

Influential Factors of the Resilience in Disaster Management during Cyclone Hudhud with reference to Visakhapatnam District, Andhra Pradesh

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Abstract:

This paper is an attempt to examine the factors influencing resilience in disaster management during cyclone Hudhud with respect to Visakhapatnam district of Andhra Pradesh. It is followed a stratified random sampling to conduct a combination of research methods such as questionnaire survey and econometric analysis. As the first round of identification strategy for the study, six coastal villages selected. Vulnerabilities of coastal communities have increased as more people have to live in cyclone-prone areas due to population growth in recent years. Visakhapatnam district is one such vulnerable district in Andhra Pradesh that faces the many challenge of cyclonic risks. This study identifies the environmental and socioeconomic factors contributing to the resilience building that helped the communities in the study area to cope with cyclone Hudhud in 2014. The damage suffered by the households, and the time needed by them to return to the pre-cyclone situation were used as indicators of resilience. This study concluded that factors such as education, decision-making power, and presence of coastline vegetation of local species such as cashew and casuarinas helped the communities to build resilience toward tropical cyclones.

Index Terms: Coastal Communities, Cyclone Hudhud, Resilience, Vulnerability, Visakhapatnam District

1. INTRODUCTION

Climate extremes such as natural disasters affect the poor disproportionately and cause more loss to their welfare than the rich (Sakai et al. 2017)¹. Resilience is usually perceived as a long-run phenomenon (NRC, 2012)². Building resilience is essential to improving human well-being and eradicating poverty (Ross, 2014)³. It is linked inversely to vulnerability and directly to the adaptive capacity of a system (Yoon et al. 2016)⁴. Though, it is also reflects the short-term immunity of a system immediately after a shock.

As static resilience, the ability of a system to maintain function when shocked or the ability to limit the magnitude of immediate loss of income after a disaster is described, whereas hastening the speed of recovery and reconstruct quickly after a shock is called that dynamic resilience (Chang et al. 2018)⁵. After a disaster, static resilience reduces that an initial damage, while dynamic resilience reduces the recovery time. The east-coast of India witnesses that frequent cyclonic disturbances (Sahoo and Bhaskaran, 2016)⁶. Probably, some of the most densely inhabited areas, with population density exceeding 400 persons per sq. km. located that due to the availability of water and land like delta plains of Mahanadi, Godavari, Krishna, and Cauvery (Kumar et al. 2005)⁷. Combination of climate risks, poverty, and a high population density calls for the need to develop resilience building in these communities. Government of India adopted the National Policy on Disaster Management in 2009 with a vision is to build a safe and disaster resilient country. Accordingly, the cyclone-prone areas are provided with multi-purpose storm shelters, approach roads, saline embankments, early-warning systems, rescue and evacuation training, and disaster rapid action force to manage storm hazards effectively. When, the extreme climatic events occur such as cyclones, these measures are essential to provide the emergency response needed and have been proved effective (Das, 2019)⁸. However, socio-economic and environmental factors contributing to a community's resilience of natural disasters remain unacknowledged by the existing policy. Addressing these factors will make coastal communities more resilient and sustainable. Hence, this research paper identifies such factors by studying Visakhapatnam, one north-coastal district in the state of Andhra Pradesh, which is hit by cyclone Hudhud on 12th October, 2014. When the cyclone Hudhud hit, the coastal areas had been the above-mentioned that disaster management measures in place. Further, it is identifying the factors which helped these communities to cope with the impacts of this disaster and contributed to their resilience (Sawada, 2017)⁹. As the climatic extremes are projected to intensify, the present study provides an important input for developing an appropriate climate adaptation policy for vulnerable coastal regions. The research explains its conceptualization of resilience, which is then followed by objective of the study.

2. OBJECTIVE OF THE STUDY

There is a paradigm shift in disaster management approach from the previous focus of response and relief to prevention and preparedness. General objective of this study is “to examine the influential factors of the resilience in disaster management during cyclone Hudhud with reference to Visakhapatnam district of Andhra Pradesh”.

3. RESEARCH METHODOLOGY

For this paper, data collected through a semi-structured household schedule during April-December 2017. Households were selected by simple random sampling to conduct on risks faced, time required to return to normal, and demographic and socioeconomic characteristics. It is carried out the impact from cyclone Hudhud and as the first round of identification strategy to coast in Visakhapatnam district and purposively Bheemunipatnam is one coastal revenue administrative division was selected, next, the researchers listed all coastal villages of the division and followed by six villages were selected for the research work.

All such villages were closest to the Bay of Bengal highly populated chosen. There are surveyed that the sample size is 189 households. Villages were studied from the high impact zone to understand the effect of cyclone while identifying the different factors on loss of lives and damage occurrences and resilience. Finally, it is used the SPSS software for data analysis to derive the results.

4. RESULTS

District Disaster Management Plan (DDMP) is an operational module for the District Administration on effective mitigation of different types of disasters with locally available resources and personnel and to provide distressed people with immediate relief. It should also ensure immediate response from the existing administrative structure. It is certainly possible to reduce the impact of Disasters by evolving appropriate preparedness, mitigation and response plans. Earlier, any disaster management was considered as a crisis management function that began with a disaster and closed soon after the relief and rehabilitation. There are many studies on the relationships between poverty, disasters, and climate extremes indicate that climate change and its impacts accelerate poverty in the vulnerable developing countries (Shepherd et al. 2013)¹⁰. The last two decades, economic growth in India averaged 6% per annum and is expected to increase to 7% or higher in coming years. Despite such growth, this region accommodated 34% of the poor, around 274 million people who subsisted on Rs.156/- a day in 2013. Nearly half of these people live in the low-lying coastal regions. Large population and poverty force more people to live in marginal, hazard-prone regions such as low-lying urban areas, disaster-prone coastal areas, and flood plains, and put them under persistent risk from combined impacts of rapid-onset extreme events (e.g. cyclones or storm surges) and slow-onset processes of climate change such as sea level rise (Woodruff et al. 2013)¹¹. Population pressure causes degradation and loss of ecosystems, the first line of defence against natural disasters (IPCC 2012)¹². Increased vulnerability from climate change is reflected in the global economic loss caused by natural disasters (UNISDR 2015)¹³. Hence, these factors have reinforced an interest in studying the linkages between poverty and climate extremes to prescribe resilience-building policy options.

4.1. Socio-Economic and Demography

In vulnerable areas, increasing the adaptive capacity of people decreases their exposure to natural disasters and makes them more resilient. This study reveals the socio-economic and demographic distribution of sample households and self-reported losses during cyclone Hudhud. It is observed that the affected people to be predominantly illiterate (46%) with only 19% with no more than primary education, and 21% with no more than secondary education as well as 14% with no more than collegiate both intermediate and degree (8%) and professional (6%). Majority of households were Hindu (84%). There are 98% of households which belonged to Scheduled and Backward castes that are historically disadvantaged in terms of social status and economic security. Nearly, 42% of the households practiced subsidiary occupations, daily wage labour being the most common. The households were also practiced secondary occupation such as vendors, salt producers, petty business and employees.

Out of these households (58%), 35% households practiced either fishes or vegetable vending; 14% were employees, and 6% engaged in salt production. Petty business households were few (3%). About 66% of the households were poor with the median annual household income between Rs.50001/- and Rs.150000/-. As per their occupations, when households were earned the highest followed by fishing respectively.

4.2. Damage Caused by Hudhud

During cyclone Hudhud, all the coastal people suffered losses. However, their loss exceeded their average annual income (Rs.45,850/-). Around 81% of the households were headed by males, and 19% by females. Among the types of loss suffered, farmers reported loss of quality due to saline inundation, and loss of harvest. People also suffered different types of house damage. In the sample, nearly 18% of families had kutcha houses, 23.5% had concrete houses, and 58.5% had semi-concrete houses were fully damaged. Fishers suffered both direct and indirect losses. Direct losses included boats, nets, engines and other fishing materials, and loss of fishing days. The indirect losses were the lower catch rates after the cyclone, 82% of the households reported to have lost work days because of the cyclone, varying from less than 10 days to more than 2 months. After cyclone Hudhud, most of them had to sit idle for nearly a month.

4.3 Factors Determining Resilience to Cyclone Hudhud

In the study area, the affected people were asked how long they would take to recover completely from the loss from cyclone Hudhud. Nearly, 86% of households expected to recover within 2 years; while 5% felt that they would take between 3 and 6 years for full recovery. As an indicator of resilience, this study using the self-reported recovery probed the household characteristics and environmental features contributing to the quicker post-cyclone recovery. Only 14% of the households had tree cover along the closest coastline in the form of mixed forest. Rest of the households faced open coast. Our query was whether this mixed vegetation along the coast provided protection to households compared to an open coastline devoid of vegetation.

5. CONCLUSION

It is concluded that irrespective of economic status, the coastal communities can invest in assets that can be moved to safe zones in times of need. Households in affected areas have been recommended the five options to manage the effects of cyclone Hudhud. A large number of respondents favoured concrete houses, followed by storm shelters and early warning systems. The Central Government of India announced the Pradhan MantriFasalBimaYojana to provide insurance to families affected by cyclones. However, only one household in the study area opted for crop insurance, indicating a lack of awareness about insurance in these communities. Coastal communities should take steps to increase their capacities to better prepare themselves to face natural calamities and avail the opportunities and benefits of insurance policies and schemes, smart asset investment and financial saving plans. Insurance coverage for other assets such as fishing gear should also be considered.

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