

The Role of Proximate and Cumulative Subjective and Objective Environmental Measures in Migration Decisions in Rural Thailand

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Problem Statement and Significance

- ▶ How do vulnerable communities **adapt** or become **resilient** in the face of climate change?
- ▶ What does it mean when we talk about vulnerability, adaptation, and resilience?
 - ▶ Up to now: **objective conditions**
- ▶ Better way to elaborate the human-environment nexus: **include subjective measures**

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Problem Statement and Significance

- ▶ Objective measures tell us about **exposure**, while subjective measures tell us about **experience**.



- ▶ Adaptation may be function of **both** past exposure and experience.



- ▶ Migration might be an adaptive response used by households

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Research Questions

- ▶ Does including subjective measures of environmental stress improve our understanding of migration response?
- ▶ Do **proximate** and **cumulative** exposure and experience result in different migration behavior?

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Literature Review



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How Subjective Data Can Inform Models

- ▶ Can **explain when behavior doesn't match objective measures** (Paul 1984; Hunter 2005).
- ▶ Repeat exposure to a hazard might **"normalize"** the event (Casimir 2008).
- ▶ Past experience might reveal **proactive response** (Sanchez Peña & Fuchs 2013; Taylor 1998).
- ▶ Subjective data might reveal **local-level climatic heterogeneity** (Byg & Salick 2009).

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Migration, Environment, and Perceptions

- Yet, to date, limited incorporation of perception data:
 - A "good or bad harvest" increased odds of local and urban out-migration in study on drought in Ecuador (Gray 2009).
 - Perceived decline in agricultural productivity increased odds of local moves in the Chitwan Valley (Massey et al. 2010).
 - Households that reported a drought in rural Ethiopia had increased odds of labor migration (Gray and Mueller 2012).
 - Perception of soil degradation decreased migration among women in Ecuadorian Andes (Gray 2010)

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Methods

Data Sources – Bringing together social and environmental data

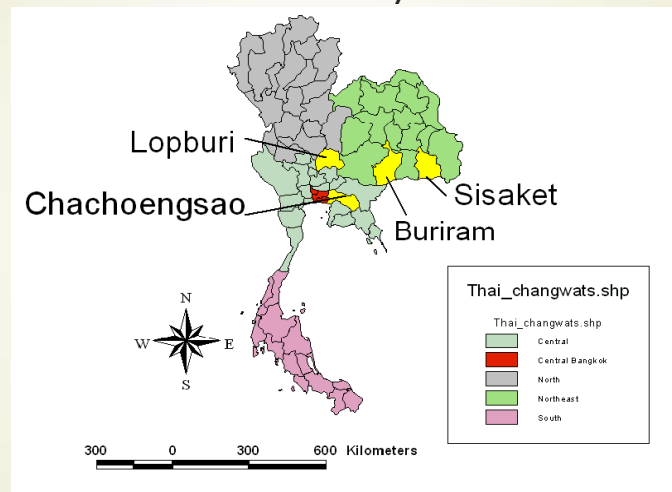
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Townsend Thai Data

- Unique dataset that includes:
 - Household composition data
 - Migration data
 - Subjective cause of livelihood risk
- 1997 to 2006
- 960 Households surveyed each year in May
- 64 Villages
- 15 Households per village

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Study Area



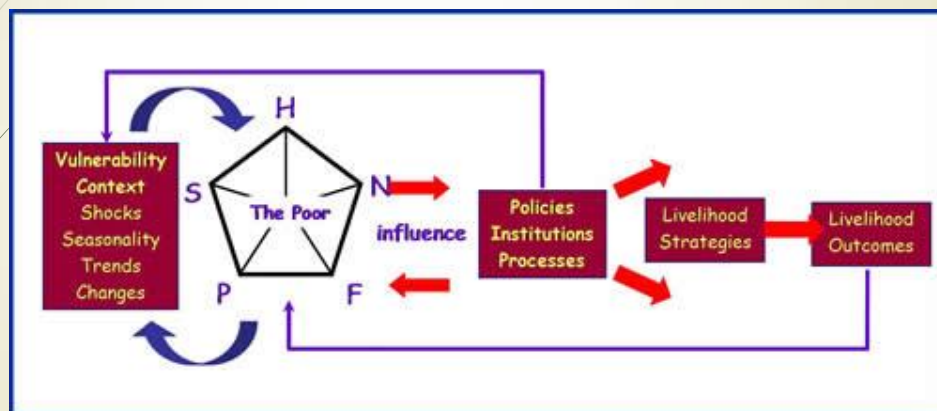
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NDVI Measures

- ▶ Normalized Difference Vegetation Index
 - ▶ Measures plant vigor and health – the higher the value, the healthier the vegetation (different crops fall within certain ranges).
 - ▶ Has been used in a number of studies as a proxy for drought (important if rain gauges are sparse).
- ▶ Generated annual z-scores that indicate anomalies from the period average.
- ▶ Generated proximate (lagged) measures.
- ▶ Calculated cumulative exposure to average, below average, and above average NDVI.

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Sustainable Livelihoods Framework (Carney 1998; Scoones 1998)



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Key Measures and Analytical Approach

- ▶ $P(\text{mig}_{it}) = f(\text{objective environmental conditions}_{t-1} + \text{perceptual environmental attribution}_{t-1} + \text{household characteristics from NELM and SLF}_{t-1})$.
- ▶ Random-effects logit, controlling for village-level effects
- ▶ Have any members of your household left the village in the past 12 months?
- ▶ Household-year-migrant file

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Results and Analysis



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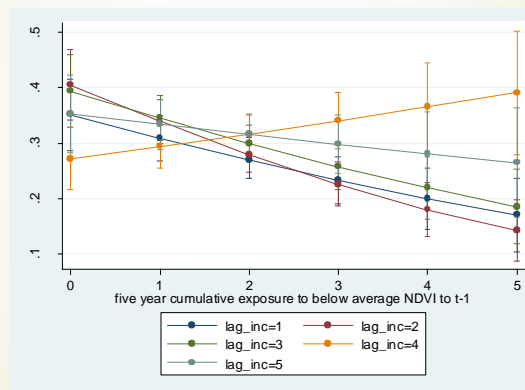
Age of Head of Household	1.111***
Age of Head Squared	0.999***
Sex of Head (female referent)	0.691***
NDVI (Average Referent)	
Below Average	0.812***
Above Average	0.757**
Cumulative Exposure to Below Average NDVI (last 5 yrs)	0.868***
Cumulative Exposure to Above Average NDVI (last 5 yrs)	0.708***
Environmental Attribution	0.826**
Cumulative Environmental Attributions	1.133***
Household Income Quintiles	
2	1.073
3	1.159
4	1.169
5	1.220+
Asset Index	0.943
Household Size	1.615***
Household Dependency Ratio	0.726***
Household Previously Sent a Migrant	1.178*
Shared labor	0.958
BAAC Membership	1.021
Land Cultivated	0.997+
Constant	0.026***
Rho	0.214***
AIC	10647.7
BIC	11259.4

+p<=.10, *p<=.05, **p<=.01 ***p<=.001



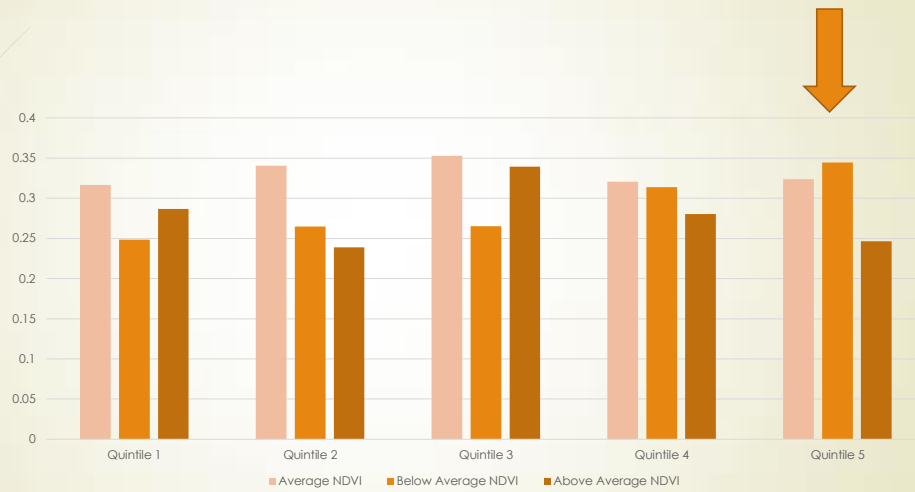
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Probability of Sending a Migrant by Cumulative Exposure and Income



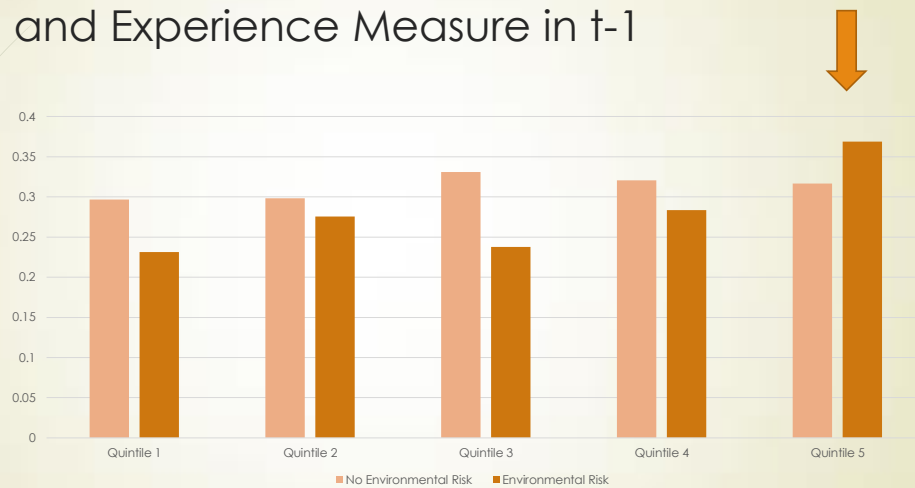
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Probability of Sending a Migrant, by Income and Environmental Condition in t-1



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Probability of Sending a Migrant, by Income and Experience Measure in t-1



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Conclusion

- ▶ Cumulative subjective measures of environmental stress lead to increase odds of out-migration.
- ▶ In the near-term, households might be able to adapt locally to environmental stresses.
- ▶ Cumulative objective measures of environmental stress lead to a decrease in odds of out-migration
- ▶ **But, this depends, in part on income**
 - ▶ Perhaps migration is as much about resources as it is about exposure or experience?

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Questions?



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