



7th International Conference on Building Resilience; Using scientific knowledge to inform policy and practice in disaster risk reduction, ICBR2017, 27 – 29 November 2017, Bangkok, Thailand

Constructing and Index to Measure the Adaptive Capacity to Climate Change in Sri Lanka

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Abstract

Climate change is considered as the major threat to the human beings in the future. Vulnerability to the climate change refers to the potential of a system to be harmed by an external threat and it is a function of exposure, sensitivity to impacts and the ability or lack of ability to cope or adapt. Adaptive capacity (AC) represents the ability of a region or community to cope with and thrive in the face of change. In this context, an attempt has been made to construct indexes to measure the adaptive capacity using five assets as economic, social, human, physical and natural. The data were obtained from Sri Lanka Household and Expenditure Survey covering 25000 households. One purpose of this research is to demonstrate a method of aggregating adaptive capacity indicators that result in a composite index. Indicators of Adaptive capacity are developed and a Weighted Principal Components Analysis (WPCA) is performed on assets. Households, who are dominantly dependent upon several resources, have always been adjusting their livelihood against the vagaries of climate. Multiple Factor Analysis for Mixed Data (FAMD) is used to handle the household data. As output shown in the analysis that the positive relationship between adaptive capacity and social assets are clearly followed by economic assets and physical assets, but human assets have been attributed a negative association. Batticaloa, Jaffna, Ampara, Moneragala, Trincomalee, Vavuniya and Puttlam districts had lower adaptive capacity, along with Colombo and Gampaha had a higher level of adaptive capacity. Furthermore, inter-household analysis of AC indicate that the poor households with less recourses are risky anywhere, irrespective of where they are located. Policy measures and development efforts should be focused towards improving the AC of the less owners of the assets.

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Peer-review under responsibility of the scientific committee of the 7th International Conference on Building Resilience.

Keywords: Adaptive capacity, FAMD, Composite Index, WPCA

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1. Introduction

1.1. Background of the study

The unbearable interaction between the human beings and the nature often leads to disaster. The nature, while protecting and looking after the human beings causes disastrous situations on a results of this complex interaction. Most of the activities are totally based on environmental activities even simply breathing. Climate change is increasingly accepted as one of the major issues that the human societies have to face in the 21st century. It will have multi directional effects on humanity in terms of several socio-economic factors and other factors like agriculture, health (disease prevalence), rise of sea level, scarcity of labour etc. Several damages will be taken place unless proper adaptation strategies are implemented in proper time. Evidences show that the natural climatic variability, entwined with climate change will adversely affect millions of lives around the world [1]. The rural communities in the developing countries are expected to be affected more due to their extensive dependence on climate sensitive livelihood options, and limited adaptive capacity to adapt to the changes.

[1] specifically highlights three components of vulnerability in the climate change context that is exposure, sensitivity and adaptive capacity. In the mean time, vulnerability is a function of those three components. Exposure is the magnitude and duration of the climate-related exposure such as a drought or change in precipitation, sensitivity is the degree to which the system is affected by the exposure, and adaptive capacity is the system's ability to withstand or recover from the exposure. , a system is less vulnerable if it is less exposed, less sensitive or has a strong adaptive capacity [2].

1.2. Problem of the study

Capability assessment has now been accepted as a requirement for the effective development. Adaptive capacity is decided complex and it varies from country to country, from community to community, from region to region, among social groups and individuals, and over time. It varies not only in terms of its value but also according to its nature. The scale of adaptive capacity is not independent or separate. The capacity of a household to cope with climate risks depends to some degree on the enabling environment of the community is reflective of the resources and processes of the region [3,4]. Many of the analytical frameworks for assessing adaptive capacity based on large scale such as national level, and less attention was given to represent capacity at local and community levels. In this research focus will be mainly on building a bridge between household adaptive capacity and local adaptive capacity where the necessary applications were not presented and needed to determine, who are the less adaptive capacity household in the country. What socioeconomic factors influence the adaptive capacity of the different household and district level deviations. What is the extent and nature of their adaptive capacity in relation to climate extremes?

1.3. Objectives

The main objective of this study is to construct an index of adaptive capacity to climate change separately for district level aggregation and household level. The thesis has the following specific objectives;

- To clarify the links between conceptualized adaptive capacity index and the fitted adaptive capacity index and to identify the deviation of those two situations.
- To visually compare the adaptive capacity index scores within country.

2. Material and methods

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