



Assessment of Vulnerability Index on Climate Variability in the East of Thailand

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Introduction

- Southeast Asia, including Thailand is facing new climate challenges e.g. flood, drought, sea level rise and increase in intensity of tropical cyclones.
- The east of Thailand, where is a major economic tree plantation zone especially fruits and rubber tree, is affected by Climate variation.
- Understanding the pattern, extent and driving factors of vulnerability is effort to facilitate climate adaptation plan.

Objectives

- To assess the vulnerability index in the east of Thailand as well as farm-households.

Vulnerability analysis

Provincial Level

- The vulnerability indexes were analyzed following ICRISAT/ADB guideline.

Indexes, which are related positively to the vulnerability, are calculated by

$$\text{index}_i = \frac{S_i - S_{\min}}{S_{\max} - S_{\min}}$$

Where : S_i is the indicator for district I
 S_{\min} is the minimum values
 S_{\max} are the maximum values

Indexes, which are related negatively to the vulnerability, are calculated by

$$\text{index}_i = \frac{S_{\max} - S_i}{S_{\max} - S_{\min}}$$

Data source

- Department of Disaster Prevention and Mitigation, Thailand
- National Economic and Social Development Board, Thailand
- The Community Development Department, Thailand
- The Thai Meteorological Department, Thailand

Household Level

- The Likelihood Vulnerability Index (LVI) is utilized and aggregated according to IPCC's three contributing factors: 1) Exposure 2) Sensitivity and 3) Adaptive capacity.
- The Likelihood Vulnerability Index -IPCC (LVI-IPCC) is achieved by employing the formula;

$$\text{LVI-IPCC} = (\text{exposure} - \text{adaptive capacity}) * \text{sensitivity}$$

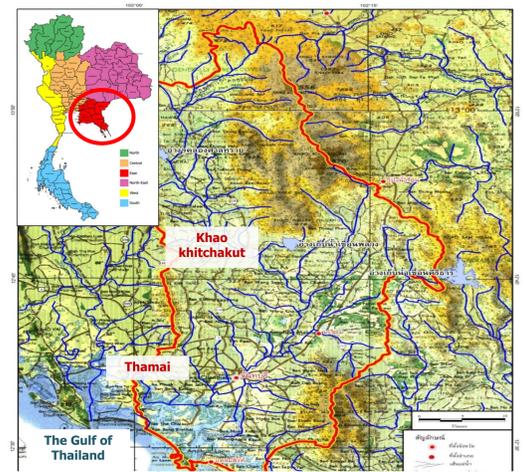


Figure 1: Study Area

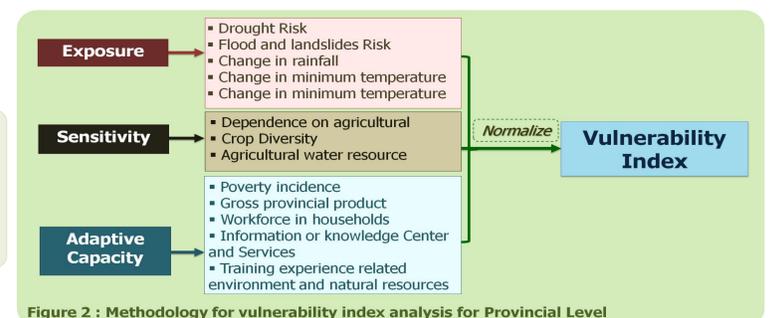


Figure 2: Methodology for vulnerability index analysis for Provincial Level

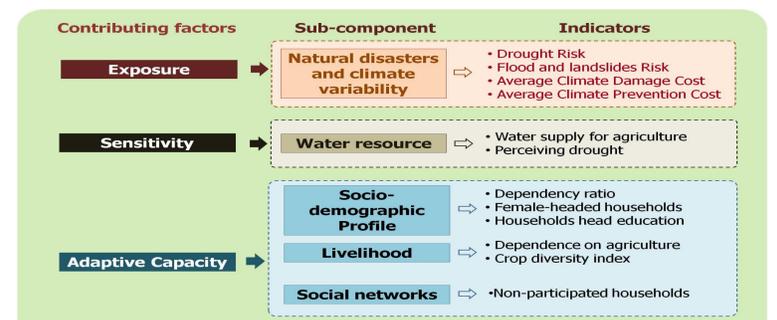


Figure 3: Methodology for Likelihoods Vulnerability Index analysis

Results

Provincial Vulnerability

Table 1: Vulnerability index and ranks for different provinces in the East

Province	Determinants of vulnerability			index
	Exposure	Sensitivity	Adaptive Capacity	
Chonburi	0.45	0.41	0.38	0.41
Rayong	0.39	0.44	0.34	0.39
Chanthaburi	0.38	0.51	0.50	0.46
Trat	0.61	0.47	0.55	0.54
Chachoengsao	0.53	0.46	0.45	0.48
Prachinburi	0.36	0.48	0.49	0.44
Sa Kaeo	0.35	0.49	0.62	0.49

- Each vulnerable level, the significant indices were the following.

- Exposure factors : Temperature, Average precipitation by month and Drought risk

- Sensitivity factors : Agricultural water resources

- Adaptive capacity factors: Household workforce ratio, Proportion of people below poverty line and Gross provincial product



Figure 4: Provincial vulnerability to climate variability in the east of Thailand, 2011

Household Vulnerability

- The households in Khoa kitchakut district showed greater vulnerability on the natural disasters and climate variability component, livelihood component and social network component index than those in Tha mai district.
- When the Likelihood Vulnerability Index -IPCC was calculated, the overall the LVI -IPCC score was higher for Khoa kitchakut than Tha mai.

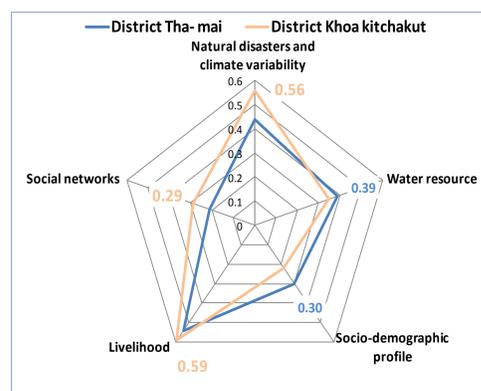


Figure 5: Vulnerability spider diagram of the major components of the Livelihood Vulnerability Index (LVI) for Tha mai and Khoa kitchakut Districts, Thailand

Table 2: Vulnerability index and ranks for Tha mai and Khoa kitchakut Districts, Thailand

Contributing Factor	District	
	Tha mai	Khao kitchakut
[1] Adaptive Capacity	0.35	0.37
[2] Sensitivity	0.39	0.35
[3] Exposure	0.44	0.56
LVI-IPCC index $(([3] - [1]) * [2])$	0.04	0.07

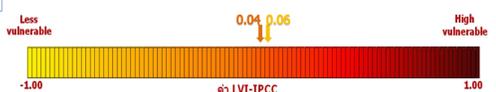


Figure 6: LVI-IPCC index of Tha mai and Khoa kitchakut

Conclusion and Suggestion

Conclusion

- Provinces exposed to climate risk, sensitive in water resources, high poverty incidence and lower adaptive capacity tend to be more vulnerable to climate variation.
- Households located in the flood and landslides risk areas, lower social networks, high dependence on agriculture and less crop diversity are more vulnerable to climate variation and extreme events.

Suggestion

- Increasing household income and crop diversification as well as improving farm water management can reduce vulnerability to climate variation.
- Promoting social integration and climate related information technology can enhance the adaptive capacity at the farm-household level.

Main References

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