Studies on Vulnerability in Coastal Areas: A Review from Analytical Perspective

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ABSTRACT: Based on existing literature, this paper, explores the vulnerability of the coastal people. The reviewed literature emphasized that vulnerability is a kind of uncertainty arising mostly from natural disasters which are different and multifarious. It discovered that the prevailing literature dealing with vulnerability of coastal people, irrespective of the cultures and the countries are unique in nature, and thus it may also be different in different parts of the same country. In addition to this, it is also hypothesized that the vulnerability of the coastal area of a developing county may further be distinct in nature as compared to a developed country. In the light of such rubrics, the paper makes an analytical discussion on vulnerability having supported by the evidences on its divergence.

INTRODUCTION

Vulnerability is a fact for a coastal region whether it is located in poor countries such as Bangladesh, Mozambique or Jamaica or in affluent countries like the United States or Australia. However, it is true that vulnerabilities are acute in poor countries as compared to rich countries because people in poorer countries have fewer alternatives to overcome these vulnerabilities. Blaikie *et al.* (2004) add that acute population density has demands on increasing food production and consumption which put the poor countries in a vulnerable situation as they end up with extensive resource depletion. This is true also for small communities when they experience something similar.

The society which faces these natural disasters[1] frequently suffers more than others. This is supported by Blaikie *et al.* (2004:5) where they maintain:

> Disasters are a brake on economic and human development at the household level (when livestock, crops, homes, and tools are repeatedly destroyed) and at the national level when roads, bridges, hospital, schools and other facilities are damaged. The pattern of such frequent stresses, brought on by a wide variety of "natural" trigger mechanisms, has often be complicated by human action- both by efforts to palliate the effects of disaster and by the social causation of vulnerability.

To be specific, it can be said that the concept of vulnerability is a new way of explaining the sufferings of a group of people in a community which occurs mostly due to environmental disasters. In many writings, it is found that, vulnerability is a

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multidisciplinary concept which is now used by almost every discipline such as Social Science and Engineering. But the approaches in explaining vulnerability, however, differ from discipline to discipline. For instance, Chambers ('89:1) explained defining vulnerability as:

> The exposure to contingencies and stress, and difficulty coping with them. Vulnerability has thus two sides: an external side of risks, shocks and stress to which an individual or household is subject; and an internal side which is defenselessness, meaning a lack of means to cope without damaging loss.

In addition, Adger (2006) defines vulnerability as a kind of insecurity which comes mostly from economic crisis creating food scarcity and posing other social problems for the inhabitants. However, he links this economic crisis with environmental changes and politics. He claims that vulnerability apparently arises from the environmental changes which are very much linked to the politics of resource use. In that context, Adger (2006) specifies, "Vulnerability is the state of susceptibility to harm from exposure to stresses associated with environmental and social change and from the absence of capacity to adapt" (p: 268).

VULNERABILITY AS A CONCEPT

Though vulnerability is very much connected with environmental issues, many theorists like Handmer *et al.* ('99) in their writings indicate that vulnerability is a process which combines environmental, social, economic and political uneasiness of a community in an interrelated framework. They remind societies that the patterns of vulnerability vary depending on the type of hazards or the kind of natural disasters. For example, the patterns of vulnerabilities from a natural disaster and man-made disaster such as drought and ethnic conflicts are not identical. At the same time, the coastal community which has strong global network can reduce its vulnerability easily in the same way; their resilient capacity is also higher than others who do not have a similar global network.

Mallick *et al.* (2011) define vulnerability[2] as a multidisciplinary concern and conferred to a point that vulnerability is a situation when shocks and pressures attack the community repetitively. A reduction of resources is observed within a vulnerable situation. This reduction is such that it directs towards the diminishing of the people's capability with less resources and assets. This vulnerable situation thus leads harm to the people's life and living style (Davis, 2011). Mallick *et al.* (2011) once again state that the vulnerability of one arrangement such as environmental degradation[3] causes vulnerability to other arrangements of socio-cultural life. Thus vulnerability causes a severe condition which appears when the coastal people do not have adequate survival strategies to overcome their diverse obstacles. Eriksen and Kelly (2007) further state that vulnerability is a set of events that can be determined through a chain of social, economic, political and infrastructural factors. Poor people are less prepared to overcome all these vulnerabilities as they have fewer options in a disaster-prone area.

Adger and his associates have a series of work on vulnerability and resiliency issues; among them some are very relevant to this present work. For example, in an article by Adger, Huq, Brown, Conway & Hulme (2003) claim that all kinds of vulnerability including those due to natural disasters are socially fabricated because the nature of each vulnerability depends on the institutional and economic condition of a society. To explain this further, they use the example of coastal community. They state that among vulnerable communities, coastal community is highly affected in terms of natural disasters. The vulnerability of this community is observable through societal impacts such as change in water quality, natural assets, food habits and also in coastal ecosystems. At the same time, they state further, vulnerability due to natural disasters depends partly on the inhabitants' experience, their geographical locations and the capacity of that community to face and recover from those disasters. It is stated in their paper that:

> The vulnerability or security of individuals and of societies is determined, not only by the likely responses of the resources on which individuals depend, but by the availability of resources and, crucially, by the entitlement of individuals and groups to call on these resources (Adger *et al*., 2003: p. 181).

Based on the foregoing discussion, some definitions of vulnerability seem to be very much similar with features of poverty, though this has been

refuted by some authors. Adger and his associates (2003) strongly establish that poverty and vulnerability are not identical. They say that most of the poor and disadvantaged people are vulnerable due to natural disasters but the nature of vulnerability is not predictable like poverty. At the same time, they add that the nature of vulnerability can be changed based on the nature of the natural disasters.

NATURAL DISASTERS AND COASTAL AREAS

Mahameru ('91) identifies the causes of coastal erosion in the southwestern coast of Johor in Malaysia. By and large, this article is based on coastal engineering facets where he claims that he has not found any previous empirical work on this related issue. For this exclusive work, his hypothesis is that both natural and man-made activities are responsible for coastal erosion in the southwestern coast of Johor. Based on non- empirical secondary data, he mentions in his paper that tidal wave and thrash thrown into mangrove forests, transform upstream fresh water availability. This erosion drift has multiplied with other human activities as well.

In this paper, Mahameru ('91) mentions that to protect this coastal region, the Malaysian government conducted one project in 1974, funded by the World Bank. Before constructing this project, the agricultural land of this coastal area was often experienced by floods, water logging and saline intrusion. To protect this region from all these disasters, the primary task of this project was to build coastal embankment, channelization and change of rivers, proper drainage system and manufacturing of divider, downpour, transportation, bridge and other constructional developments. The author found that these constructions in 1974 successfully caused less coastal erosion later.

Tjia and Mastura ('92) also conducted their research on Malaysian coastland. Along with many other issues, these authors focused on coastal problems which are also of interest of this present researcher. Tjia and Mastura (1992) outlined coastal erosion as the most significant crisis for Malaysian coastlines. According to them, Malaysia is a fast growing industrial country where pollution arises through expansion of industry and agriculture. To continue development, coastal mangrove areas need to be cut down which causes failure to protect the coast from floods and erosion. The other reality is that the aquatic resources of west Peninsular Malaysia can easily disappear compared to other coastlines. Even fast expansions of tourism within coastal areas are not properly planned which directs these areas towards degradation.

With all these external factors, Malaysian coastal zones face multiple pollutions due to rising sea levels, floods and storm waves. Tjia and Mastura ('92) believe that both natural and human actions are equally to be blamed for coastal erosion which obstructs the natural flow of river water, causes lack of fresh water in mangrove forest, demolishes mangrove forest and other negative impacts on the ecosystems diversity. Unlike Mahameru ('91), these two authors are against the building of a barrage or dam which might be constructed to stop coastal erosion. They believe these barrages might have other complicated consequences on the coast such as lack of siltation. The absence of siltation may cause devastation of agriculture, mangrove forest and fresh water supply for the coastal community. It is found that the authors of this article emphasise more on environmental issues as industrial expansion failed to bring environmental equity in the coastal zones of Malaysia (Tjia and Mastura,'92).

Coastal Areas and Vulnerability

Based on the livelihood framework, Badjeck, Allison, Halls and Dulvy (2010) detailed the impact of climate change on the coastal household and community people. They found that these people were mostly dependent on fishing activities for their livelihood. They further add that these fishing dependent people had to acclimatize with the changing climate situation. At the same time, these coastal people were over exploiting the aquatic and sea resources which reveals the dilapidation these resources. This is factual for the local in particular and for the whole world in general. As a consequence of this dilapidation, the pressure on fishing assets occurs and causes negative impacts on the coastal community people.

Bogardi (2004) mentions that climate change[4] is the result of both human exploitation and natural dynamism. He tries to establish that both human actions like over exploitation and natural resource

dynamism are together responsible for climate change. However, these natural dynamisms such as rainfall, deforestation or land degradation are mostly the result of over exploitation of natural resources because of population density. At the same time, greediness for economic benefits is also a cause for over exploitation which leads to natural disasters. This paper predicts that, if the trend of over exploitation continues, by the year 2025 around 5 billion out of 6 billion people of the world may need to depend on urban areas for their livelihoods which may generate new hazardous problems.

Pomeroy, Ratner, Hall, Pimoljinda and Vivekanandan (2006) focus on the remedy that the coastal communities can apply after the vulnerability of the Asian Tsunami of 2004. To analyze the healing process of their livelihoods, most of the coastal communities of developing countries turned immediately to the nature for their livelihoods. The reason that they considered this dependency on nature is the lack of alternatives. If the natural disasters degrade the natural setting, the residents of this community suffer a lot. This occurred in December 2004 after the Tsunami hit India, Indonesia, Sri Lanka and Thailand. Because of the Tsunami, the resource settings were changed polluting the coastal poor in vulnerable situations. As such, the Tsunami caused both direct and indirect impacts on productive forces.

Natural disasters like degradation of natural settings have strong impacts on a society which is socio-economically backward (Kesavan and Swaminathan, 2006). By using the methods of Environmental Science, coastal people of India who suffer a lot due to natural disasters can be assisted. In recent times these disasters occur so frequently that coastal people of India need to be compensated for losing their livelihoods. People living in rural areas of coastal India are vulnerable because they are not technologically skilled which puts them behind in term of finding alternative resources. There is a strong correlation between the force of natural disasters and greater social vulnerability. At the same time, there is a relation between degradation of natural settings and demographic pressures on society. Kesavan and Swaminathan (2006) gave the example of Orissa cyclones which occurred in 1999. They proclaimed that in the aftermath of these cyclones, the number of lives loss and infrastructural damages were quite high because the mangrove forests of that area were degraded badly. They state that this is true not only for Indian coasts but for all coasts of developing countries.

The Annual Report of CGIAR (2000) elaborates that coastal soil which is full of salinity prevents farmers from traditional harvest and crop-growing. Consequently, they fail to produce their main crop-rice which generates a food crisis. This report covered agriculture in a broad sense which included cropping, livestock, forestry and fishery. The report indicates that climate change effects mostly destroy the livelihood of developing countries as these people live on nature dependent agriculture. The Annual Report of CGIAR (2000: 15) in this regard states:

> As evidence mounts that earth's climate is becoming warmer, the predicted effects of climate change on developing-country agriculture-for instance, on the productivity of crops, livestock, forestry, and fisheries-are of enormous significance to millions of small farmers, and the ecosystems on which they depend.

Njayaand Howard (2006) did their research on African fishermen who reside in coastal zones. These researchers found vulnerability in this group and identified climate change as the main cause in increasing the vulnerability by reducing the availability of fish supply and by increasing natural degradation. There was congestion of their livelihood alternatives. In this regard they stated:

> Climate change could increase the vulnerability of fishing communities and also affect the contribution that fisheries make to the economies of developing countries. There are particular concerns for African fisheries where communities are already vulnerable and climate change might over stretch their coping strategies by increasing climatic variation, reducing fish catches and causing extreme climatic events (p. 13).

CONCLUSION

Environment plays an important role for nature dependent coastal communities (Leach, Mearns and Scoones,'99; Brooker, 2006). A number of research claim that climate change and its effect has negative impacts on fishing and related activities. As the water table decreases during the dry season, people lose their

fresh water fish causing them food and nutritional scarcity. Thus, people of developing countries fall into vulnerability due to food scarcity and lack of livelihood options (Ellis, 2000; Njaya and Howard, 2006; Quadir and Iqbal, 2008; Saroar and Routray, 2012; Kebe, Jern, Collins, Kay and Kekula, 2009; Siddique and Volpe, 2009; Anwar, 2003; Haque, Bhatta, Hoque, Rony and Rahman, 2008; Sharma, '97; Benessaiah, 2008).

Not only are the livelihoods or the economy affected but other social aspects of coastal life are interrupted by these disasters. Natural disasters change the land pattern and ownership pattern of coastal people which affect their household activities by creating marginal and landless family units (Shamsuddoha and Chowdhury, 2007). It puts tremendous effects on the poor's resource capacities, living standard, life expectancy, per capita farming land, entrance into education and access to health care services (Shamsuddoha and Chowdhury, 2007). In this regard it was found in Mombasa, Kenya:

> Salt-water intrusion can affect coastal habitats and affect the livelihoods of populations dependent on fisheries and other coastal industries and can result in permanent damage to sensitive ecosystems. In Mombasa, Kenya, a city of 870,000 on a low-lying coastal plain, a rise in sea level of just 0.3 meters would submerge about 4,600 Ha (17 percent of the city's land area). Salt stress in Mombasa is expected to have two significant impacts. It can potentially leave large areas of agricultural lands that surround the city unproductive, as well as salinate inland waterways that supply potable water (Baker, 2012:19).

NOTES

1. This is defined as "A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources" (UNISDR, 2009: p. 13).
2. Vulnerability is "The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard" (UNISDR, 2009: p. 30).
3. "The reduction of the capacity of the environment to meet social and ecological objectives and needs" (UNISDR, 2009).
4. "A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods" (The United Nations Framework Convention on Climate Change (UNFCCC).

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