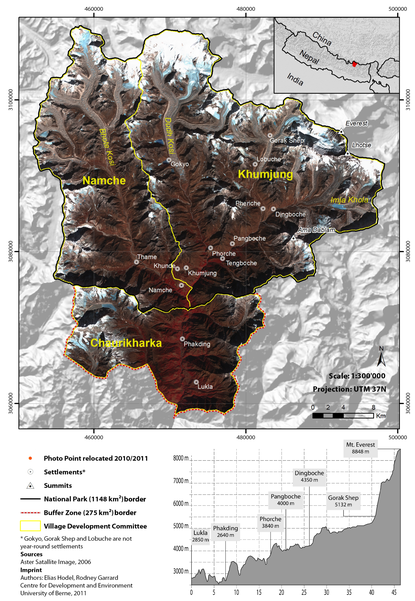

Fig. 1. Study Area (Garrad et al., 2016)

- **The key explanatory variables** were selected from survey question on, personal experience with extreme climate events and whether respondent suffered from financial and physical damage, age, income source, and gender.

Methodology

- For paper's empirical investigation, a Logit Model (LM) is employed to understand respondent's climate change perception based on various independent variables.
- A detailed explanation is presented in the following LM test.

$$y_i^* = \delta_1 expr_i + \delta_2 damage_i + \delta_3 income_i + \delta_4 risk_i + \delta_5 age_i + \delta_6 gender_i + B^T X_i + \varepsilon_i$$

Here

- ✓ y_i^* =Latent climate change perception
- ✓ $expr_i$ = Experience with the respective extreme events
- ✓ $damage_i$ = Damage suffered by respondent *i.*
- ✓ $risk_i$ = Knowledge on the climate hazard present in the region.
- ✓ δ' = Parameters to be estimated from the independent variables of i respondents with different age (Age variable), with involvement of farming or tourism as source of income ($income_i$) and gender.
- ✓ ε_i = Error term for i respondent.

Results

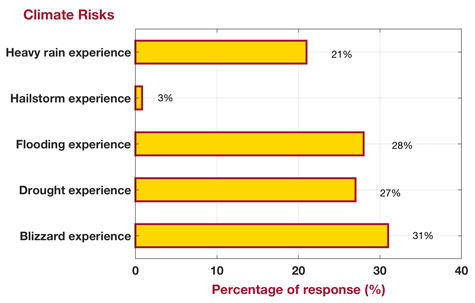

Fig. 2. Percentages of the perceived natural hazardous event experiences in the Everest region (n=138).

- ✓ Blizzard, Drought, Flooding and Heavy rains are the three most experience hazards in the Mt. Everest region of Nepal.

- Experiencing extreme events are positively correlated to perceiving climate change as a severe problem as shown in table 2. Here, drought and heavy rain are positively correlated and significant. Thus, this confirms the **hypothesis 1,** paper has employed.
- Though, not significant, the correlation between age and the perception result on climate change was observed to be same as the **hypothesis 2** of this paper's model 1.Younger the age, people will have more knowledge about through education and other social media.
- A negative correlation between variable female and perceiving climate change as a serious hazards follows the **hypothesis 3** of this paper.

Explanatory Variables	Model 1	
	Coefficient	Std. Err.
Experiences of flood	.6711	.7467
Experiences of drought	2.6551*** (2%)	1.1476
Experiences of Heavy rain	4.2999** (6%)	1.5615
Experiences of Heavy snow	1.0549	.8232
Experiences of Hailstorm	.6045	1.8959
Risk perception	3.5013*** (0%)	.8956
Knowledge on glacial lakes	7.5435*** (2%)	3.2336
Problem in water supply	-2.0613*** (1%)	.8646
Female	-.5455	.7221
Age	-.0082	.1757
Farming	3.2503 ***	1.4782
Tourism	-1.1175	.8894

Table 2: Note: *(**, ***) corresponds parameter is different from zero at the 10% (5%,1%) significance level, respectively.

Discussion & Conclusion

- Respondents who are more exposed to a glacial hazard, seem to take climate change as a serious problem, which is in line with the literature that, individuals who experience an adverse natural event and have suffered from related damages shall be more likely to be concerned.
- Based on if respondents have experienced different climatic adverse events, they perceive the climate change risk accordingly.
- Farmers are more concerned with the climate change and consider it to be on the higher level of risk, compare to individuals involved in tourism (table 2).
- People who don't have the specific or generic capacity at an individual or community level will face more problem and will take it as a serious issue than comparing to those who have resources to cope.

References

- Dai, J., Kesternich, M., Löschel, A., & Ziegler, A. (2015). Extreme weather experiences and climate change beliefs in China: An econometric analysis. *Ecological Economics*, *116*, 310–321. https://doi.org/10.1016/j.ecolecon.2015.05.001
- Frondel, M., Simora, M., & Sommer, S. (2017). Risk perception of climate change: Empirical evidence for Germany. *Ecological Economics*, *137*, 173-183.
- Garrard, R., Kohler, T., Price, M. F., Byers, A. C., Sherpa, A. R., Maharjan, G. R. (2016). Land Use and Land Cover Change in Sagarmatha National Park, a World Heritage Site in the Himalayas of Eastern Nepal Land Use and Land Cover Change in Sagarmatha National Park , a World Heritage Site in the Himalayas of Eastern Nepal. *Mountain Research and Development (MRD)*, *36*(3), 299–310.

Acknowledgements: This material is based upon work supported by the National Science Foundation under the grant number CNH-1516912, *CNH-L: Science-Driven, Community-Based Approach to Reducing Glacier Lake Outburst Flood Risks,* which is a collaborative research project of University of Texas, Austin (PI: Dr. Deane McKinney), Arizona State University (Co-PI: Dr. Milan Shrestha), and University of Colorado, Boulder (Co-PI: Dr. Alton Byers). Their guidance and support is gratefully acknowledged. The direct supervision provided by Dr. Joshua Abbott of School of Sustainability is highly acknowledged here. Summer fieldwork of 2016 immensely benefitted from the research assistance received from Mr. Jagadish Parajuli (ASU, School of Sustainability) and Mr. Saroj Adhikary, Ms. Shanta Sharma, and Mr. Lalmani Wagle of Tribhuvan University, Nepal.