

# Livelihood Vulnerability due to Disaster: Strategies for Building Disaster Resilient Livelihood

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**Abstract**—This article explores the livelihood vulnerability due to disaster as well as strategies for building disaster resilient livelihood. Occurrences of disasters have been increasing worldwide over time which damages resources and livelihood significantly. A study on disaster events from 1990 to 2012 revealed that 339 disasters had taken and about 240 million people were affected. It is also reported that the experience of disaster events observed worst on the low income population from the developing countries. Many people's livelihood becomes vulnerable as consequences of disaster events. In such circumstances, some social practices such as community based organization, disaster insurance scheme, rural disaster team etc. could be useful for making resilient livelihood to reduce drastic effect of disaster. There is also need to promote livelihood centered approach or need based approach for achieving resilient livelihood. Promoting social protection with community based disaster risk reduction and diversified livelihood options have immense potential to reduce vulnerability.

**Keywords**— Disaster, Livelihood, vulnerability, strategies and resilient livelihood

## I. INTRODUCTION

**O**CCURRENCES of disasters are increasing worldwide over time which damages resources and livelihood significantly. Disaster hampers many development activities and plans especially in the developing countries and regions. In 2011, 332 natural disasters were recorded worldwide where casualties and economic losses were enormous. These disasters caused the death of more than 30,770 people, left 244.7 million victims and caused a record amount of US\$ 366.1 billion of damages. A total of 101 countries were badly affected by these disasters [1].

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According to 2010 statistics, disaster has killed nearly 300,000 people where over 300 million people were affected [2].

Figure 1 (see in Appendix I) shows the number of reported disasters and victims from 1990 to 2012 where an increasing trend of natural disasters over the year has found. From the data analysed between 1990 and 2012, it has been estimated that about 339 disasters took place every year and 240 million people were affected due to those disaster events.

The impacts of disasters induced by climate change and extreme events are likely to enhance the vulnerabilities of many of the societies and communities as well as to hamper many development investments and efforts [3]. Poorer communities suffer a disproportionate share of disaster loss. Poor households are usually less resilient to loss and are rarely covered by insurance or social protection [4]. Disaster impacts lead to income and consumption shortfalls and negatively affect welfare and human development, often over the long term [4]. The impacts of disaster on livelihood of low income people of the developing nations are enormous. The low income groups are always fighting to have a better livelihood as they are lacking of access and resources to lead their lives. When a disaster happens, they face the greatest loss of their livelihood resources and can-not overcome the worst impacts of disaster as well. Every year many people become vulnerable to better livelihood due to disaster situations. Therefore this article explores livelihood vulnerability due to disaster as well as outlined a framework for building resilient livelihood.

## II. CONCEPTS AND DEFINITIONS

### A. Disaster

By taking advocacy of the International Decade for Natural Disaster Reduction or IDNDR, the United Nations promoted its working definition for disaster as “a serious disruption of the functioning of society, causing widespread human, material or environmental losses which exceed the ability of the affected people to cope using its own resources. Disasters are often classified according to their cause viz. natural or man-made” [4]. CRED defines disaster as “a situation or event which overwhelms local capacity, necessitating a request to a national or international level for external assistance; an unforeseen and often sudden event that causes great damage, destruction and human suffering” [2]. Disaster risk arises when hazards interact with physical, social, economic and

environmental vulnerabilities. The relationship of vulnerability, hazard and disaster are as follows:

Disaster = Vulnerability + Hazard

### B. Vulnerability

Vulnerability means the susceptibility of people and communities exposed with their social, economic and cultural abilities to cope with the damage that could occur [6]. According to the International Strategy for Disaster Reduction (UN/ISDR), vulnerability is defined as the conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards [7].

### C. Hazards

A natural or human-made event that threatens to adversely affects human life, property or activity to the extent of causing a disaster [8].

Hazard is a potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation [7].

### D. Resilience

Different scholars/organizations have been defined resilience by different perspective. Here resilience is considered with the perspective of disaster or hazard event. International Strategy for Disaster Reduction (ISDR) defines resilience as 'the capacity of a system, community or society that is potentially exposed to a hazard, to adapt to it by resisting changing so that it reach and maintain an acceptable level of functioning and structure' [9]. UNISDR also define as "the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner".

### E. Disaster resilience

DFID has adopted a working definition:

Disaster Resilience is the ability of countries, communities and households to manage change, by maintaining or transforming living standards in the face of shocks or stresses - such as earthquakes, drought or violent conflict - without compromising their long-term prospects [10].

### F. Resilient livelihood

A resilient livelihood is one that enables people to anticipate, organise for and adapt to changes - good or bad, sudden or slow. For this people need safeguards in case of upcoming disaster, such as early warning systems, awareness and training, safe housing and food stocks [11].

## III. LIVELIHOOD VULNERABILITY DUE TO DISASTER

Vulnerability diminishes the capacity of an individual or group to anticipate, cope with, resist and recover from the impact of a natural or man-made hazard. The concept is relative and dynamic. Vulnerable groups are also those that also find it hardest to reconstruct their livelihoods following disaster, and this in turn makes them more vulnerable to the

effects of subsequent hazard events. Vulnerability is most often associated with poverty, but it can also arise when people are isolated, insecure and defense less in the face of risk, shock or stress.

People differ in their exposure to risk as a result of their social group, gender, ethnic or other identity, age and other factors. Vulnerability may also vary in its forms: poverty, for example, may mean that housing is unable to withstand an earthquake or a hurricane, or lack of preparedness may result in a slower response to a disaster, leading to greater loss of life or prolonged suffering [12]. However, poor people face many risks and pressures that limit their ability to improve their livelihoods and wellbeing - disasters, climate change, resource degradation, conflict, disease, poor governance, inequality, lack of decent employment, unfair markets, price crashes, competition for scarce resources and more [11]. So livelihood can be a sort of vulnerability for so many factors which are summarized in Table I (see in the Appendix II).

People's livelihoods and the wider availability of assets are fundamentally affected by critical **trends** (resource trend, technological trend etc.) as well as by **shocks** (natural shocks, economic shocks etc.) and **seasonality** (of process, of production etc.) [13]. Shocks especially natural disaster significantly affects people's livelihood CRED statistics shows that disasters affect more than 200 million people annually, causing significant loss of lives, assets and infrastructures and so on [2]. About 85% of people exposed to earthquakes, tropical cyclones, floods and droughts live in countries with either medium or low levels of development [3]. Poor countries are less able to withstand the initial disaster shock than richer countries [14] and they face much larger shocks to their economies after a disaster of a similar relative magnitude [15]. Similarly, poor people become more vulnerable than rich people as they are less able to cope the impacts of disaster [16]. The trend over the past 23 years points to a greater frequency of environmental and climatic hazards and therefore a growing risk for vulnerable populations worldwide. Though disasters affect everyone, often the impact disproportionately falls on poor countries and the poor and marginalized people within. The effects of natural disasters can be persistent for the poor, especially when they losses both of income and assets [15]. Using a non-equilibrium dynamic model, Hallegatte et al. (2007) showed that short-term constraints for recovery can cause poverty traps and result in a reduction of long-term macro-economic growth rates [17]. Thus natural hazards and the associated asset losses generate a serious threat to livelihoods of the people which is much higher in poor countries and communities. Figure 2 (see in Appendix I) shows that people loss the various livelihood capital that calls for vulnerability in their lives.

## IV. STRATEGIES FOR RESILIENT LIVELIHOOD

It is important to build disaster resilient livelihood by enhancing the capacity of vulnerable people to cope with environmental hazards. Many people of different countries live in areas subject to extreme flooding and riverbank erosion, cyclone etc. which destroy their crops, homes and livelihoods, undermining their economy, health and nutritional security.

Two key strategies need to consider which reduce vulnerability and increase the resilience of livelihood to disaster:

- Community based Disaster risk reduction through prevention, protection and preparedness;
- Strengthening and diversifying livelihood options.

#### A. *Community base Disaster Risk Reduction*

Disaster risk reduction (DRR) can be accelerated through using the potentials of the community people where they join hands together. So community based DRR approach could be useful to reduce disaster risk and enhance resilience of the livelihood. Establishing social organizations such as community based organizations (CBOs) are important tool to conduct DRR measures at local level which enhance the resilience of the community people [18 , 19]. Several countries have already adopted community based DRR approaches that have increased the capability of the community to deal with disaster event [21]. Chen et al. (2006) discuss on community-based disaster management program in Taiwan where community residents learned how to analyze vulnerable conditions, discover problems, develop solutions, and establish an organization to implement disaster management tasks [20]. They also continuously improve their emergency response capability through a participatory process. Some of the good practices for building resilient livelihood of the community are shown in Table II (see Appendix II).

#### B. *Livelihood diversification*

It is useful to apply need-based approach that brings measurable economic gain for the people who are vulnerable. Increased income can be achieved through skill development for alternative or diversified livelihood options, both on farm and off farm. The 'Mainstreaming Livelihood-Centred Approaches to Disaster Management' (DRR) Project of Practical Action Bangladesh has used a sustainable livelihoods approach to demonstrate positive development impacts that increase resilience and the ability to adapt to climate change. The project has promoted a number of on-farm and off-farm activities based on local needs, capacity and opportunities. With improved knowledge and support mechanisms, several thousand vulnerable families from flood-prone, river eroded areas of Bogra, Gaibandha and Sirajganj districts now have the capacity to reduce their vulnerability to disaster risks [24].

**On-farm activities:** Training in practical technologies and skills for farming activities, such as profitable livestock (cow, goat, sheep) rearing, poultry (duck, hen, pigeon) rearing, beekeeping/apiculture, homestead gardening, garlic and watermelon cultivation, early maturing rice cultivation, nursery establishment and fruit sapling plantation, were provided to individuals and groups (project participants). The project also provided appropriate inputs to the trainees. 4,000 families in the project locations are now using newly acquired knowledge and skills. Gainful employment has been stimulated within the communities, leading to increased earnings, the ability to satisfy basic needs and increased disaster resilience. This appropriate need-based approach has resulted in measurable

economic gains by beneficiary families. The project has also implemented flood proof Tube well and Sanitary latrine

**Off-farm activities:** A number of off-farm activities, such as bamboo product-making (handicraft), mat making, blanket making, curd production and seed preservation, were promoted under the project by providing training to selected participants. The project also provided equipment to the trained persons so that they could begin earning money using their newly gained skills. Packaging and blanket making have been replicated within the community. The group of people involved may choose to divide responsibilities with sub-groups taking up separate components such as raw material collection, marketing etc; each group contributing to the production of the end product. Each component can even be run as a separate competitive enterprise. Curd production was a completely new way of generating income for the community. The beneficiaries who received training in these skills are now earning money all year round - even during the monsoon season, previously a period when no sources of income were available.

The livelihoods-centred approach to DRR has clearly demonstrated that skill training coupled with initial input support can equip people with new opportunities and enhanced ways of earning a living. Improved incomes not only move people away from destitution, but also increase their ability to cope with both predictable and unpredictable shocks and stresses [24]. Strengthening and diversifying livelihoods through skill development of on-farm and off-farm activities is easily replicable in other areas of Bangladesh as well as the other countries and provides a means of reducing poverty and vulnerability while increasing resilience to disastrous events.

A framework for building resilient livelihood has been developed in this study. It is important to initiate some strategies for achieving resilient livelihood before disaster as well as during and after disaster period. Social protection, disaster risk reduction and climate change adaptation that have similar objective of reducing the impacts of these shocks and hazards on individuals and communities by anticipating risks and uncertainties. All three are therefore linked by a fundamental concern with reducing vulnerability and building resilience in the face of poverty, disasters or long-term changes in average climate conditions [25]. This study suggests that a combination of strategies for building disaster resilient livelihood through community based DRR, social protection and diversified livelihood options before a disaster event occur. It also provide some strategies such as deploying special forces, rehabilitation of damage structures and special allocation of the government in the disaster affected areas during and after disaster which enhancing the coping capacity and resilience of the people's livelihood. Figure 3 Shows a combination of strategies that might be useful for building disaster resilient livelihood.

V. CONCLUSION

Occurrences of disasters are increasing worldwide over time which destroy resources and affect livelihood significantly. The extreme weather and disaster events are increasing year after year and people's vulnerabilities also increase. As the low income people of the developing world are in high risk and disaster is making their livelihood towards vulnerable condition, so greater emphasize are needed for achieving their better livelihood. There article have found some good practices such as community based organization, disaster insurance scheme, rural disaster team etc. that could be implemented in the disaster affected areas towards building disaster resilient livelihood. Linking social protection with community based DRR and climate change adaptation at local level can provide assistance for vulnerability reduction and disaster resilient livelihood. Some of the recommendations for building disaster resilient livelihood are:

- ✓ reduce the impact of the hazard through community based mitigation, protection and early warning and preparedness;
- ✓ develop and strengthen social organization as well as community based DRR approaches for building capacities to withstand and cope with hazards events; and
- ✓ tackle the root causes of vulnerability, such as poverty, poor governance, discrimination, inequality and inadequate access to resources and livelihoods.

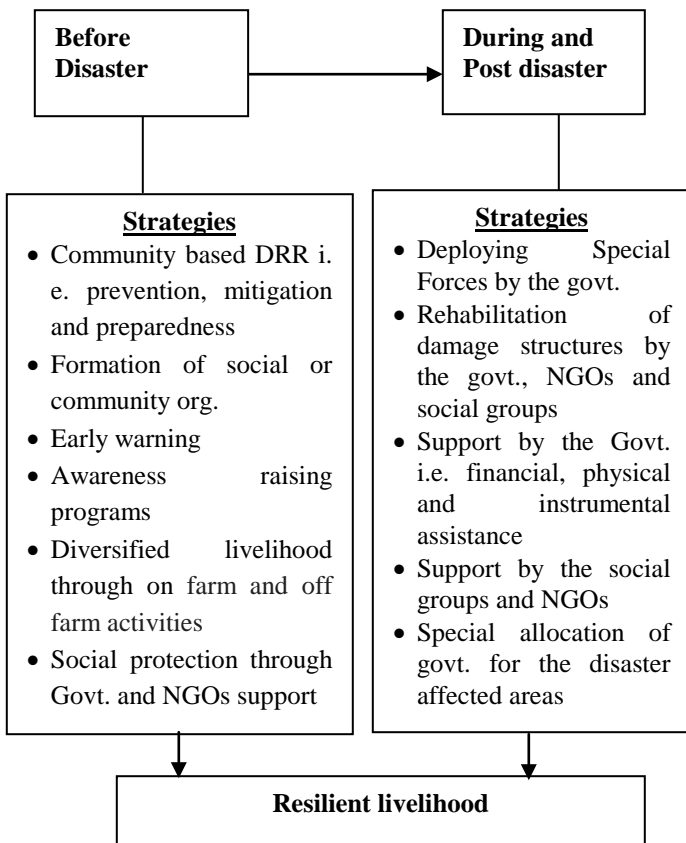


Fig. 3 A conceptual framework of building disaster resilient livelihood

APPENDIX I

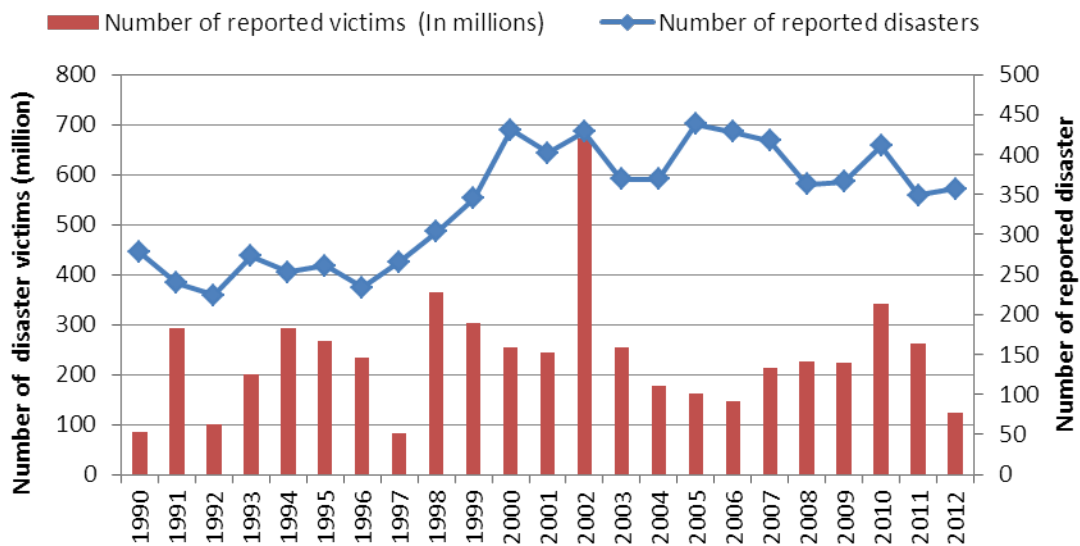


Fig. 1 number of reported disasters and victims worldwide from 1990-2012 [5]

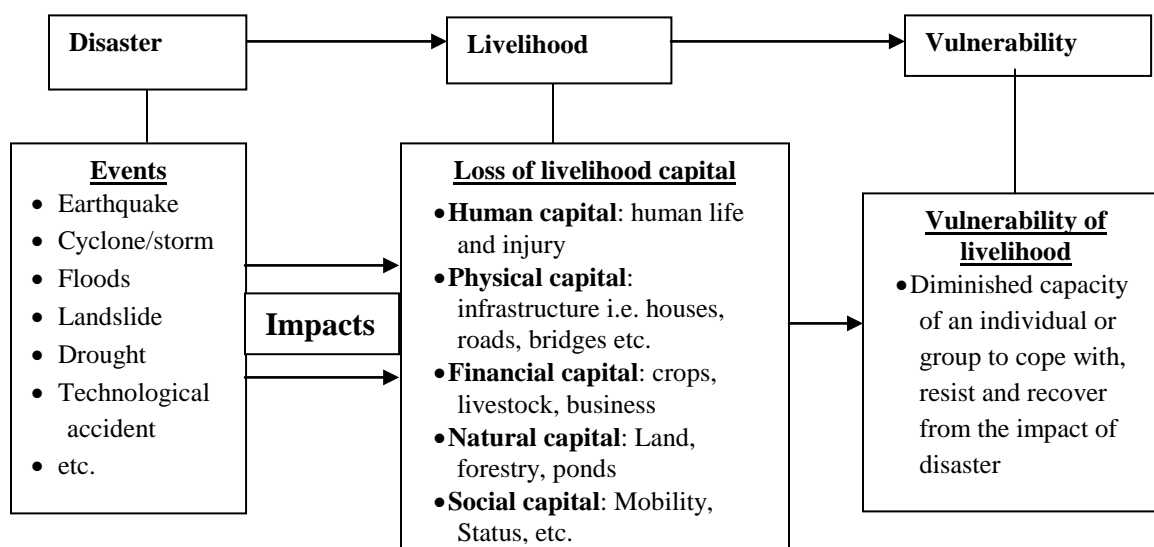


Fig. 2 Relationship between disaster, livelihood and vulnerability

APPENDIX II

TABLE I  
CAUSES AND DRIVERS FOR VULNERABILITY OF LIVELIHOOD [8]

Underlying causes	Dynamic pressure	Unsafe conditions
<ul style="list-style-type: none"> <li>• Poverty</li> <li>• Limited access to</li> <li>- Power</li> <li>- Structure</li> <li>- Resources</li> <li>• Ideologies</li> <li>- Political system</li> <li>- Economic system</li> <li>• Age, sex</li> <li>• Illness &amp; disabilities</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of</li> <li>- Local institutions</li> <li>- Education</li> <li>- Training &amp; skill</li> <li>- Local markets</li> <li>- Local investment</li> <li>• Macro forces</li> <li>- Population expansion</li> <li>- Urbanization</li> <li>- Environmental degradation</li> </ul>	<ul style="list-style-type: none"> <li>• Fragile physical environment</li> <li>- dangerous location</li> <li>- dangerous building</li> <li>• Fragile local economy</li> <li>- Livelihood at risk</li> <li>- low levels of income</li> <li>• Public actions and Institutions</li> <li>- Lack of disaster preparedness</li> <li>- Prevalence of endemic disease</li> </ul>

Source: WHO/EHA, 2002.

TABLE II  
SOME GOOD PRACTICES IN DIFFERENT COUNTRIES TOWARDS BUILDING RESILIENT LIVELIHOOD [20, 21, 22, 23]

Country	Good practices/initiatives	Outcomes
Bangladesh	Formation of Village Development Committee	<ul style="list-style-type: none"> <li>• Solved their communication problem by purchasing a community boat for their own use</li> <li>• Enabled poor communities to reduce disaster risks that threaten their livelihoods.</li> </ul>
Malaysia	CBO for disaster management in Kuala Lumpur	<ul style="list-style-type: none"> <li>• Sharing knowledge to deal disaster events</li> <li>• Increased emergency response through CBO</li> </ul>
India	Disaster Micro-Insurance Scheme for Low-Income Groups	<ul style="list-style-type: none"> <li>• Helped people for sustainable economic recovery</li> </ul>
Indonesia	Combining Science and Indigenous Knowledge to Build a Community Early Warning System	<ul style="list-style-type: none"> <li>• Increased capacity to manage dry land</li> <li>• Developed community early warning system</li> </ul>
Kyrgyzstan	"Disaster Teams" to Boost Preparedness	<ul style="list-style-type: none"> <li>• Enabled people to plan community response to disasters as awareness increase</li> </ul>
Malawi	Small and Medium-Scale Initiatives to Control River Flow	<ul style="list-style-type: none"> <li>• Flood protection successfully by building an earthen flood dike and a storm drain and tree plantation</li> </ul>
Taiwan	Community based Disaster Management	<ul style="list-style-type: none"> <li>• Increased emergency response capability as well as resilience of the community</li> </ul>
Haiti	Community Members Design and Implement Information Campaigns for Their Communities	<ul style="list-style-type: none"> <li>• Increased public awareness and capacity building and effectively enhanced the safety of the population at risk.</li> </ul>
Namibia	Supporting Local Decision Making and Local-Level Monitoring	<ul style="list-style-type: none"> <li>• Building platform among communities</li> <li>• Developed Local Level Monitoring system</li> </ul>
Philippines	Mainstreaming Community-Based Mitigation in City Governance	<ul style="list-style-type: none"> <li>• City officials trained village communities</li> <li>• DRR plans developed for vulnerable communities and integrated into the City Plan</li> </ul>
Vietnam	Flood and Typhoon-Resilient Homes through Cost-Effective Retrofitting	<ul style="list-style-type: none"> <li>• Reduce the impact of typhoons and floods on housing and public buildings</li> </ul>

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