

Experience of Climate Change Adaptation; *Emic* Perception of Community Based Disaster Risk Reduction Programs in Bangladesh

Dr. Rathana peou van den Heuvel^a, Mohammad Ehsanul Kabir*^b

^a Associate Professor, University of Liberal Arts Bangladesh (ULAB), Dhanmondi, Dhaka, Bangladesh

^b Assistant Professor, Dhaka School of Economics (DScE), A constituent institution of the University of Dhaka,
Eskaton Garden Road, Ramna, Dhaka 1000, Bangladesh

^a Email: rathanapeou82@gmail.com

^b Email: cyberehsan@gmail.com

Abstract

Over 40 years (I)/ NGOs together with the Government of Bangladesh (GoB) have been working to build the capacity of population at risk to cope with natural disasters. From a response rationale to preparedness one, (I)/NGOs together with the GoB struggled to integrate adaptation frame into Disaster Risk Reduction program. Those initial steps were mainly lead by a top down approach.

Bangladesh usually pointed as the most vulnerable country in the world, has a long history of different frame of actions and practices toward building both community and individual resilience. Structural poverty and low good governance mechanisms are just some of the factors that jeopardize the gains of development project in general in Bangladesh. Donors and (I)/NGO play major roles by shaping not only the national discourse but as well by leading the practices and the methodology that needs to be used at the field. Within couple of years, community based approach has been largely adopted by different institutions as being the right way to deliver intervention that aims at reducing the vulnerability and the enhancing the resilience. It is in this context that this paper offers an insight on how DRR and adaptation is translated at the field level. Through an emic perspective this research aims at confronting the realities of the practices of DRR/ Adaptation by (I)/NGOs to the discourse that they communicate.

Key words: Climate change adaptation, Bangladesh, disaster risk reduction, poverty and vulnerability, community based approach, DIPECHO V, DRR vs Adaptation

1. Introduction:

Global disaster risks are predominantly focused on poorer countries with relatively weak government system [1]. In 2009, the UNSDR Global Assessment on Disaster Risk Reduction has stated: “The most intensive risk is found in a very small portion of the earth’s surface. Just three countries – Bangladesh, China and India, each heavily populated – account for 75% of the mortality risk from floods” [1] (p1).

Corresponding author. Tel (+88-01715046050)

Email: cyberehsan@gmail.com

Among the three countries, Bangladesh is the most vulnerable countries to natural disasters due to its unique geographical vulnerability, sensitivity, population density and poorer national preparation to mitigate various climate and environmental risk factors. About 30-70% of the country's land is flooded every year; tropical cyclones hit the coastal areas making way for tidal surge, salt-water intrusion, and destruction of households. Since the devastating cyclone in 1991, two other cyclones Sidr and Aila severely damaged the country's economy along with hundreds of thousands of people standing without food, shelter and medication [2]. Other extensive risks include those related to the sea level raising; changing pattern of season and temperature anomalies with frequent tropical cyclones, prolonged droughts and increased regional earthquake risks reinforced many of the baseline stresses challenge the sustainable development of the country and jeopardize the fragile gains of poverty alleviation programs. The societal exposure to such risks is further intensified by Bangladesh's high population density, poverty and poor livelihood condition, poor water-sanitation facilities and lack of healthcare benefits amongst others [3]. Thus the poor and marginalized groups are facing multiple and diverse challenges while coping with natural disasters in Bangladesh. There are ongoing discourses on what should be the coping mechanism during disasters [3], but without involving local communities and integrating it with the on-going development programs, disaster risk reduction is restricted being a just a tool amongst other.

Over the past forty years in Bangladesh, people have learnt methods for reducing the impacts of disasters at both community and individual levels under different disaster preparedness and response programs initiated by the government and NGOs. This community based approach was based upon the common understanding among both donors and humanitarian agencies that during a disaster it is the community who acts as the first respondents, helping each other in whichever way possible to lessen death and destruction. In another hand (I) NGOs and NGOs usually provide technical expertise and funding. DIPECHO (Disaster Preparedness European Commission Humanitarian aid and Civil Protection) has been funding, since 2012, several international NGOs in Bangladesh.

This article is based on DIPECHO run activities under the DIPECHO V plan in community mobilization for disaster risk reduction, with a research leads by CSD in 2010 with a critical analysis on the sustainability of their projects in the context of Bangladesh.

Nevertheless, over the last decades, the government of Bangladesh has been active in providing normative support, which includes developing national policy frameworks and capacities of the country towards climate change and natural disasters. Bangladesh is now one of the first countries, which finalized the National Adaptation Programme of Action [4], and the Bangladesh Climate Change Strategy and Action Plan [5]. These two cardinal documents aim at enabling national capacities towards climate change adaptation. Moreover, the country's second revised National Strategy for Accelerated Poverty Reduction (NSAPR II, 2009-2011) integrated poverty alleviation as a national priority in climate change adaptation. In practice, such integration can be achieved through poor-focused management strategy, by prioritizing adaptation and disaster risk reduction, and adequate provision for local and international funding.

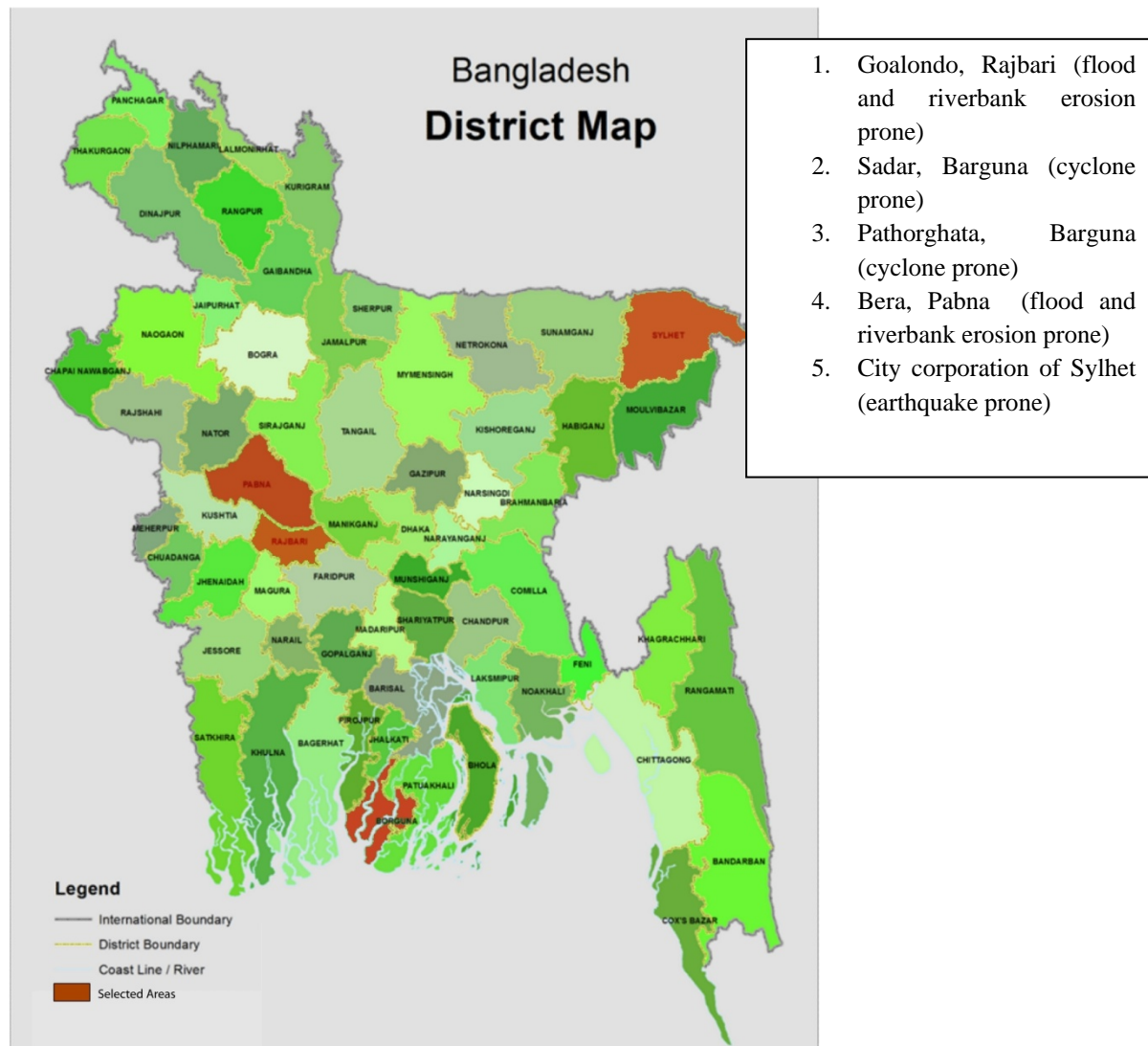
2. Methodology

In terms of poor socio-economic condition, disaster vulnerability, regularity of disaster occurrences and disaster management interventions undertaken by DIPECHO partner's working areas; five different communities were selected as the study areas of Bangladesh. To best represent the differential vulnerability of the rural and urban people: four areas were selected from rural while one from urban communities:

Some parameters are listed below which have been considered while outlining the checklist: Moreover, while focusing on the issues pertaining to sustainable volunteer management system, the following questions were given due considerations:

- a) How does the volunteer management system integrate with the entire disaster management system?
- b) What coordination plan can be developed to avoid redundancy?
- c) What are the processes to be followed to identify volunteer resources?
- d) What are the measures to be taken to channel volunteers to avoid unsafe conditions?

- e) How can the volunteers be processed for formal assignments?
- f) How are volunteers with recognized response organizations managed differently (and similarly) to spontaneous volunteers?
- g) How are response needs and skills prioritized to move quickly through the system?
- h) What kind/amount of resources is needed to screen, assign, and manage volunteers?
- i) As volunteer commitment/interest changes, how does the system react?
- j) How is demobilisation from response and remobilization to recovery related to volunteers' addresses?
- k) What post-disaster volunteer follow-up is indicated?



Map 1: Selected areas for the study

The research was done based on both qualitative and quantitative data. For qualitative data, 4 following tools have been developed.

Table 1: Sample Distribution

Data Collection Tool(s)	Number
KII (Key Informant Interview) for children	16
KII for DIPECHO managers	10
KII for adults	150
FGDs	50

The quantitative data is based on a Knowledge Attitude and Practice (KAP) survey. For this survey, the total sample was 301 persons including children, elderly and persons with disability. *Multistage cluster sampling method* was followed to make a reasonable distribution of samples into five different study areas. This method helps to maintain the probability proportionate to the size of population [6]. This means that the greater the number of population in a particular district is, the bigger the ration of sample size.

3. Findings and Discussion: Community mobilization faces decline of indigenous knowledge; poverty; and, lack of local partnership.

This section presents the survey findings and also some interpretations based on KII interviews. The entire discussion is mainly based on the community's perceptions on DRR projects and activities.

3.1. Lack of integration of Indigenous knowledge as coping mechanism in disasters management programs:

All throughout history, humans have adapted to natural climatic variations and changing weather patterns and thus, the knowledge of local adaptation has been embedded in the social fabric of any geographically specific community [7]. Many of current academics argue that such indigenous knowledge is resilient to the effects of climate change such as extreme environmental events including natural disasters, and provides an important source for baseline information for researchers and the scientific community. Communities are not homogenous across the world [7]. Climate change impacts do not affect each community in the same way as others. Many of the communities are unparallel in terms of cultural sensitivity, ethnicity, gender, class, geo-political factors like access to natural resources and also climate variables [8]. On the other adaptation, for example, the rain calendar in Malawi, seasonal analysis chart hand, due to the geo-social differentiations, communities have their own knowledge regarding in West Bengal amongst many others [8].

Conversely, due to the absence of proper documentation and records, the memories of older people in the communities are often the only existing source of climate change trend or local adaptation in the past [8]. Incorporation of such indigenous knowledge provides a platform for arranging coping mechanisms from the past practices along with a unique source of local environmental expertise that is gathered through generations of experience and practices [9], although all of these do not necessarily address solutions to future challenges of climate change [7]. However, incorporation of indigenous knowledge from local to expert perspectives is still widely absent, whereas valuing indigenous coping mechanism in adaptation is being accepted more as formality [10,11] rather than being integrated in the long term implementation process. Hence, the participatory approach to reduce vulnerability and disaster risk is yet to materialize, especially in the field of Bangladesh [12].

Our research shows that about 26% of the people studied are still dependent on indigenous knowledge as a coping mechanism during any natural disaster. However, in KIIs and FGDs, it has been revealed that indigenous knowledge is not systematically recorded or documented by any government or non-government organization, rather these practices exist more in people's words and tales, mostly told by few elderly people of the villages. For example, in the North (in Pabna district), some elderly persons interviewed said that *they recall their previous generation planting trees surrounding the house yard which makes a tree-fence to defend the house from storms, and then, they used to tie (fix) the pillars of house with those stronger trees to strengthen the house columns* [13]. In contrast, while interviewing the youth in the same community, they hardly could mention such practices.

It seems that there is a gap in transferring knowledge from the older to the younger generations in the communities studied in Bangladesh. The main source of knowledge from the youth lies on the school access and the awareness campaign of the GoB and the NGOs that intervene in the field of disaster risk reduction. The centralisation and uniformisation of the knowledge at school related to climate and environmental science hardly incorporate indigenous knowledge. There is a little literature available on indigenous knowledge in Bangladesh. Even the practitioners described such indigenous knowledge as not well documented. Debates go on regarding what is the real number of beneficiaries between the direct one and indirect one and what is the real impact in terms of behavioural changes [13].

In this study, KAP survey shows that about 26% of the people in community still depend on indigenous knowledge to cope with natural disasters, especially in rural areas where NGO intervention has not been reached that much. Hence, the role of indigenous knowledge as a coping mechanism for natural disasters is still very important in different areas of Bangladesh, having the potential to save about a quarter of the people’s life in the vulnerable communities.

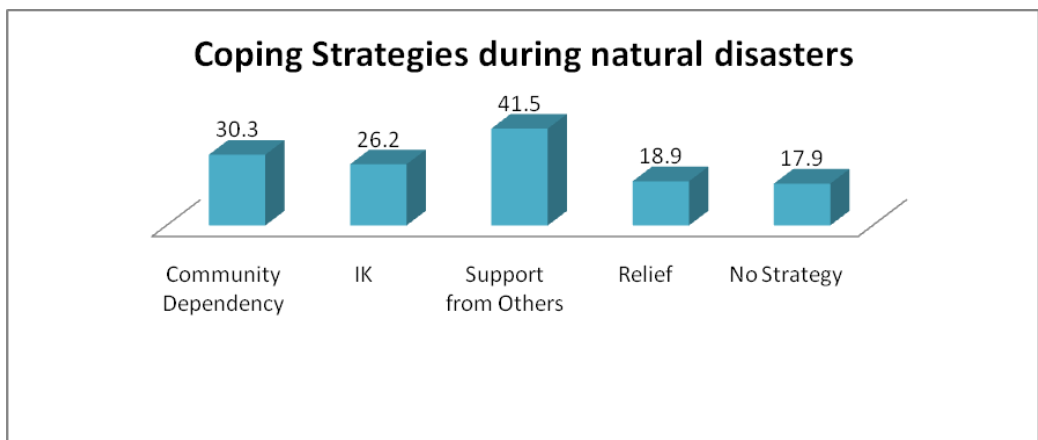


Figure 1: Coping strategy during natural disasters

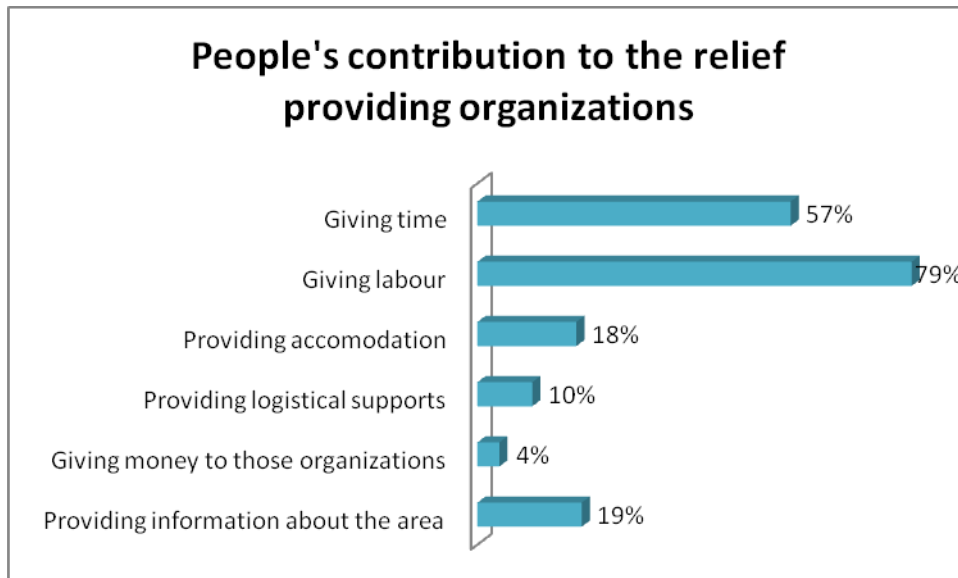
Looking to the program of DIPECHO partners we can say that the integration of indigenous knowledge is minimal and insufficient which can be explained by the short duration of the immersion phase of a project. DIPECHO projects have spent as an average only 2% of the whole project duration to assess local knowledge and needs during the inception period [13]. It is commonly understood that people who are still highly dependent on natural resources or whose livelihood income depends on it have a higher level of awareness regarding disasters and better knowledge on how to be prepared and how to respond. People who have built a close relationship with the land where they live have a better understanding and therefore a better ability to cope with disasters and catastrophes.

Such ‘rapidness’ during project inception substantiates the absence of necessary time allocation in designing the DRR projects to integrate local needs and existing practices, although some participative methods such as mapping are being used by community mobilizers. Literature review show that the DIPECHO initiated DRR activities for the community, involves training modules and practices, many of which have been developed, or, already implemented in some other countries of the world. In DIPECHO projects in Bangladesh, for example, the community’s primary response as expected is to join the DRR related courtyard meetings, mock drill and some other mobilization programs during the project intervention. When the local people attend these classes and training sessions it precariously alters their faith on the existing indigenous knowledge that the community have practiced so far. As a result, the community’s confidence on their own valuable knowledge decreases.

It was observed that there is a low level of community self-assurance about their ability to contribute actively in the process of disaster risk reduction in Bangladesh. Focus group discussions further revealed that the community did not feel that their indigenous knowledge is useful for designing projects. While asking how the

community thinks that they have contributed in past disaster risk reduction activities apart from just providing physical labour, only 19% of the responded have said that they have provided geographical information about their area [13]. Figure 2 offers an illustration of this response.

Figure 2: People’s contribution to the relief providing organizations



Within this study, no participant mentioned that the NGO representatives asked them about the existing practices or local knowledge related to DRR within their locality during the project inception. Only 19% of respondents have said that they have provided information about the area, which mostly involves social mapping, or ordinary response to any baseline survey by Community Based Organizations (CBO). In addition, the highest percentage (i.e. 79%) of the respondents said that they have contributed by giving physical labour during any project lifecycle. Physical labours have been necessary for rehabilitating roads, embankments, dams, cleaning of pond after flood or cyclone and for other emergency purposes. In multiple response to the question, almost 57% of respondents said that they are giving time to NGOs, which is mainly their participation or attendance in community meetings to know about DRR, health and maternal health care.

In short, the community surveyed do not feel empowered in terms of having confidence to participate actively in DRR, neither are they taking over the practices of DRR in the long term, when a DRR project is over. The only way they are comfortable to become involved is under the instruction of external organizations (NGOs), where the community will offer their physical labour (in figure 3). In contrast, records show that the community mobilization has a greater success and solidarity in the 1970s. Evidence shows that in 1970s, the Bangladesh Red Crescent Society and the government have successfully conducted cyclone preparedness programs, that successfully warned, evacuated and sheltered millions of people from cyclone since the inception of the projects in the early 70s [14]. In the 1991 cyclone rehabilitation, the community development approach has been observed to be functioning in the long term rehabilitation and development of communities in the Southern Bangladesh. Although there are some criticisms arguing that some of the NGOs’ DRR activities had ‘vagueness’ in proposals in clarifying how the community development groups or some credit programs have been organized [15] the spirit of community mobilization and vigorous volunteerism have achieved greater recognition in saving lives and property of coastal people since the inception of programs in early 70s (such as RCS,2009)[16].

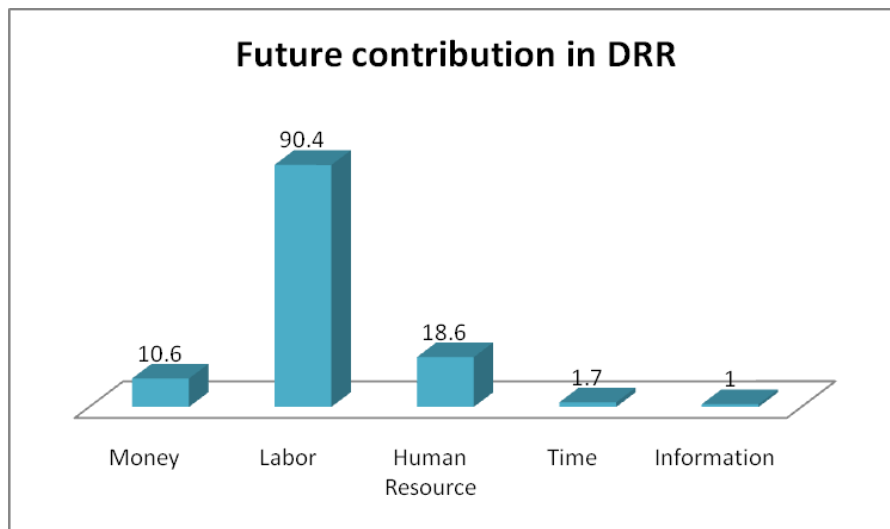


Figure 3: Future Contribution in disaster risk reduction

3.2 Monetary benefit as the major motivation to join a community based organization

Climate change and poverty are critically connected which reciprocally determine the issues of a community's vulnerability to a natural disaster [17]. Mostly the poorest are the hardest hit by natural disasters. Therefore vulnerability reduction to such disasters cannot be understood only in terms of people's exposure to disasters but should also include people's ability to participate in community mobilization activities, voluntary work, and the capacity (both financial and institutional) for recovery from the damages caused by natural disasters [17]. Wealthy nations, on the other hand, are more resilient to some natural disasters than poorer countries since they have the ability to afford the cost of climate change adaptation [18]. It is also recognized that disaster risk is directly related to vulnerability, poverty and scarcity of resources [17,18,19,20,21]. People in the community in response, resist and recover the consequences of a disaster through the assets that they can mobilize to recover the damages [22] which is deficient in poorer countries. In a study conducted on the community vulnerability and adaptive coping mechanism to floods in the South East Bangladesh- where people are vulnerable to seasonal floods, [23] found that the most flood prone residents besides the river Meghna, are living without any flood protection and coping mechanism. Brouwer and his associates show that households having lower income and low access to useful natural resources are having the most frequent exposure to the risk of flooding. Moreover, "disparity in income and asset distribution at community level furthermore tends to be higher at higher risk exposure levels, implying that individually vulnerable households are also collectively more vulnerable" [23] (p 313). Ironically, the communities that face higher risk of a disaster are least prepared, both before and after a natural disaster occurs.

According to the UNDP Human Development Index (HDI), Bangladesh is one of the lowest ranked countries of the world. Even the country's position within South Asia is below the regional average, where vulnerability driven by poverty is very high.

Bangladesh's HDI is 0.500, which gives the country a rank of 146 out of 187 countries with comparable data. The HDI of South Asia as a region increased from 0.356 in 1980 to 0.548 today, placing Bangladesh below the regional average. The HDI trends tell an important story both at the national and regional level and highlight the very large gaps in well-being and life chances that continue to divide our interconnected world [24].

Despite a number of ministries are involved, there is no national policy which integrates social protection and safety net programs which is based on a comprehensive vulnerability mapping [25]. Often, the nature and procedure of many safety net programs “change with the change of government” [26]. Many of the safety net programs also suffer from lack of coordination among different programs and safety net providers. Budget allocation is ‘ad-hoc’ and often given as ‘block allocations’. Consequently, about 16 million (10%) of the country population live in extreme poverty, 4.5 million are completely landless and also suffer from extreme livelihood challenges like unemployment, health issues and higher mortality rates, lack of access to education and many other problems [24,26,27,28]. With the present livelihood situation, it is a challenge to include people’s involvement in climate change adaptation programs, especially activities which are not directly benefiting the people financially. The assumption is that the greatest challenge that the poorest of the communities face is to meet their basic needs and improve existing income condition, whereas the regular disaster risk reduction activities may appear to be an additional factor and commitment.

In this study, attempts were made to know about people’s motive for joining Community Based Organizations which facilitate community mobilization for disaster risk reduction. About 23% of the people in the community studied are somehow involved in relief providing organizations. They have been asked about the reasons for joining these organizations. Their answers are diversified:

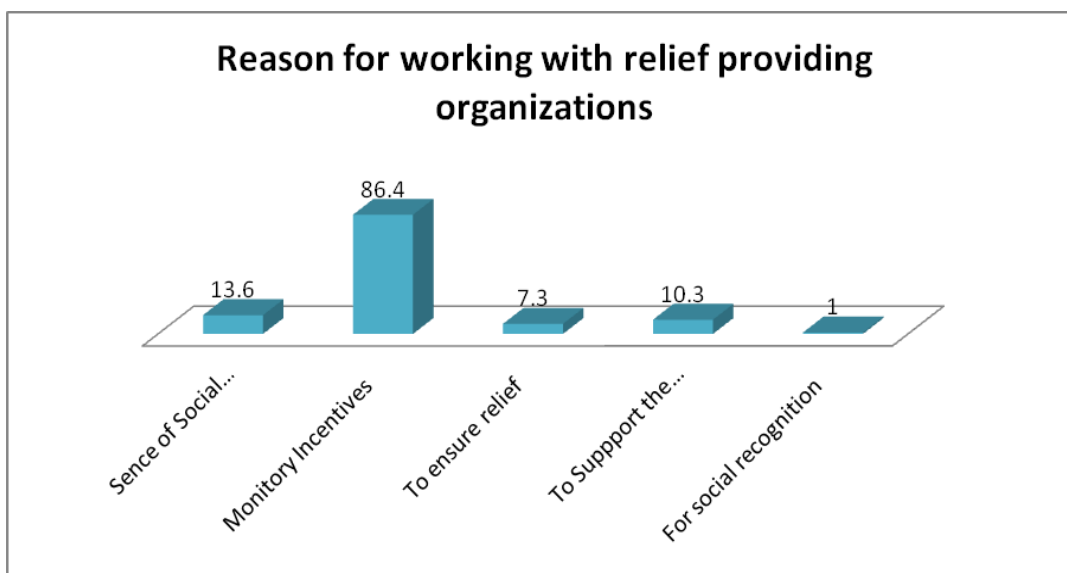


Figure 4: Reason for working with relief providing organizations

[Note: For this answer, we have accepted multiple answers from a single respondent] Among these smaller percentage of people (i.e. 23% of total sampled participants) who have at least once joined a relief providing organization, almost 86% of respondents answered that it was with the hope of monetary benefit, that is, they might receive financial incentives while working with such organizations. About 14% of those respondents have said that it was a ‘sense of social responsibilities’ - for which they have worked for any relief providing organization. Again, almost 10% and 7% of respondents have said that they have worked for such organizations because they wanted to support their community during crisis, and they wanted to ensure distribution of relief in any future disaster, respectively. Only 1% of those people said that they have worked for those organizations to get social recognition.

The spirit of voluntary contribution is fairly missing in the studied DIPECHO intervention areas, whereas the expectation for monetary benefit is dominant. Indeed, to most of the people studied, the main reason for joining any community based organization is the anticipation of financial support. One can argue that either CBOs are somewhat lacking in promoting proper voluntary spirit in intervention area or the community is not willing to offer free work any longer. Our argument here is that if ‘free’ voluntarism does not sustain with people’s poor

livelihood condition, community mobilization may be at its demise among the population who are financially underprivileged, unless initiatives are taken to improve their financial condition [13].

This study's FGD and KII explain that poverty is the crisis they face everyday whereas the DRR activities are additional factors to the community, given that appearance of a disaster is more unpredictable and more 'occasional' compared to the daily shortcomings in livelihood. Though people have acknowledged the importance of disaster preparedness, the urgency for improving livelihood regularly drives the community to find better income sources. This is the reason why, the community studied have mentioned that their main reason for joining CBO was to receive monetary support from NGOs (figure 4) rather than acquiring disaster preparedness training and skills.

3.3 Low linkage with local authorities at the immersion and consolidation phase

Evidence show that the countries which are signatory to the United Nations Framework Convention on Climate Change (UNFCCC) include national level participation in mitigation and adaptation strategy. However they are not clear about the role of local authorities in adaptation [29]. In least development countries (LDCs) such as Bangladesh, the National Adaptation Programmes of Action to Climate Change (NAPAs) provides national priorities for adaptation to climate change, where involvement at the local level is identified [30]. However, it hardly identifies the roles and activities to involve lower tier institutions while implementing priority actions to climate change adaptation (UNDP, 2010). Hence, much is planned and talked about but little has been done yet to involve local government in climate change adaptation actions. Local government has the ability to incorporate intervention initiatives, especially when specific knowledge and stakeholder participation is necessary [30]. Local government in the Asia Pacific context are familiar with the concept of ecosystem and their involvement in livelihood [30]. It is also very important to recognize that people at the local level are connected with the governance system, by ways of conflict resolution, land distribution, and resource allocation or mobilization. Without serious initiatives to actively involve the local government to adaptation programs, it is also unlikely that the local government will participate in DRR and other adaptation initiatives. Moreover, lack of involvement of the local government will create tension between the people and the local power structure. This is because the assumption is that, if the local government such as the chairman and the UP (*union parishad*) members are not actively participating in DRR activities, they might not cooperate with it, especially after the consolidation face of the program.

In the survey areas for this study, a number of DRR projects have been implemented, many of which are short lived, not more than 16 months. In most of the cases, project implementation phase receives the largest period of time and attention.

KAP survey, Focus group discussions, KII show that usually people go to the local government such as the chairman, UP leaders if they face any major problems, for example, if there is any land related dispute in the community. Usually the local leaders solve these problems.

About 43% of the people interviewed said that they go to UP (*union parishad*) members, 38% of respondents have said that they go to local leaders for solution, 9% of respondents have said that they go to religious leaders, 7% of the respondents said that they go to the local elderly people, about 2% of respondents said that they go to NGO workers to find any solution, and only 1% of respondents have said that they access *Upazila* officials.

Data also supports the statement of the previous paragraph that in many DIPECHO intervention areas, normally people prefer to go to the local government representatives to solve any local problem. However, the local government and traditional institutions (such as the rural assembly) as the main social institutions are not actively involved in the activities conducted by DIPECHO partners [13]. Since people intentionally go to the local government and social institutions, without involving such institutions, community mobilization will remain incomplete in many circumstances.

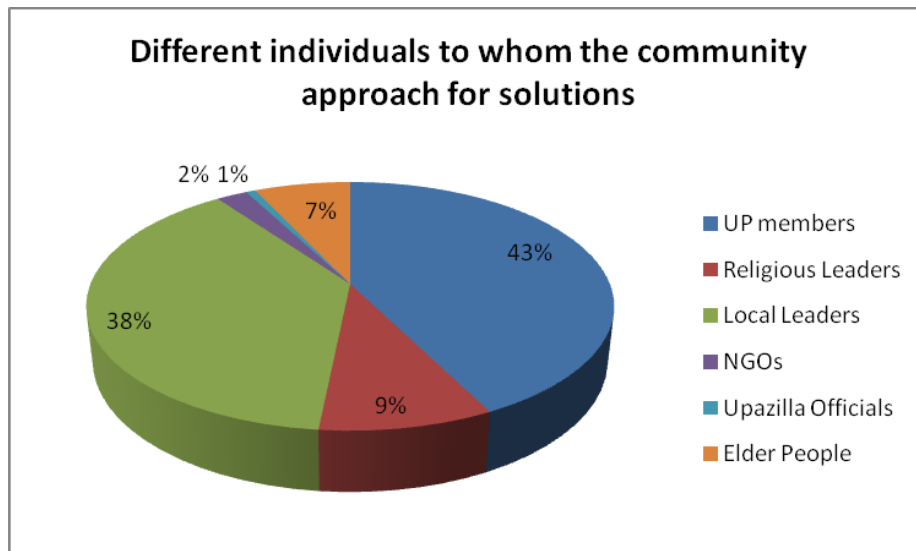


Figure 5: Different individuals to whom the community approach for solutions

4. Conclusion

In summary, climate change should be included in every driver of poverty, instead of pursuing unaccompanied DRR volunteerism in the poor communities. It is now an obvious fact that climate change adaptation should be an integrated approach where DRR is a part of it. In such integration, other important part should come with CCA like the improvement of livelihood and increased access to the basic utility services. Without improving livelihood conditions with particular focus on local income generation and meeting basic daily needs, the DRR activities are not being well accepted in the community. For medium to long term sustainability of any intervention on DRR, mobilization activities must be integrated in the mainstream livelihood development and poverty alleviation programs [31,32].

References

- [1] UNISDR. (2009). *Global assessment report on disaster risk reduction: risk and poverty in a changing climate*. UNISDR.
- [2] The Daily Star, June 2009 "Aila After Sidr". Retrieved 3 Mar 2012 from <http://www.thedailystar.net/newDesign/news-details.php>
- [3] OECD. (2003). *Development and Climate Change in Bangladesh: Focus on the Coastal Flooding and Shundarbans*. Paris: Head of Publications Service, OECD, Paris.
- [4] NAPA (2005) *National Adaptation Programme of Action*. Ministry of Environment and Forest, Government of the People's Republic of Bangladesh
- [5] BCCSAP (Bangladesh Climate Change Strategy and Action Plan 2009) Government of Peoples' Republic of Bangladesh. Retrieved on 10 Oct 2012 from http://moef.gov.bd/climate_change_strategy2009.pdf
- [6] E. Babbie. (2007)*The Practice of Social Research*. Thomson Wardsworth: USA
- [7] F. Yamin, A. Rahman & S Huq. (2005). "Vulnerability, Adaptation, and Climate disasters: A Conceptual Overview". *IDS Bulletin*, Vol 36(4) , 1-14.

- [8] IIED (The International Institute for Environment and Development) (2009) *Participatory Learning and Action: Community Based Adaptation to Climate Change*. Retrieved March 20 2012 from www.iied.org
- [9] D. Riedlinger & F Berkes (2009) "Contributions of traditional knowledge to understanding climate change in the Canadian Arctic", *Polar Record*, 37 (): 315-328
- [10] R. Munton, 2003, 'Deliberative Democracy and Environmental Decision-Making', in F. Berkhout, M. Leach and I. Scoones, *Negotiating Environmental Change*, Cheltenham: Edward Elgar.
- [11] M. Pimbert, 2004, 'Natural resources, people and participation', *Participatory Learning and Action* 50, London: International Institute for Environment and Development
- [12] S. Huq, A. Rahman, M. Konate, Y. Sokona and H. Reid, 2003, *Mainstreaming Adaptation to Climate Change in Least Developed Countries*, London: International Institute for Environment and Development
- [13] R. Peau & M. E. Kabir (2010). *Understanding Community Mobilization, Case of Bangladesh Dhaka*, Bangladesh: DIPECHO.
- [14] IFRCRCS 2006 *World Disaster Report*, International Federation of Red Cross and Red Crescent Societies Retrieved April 2 2012 from <http://www.ifrc.org/Global/Publications/disasters/>
- [15] D. Jones (1993). *Evaluation/ review of the ODA financed Relief Rehabilitation Programmes in Bangladesh following the cyclone of April 1991* . DFID.
- [16] Red Crescent Society (RCS), (2009) "CYCLONE PREPAREDNESS PROGRAMME (CPP) BANGLADESH RED CRESCENT SOCIETY", retrieved Jan 11 2012 from http://www.iawe.org/WRDRR_Bangladesh/
- [17] S. Rayner & E. Malone (2001). "Climate change, poverty, and intragenerational equity: the national level". *International Journal of Global Environmental Issues*. 1(2): 175-202
- [18] I. Burton, B. Challenger, S. Huq, R.J.T Klein, G. Yohe, (2001) "Adaptation to Climate Change in the Context of Sustainable Development and Equity", *Climate Change 2001: Impacts, Adaptation and Vulnerability*, IPCC, Retrieves Nov 19, 2011 from <http://alapaap.observatory.ph/resources/IPCC/TAR/>
- [19] N. Chan and D. Parker, (1996) Response to dynamic flood hazard factors in peninsular Malaysia. *The Geographic Journal*, **162(3)**, 313–325.
- [20] S. Fankhauser & R.S.J. Tol, (1997) "The social costs of climate change: the IPCC second assessment report and beyond". *Mitigation and Adaptation Strategies for Global Change*, **1**, 385–403.
- [21] S. Rayner and E.L. Malone (eds.), 1998: *Human Choice and Climate Change Volume 3: The Tools for Policy Analysis* . Battelle Press, Columbus, OH, USA, 429 pp.
- [22] K. S.Vatsa (2004) "Risk, vulnerability, and asset-based approach to disaster risk management", *International Journal of Sociology and Social Policy*, 24(10-11): 1 – 48
- [23] R. Brouwer, S. Akter, L. Brander, E. Haque (2007) "Socioeconomic Vulnerability and Adaptation to Environmental Risk: A Case Study of Climate Change and Flooding in Bangladesh", *Risk Analysis*, 27(2): 313-326

[24] UNDP, (2011) *Bangladesh: International Human Development Indicators*, Retrieved Nov 19 from <http://hdrstats.undp.org/en/indicators/103606.html>

[25] IMF, 2005 Bangladesh: IMF Country Report 05/410. Washington D.C.

[26] WHO, 2011. Bangladesh: Country Profile. Retrieved Nov 21 2011 from <http://www.whoan.org/EN/Section28.htm>

[27] IRIN, (2011) Bangladesh: Landless Number on the Rise. IRIN:the humanitarian news and analysis service. United Nations. Retrieved Nov 22 from HYPERLINK "<http://www.irinnews.org/report.aspx?reportid=89399>"

[28] The Daily Star (Oct 8, 2011) New Statistics:25 millions in extreme poverty. *The DailyStar*. Retrieved Nov 23, 2011 from <http://www.thedailystar.net/newDesign/news-details.php?nid=205568>

[29] UNDP, (2010) *LOCAL GOVERNANCE AND CLIMATE CHANGE: A Discussion Note December 2010*. APRC Publication Library. Retrieved Nov 20 2011 from <http://www.snap-undp.org/elibrary/default.aspx>

[30] Government of Bangladesh (2005) *National Adaptation Program of Action (NAPA)*. Ministry of Environment and Forest (Government of Bangladesh): Dhaka

[31] Institute for Rural Development (IRD) (2006). *Livelihood adaptation to climate variability and change in drought- prone areas of Bangladesh* . Rome: ADPC- FAO.

[32] International Federation of Red Cross and Red Crescent Societies (IFRCRCS) (2006) *World Disaster Report: Focus on Neglected Crisis*. IFRCRCS: Switzerland