## An Assessment of Livelihood Vulnerability to Climate Variabilities: A Case Study in Quirino Province

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# Introduction

The Philippines is occasionally affected by the El Niño Southern Oscillation (ENSO) that induces extended wet and dry seasons.

ENSO phenomenon meant more water during the rainy seasons, and drier during the dry seasons.

The agriculture sector, which is highly dependent on climatic conditions, has become one of the most affected sectors in terms of the impact of climate variabilities.

Strong typhoons and prolonged dry seasons have brought tremendous damaged to agriculture and property.

# Introduction

Typhoon-flooding and drought is expected to occur repeatedly in the future

Local people and their livelihoods will continue to become vulnerable to climate variabilities unless mitigation and adaptation measures are developed.

Local-level researches to assess livelihood vulnerability as well as coping mechanisms employed by local people are still inadequate.

The Livelihood Vulnerability Index (LVI) using multiple indicators and the Intergovernmental Panel on Climate Change – Vulnerability Index (IPCC-VI) was used.

#### **Materials and Methods**

#### March to May 2015

The SLF classifies five major livelihood assets into physical, human, financial, social and natural capital.

Indicators used in calculating the LVI were lifted from various studies, including that of Hahn (2009), Pasakhala (2010), Nguyen et al. (2013) and Panthi et al. (2015

# Asset, major components and sub-components comprising the livelihood vulnerability index

Asset	Major Component	No. of Sub- component
Human	Health	2
	Knowledge and Skills	2
	Livelihood Strategies	6
	Food	1
	Labor force	1
Natural	Land	2
	Natural Resources	2
	Natural Disasters and Climate Variability	6
Social	Demographic conditions	2
	Social networks	4
Physical	Housing and production means	4
Financial	Finance and Incomes	5

# Categorization of sub-components into contributing factors using IPCC's definition of vulnerability.

Factors	Component	No. of Sub- components
Exposure	Natural disasters and climate variability	9
Adaptive Capacity	All factors that enhance capacity to adjust	23
Sensitivity	Water, food and health	4

#### **LVI Equation:**

$$LVI_{v} = \frac{\sum_{i=1}^{12} W_{mj} M_{vj}}{\sum_{i=1}^{12} W_{mj}}$$

Where:

 $LVI_V$  is the Livelihood Vulnerability Index  $W_{mj}$  is the weight value of major component

LVI range: Between 0 to 1, Where:

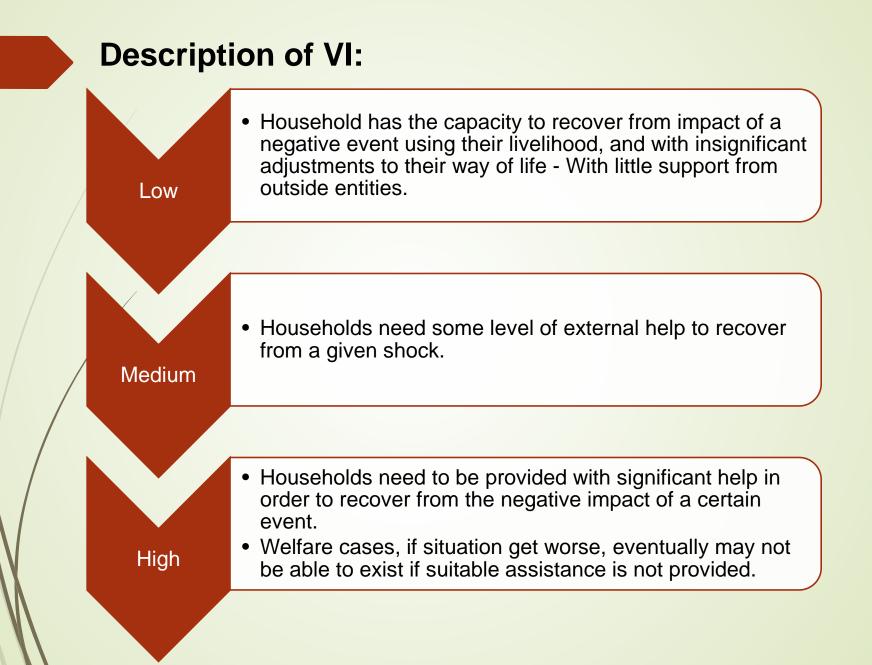
- 0 denotes least vulnerability
- 1 denotes high vulnerability

#### **IPCC VI Equation:**

Vulnerability = (Exposure – Adaptive capacity) \* sensitivity

IPCC-VI ranges from -1 to 1,

- -1 denoting least vulnerability and
- 1 the most vulnerable



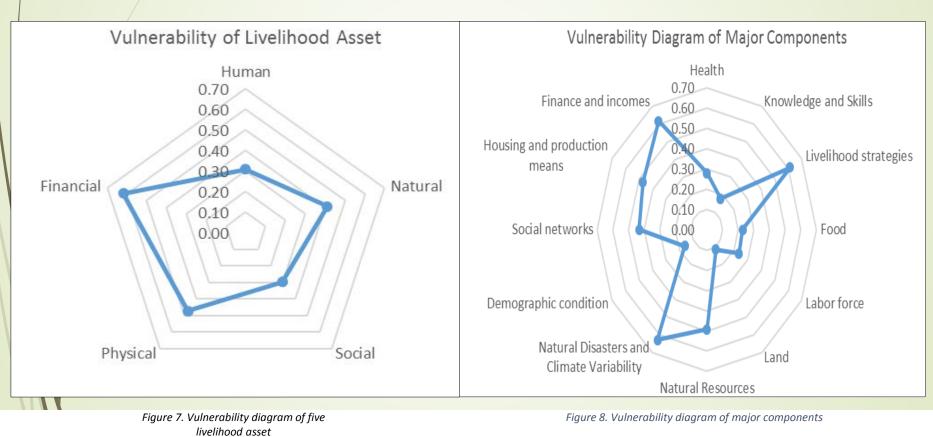
### Study area and household surveys

- Liwayway in the municipality of Diffun,
- Villamor in Cabarroguis,
- Tres Reyes in Aglipay, Dumabato Norte in Maddela and
- San Ramos in Nagtipunan

139 respondents to the survey questionnaire

#### **Results and Discussion**

#### **SLF - LVI** Results



#### **SLF - LVI Results**

Asset	Major Component	No. of Sub- component	VI	Qualitative Description
Human	Health	2	0.28	Low
	Knowledge and Skills	2	0.18	Low
	Livelihood Strategies	6	0.61	Medium
	Food		0.23	Low
	Labor force	1	0.34	Medium
HUMAN ASSET AVERAGE VI			0.31	Low
Natural	Land	2	0.11	Low
	Natural Resources	2	0.49	Medium
	Natural Disasters and Climate Variability	6	0.80	High
NATURAL ASSET AVERAGE VI			0.47	Medium
Social	Demographic conditions	2	0.16	Low
	Social networks	4	0.43	Medium
SOCIAL ASSET AVERAGE VI			0.30	Medium
Physical	Housing and production means	4	0.47	Medium
Financial	Finance and Incomes	5	0.62	Medium
OVERALL VI			0.43	Medium



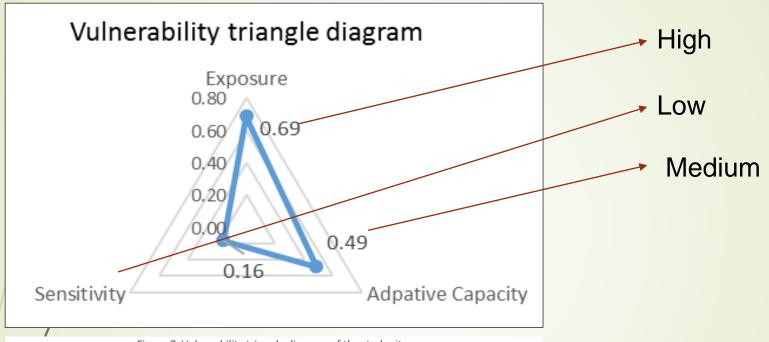


Figure 7. Vulnerability triangle diagram of the study sites

The overall vulnerability index is 0.032 - medium vulnerability

#### Conclusion

 Local people and their livelihoods have the capacity to recover from a given shock, but still need some level of external help to fully recover from damage or loss cause by climate variabilities.

#### **Recommendation**

- 1. Development of alternative, non-farm livelihoods to increase income
- 2. crops diversification
- 3. Construction of irrigation facilities for water sources
- Introduction and use of farm machineries and equipment to reduce harvests and post-harvest losses
- 5. Crop insurance

#### ACKNOWLEDGMENT

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- 3. Farmers in the study sites

# Thank you!