Community risk assessment for disaster risk reduction: challenges and future

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All papers submitted to COBRA were subjected to a double-blind (peer review) refereeing process. Referees were drawn from an expert panel, representing respected academics from the construction and building research community. The conference organisers wish to extend their appreciation to the following members of the panel for their work, which is invaluable to the success of COBRA.

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Abstract

Significant attention is paid towards community based disaster risk reduction (DRR) activities that integrate community participation and scientific knowledge for the development of effective DRR strategies. Community based DRR activities empower communities to take a leading role in developing DRR strategies, thus increasing the commitment and sense of belongingness of the community towards DRR activities. This paper evaluates a community based DRR method called Community Risk Assessment (CRA) through a comprehensive literature review. CRA is a method that assesses local hazards and community vulnerability to develop DRR strategies with the active participation of different groups of the community, community leaders and local authorities. The paper discusses a number of benefits of CRA activities such as increased participation of community towards the preparation of comprehensive DRR strategies, increased understanding of natural hazards and community vulnerabilities of the locality, reduced social tension between the authorities and communities regarding DRR strategies, and opportunities provided for the socially deprived community groups to discuss their risk and vulnerabilities from natural hazards. Despite the aforementioned benefits, CRA is challenged with the significant amount of human resource and time it requires, lack of participation and representation of different groups in the community, cultural attitudes of some community groups towards the engagement of socially deprived people for DRR activities.

Key words: community risk assessment, disaster risk reduction, hazard, vulnerability

1. Introduction

Number of disasters has risen sharply worldwide making the risk of disasters a global concern. These disasters suggest the timely need for Disaster Risk Reduction (DRR) measures to successfully manage the natural disasters and cope up from the adversarial impacts of disasters. Disaster risk reduction

minimises vulnerabilities and disaster risks of a society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development (UNISDR, 2004). DRR strategies seek to build resilience and reduce vulnerability, and therefore they offer capacities to support adaptation, in respect to coping with natural disasters. DRR can take the form of top-down or bottom-up. Often the top-down approaches that are dominated by external parties are criticised due there incapability of addressing requirements of the affected community. As oppose to this, community driven DRR activities are encouraged. This paper evaluates one of the bottom-up approaches to DRR called as the Community Risk Assessment (CRA) method.

The paper first introduces DRR and approaches to DRR with their positive and negative aspects. This is followed by a discussion on CRA by explaining how it works and its limitations. Paper also identifies some areas that can be incorporated within CRA to further improve it.

2. Disaster Risk Reduction

Disasters are often defined as sudden events that bring disruption to a society with human, material, economic and environmental losses or impacts that exceed the ability of the affected community to cope up with by using their own resources (UN/ISDR, 2009). By considering the factor that disasters do not have to be always a sudden event but can develop over a time period EM-DAT (2009) defines disasters as a situation or an event that overwhelms the capacity of the affected community which seek national or international assistant. Implementation of appropriate disaster risk reduction measures is an important element in disaster management. Lack of DRR measures could lead to significant loss and damage to human and materials and could hamper economic wealth of the society. Further, as identified by UN/ISDR (2003) lack of DRR measures could increase the resources requirement for post-disaster response activities that could have been used elsewhere for example future development activities.

White et al (2004) identify DRR as the measures to control the disaster losses, by minimising the hazard, reducing exposure and susceptibility and enhance coping and adaptive capacities. The emphasis for DRR should continue even after the disaster increasing resilience for future disastrous events. Hyogo Framework for Action 2005-2015 (The International Strategy for Disaster Reduction, 2005) highlights the importance of mainstream disaster risk reduction measures within urban planning and reconstruction of building and infrastructure projects. Approaches to DRR can be mainly divided into two as top-down and bottom-up. These two approaches are discussed in the following section.

3. Approaches to Disaster Risk Reduction

Technology based methods provided by the authorities are a main component of top-down DRR approach. This approach focuses on monitoring techniques such as hazard mapping, implementation of buffer zones and physical mitigation measures such as flood barriers. Often, top-down approaches do not take into consideration the social factors such as cultural believes, livelihood patterns, and land ownerships of the affected community. As a result of that, when implementing to-down approaches governments and NGO are in confrontation with the same people that they want to provide assistance. For example, after the Tsunami in year 2004, Sri Lankan government impost a 100m buffer zone restricting any development within this limit. Even though the implementation of buffer zone was done to increase the safety of the community living in the coastal areas, it affected their livelihood patters and main source of income. Hence, the community continued to live and use 100m buffer zone neglecting the government's restrictions. This led the government to revise the policy related to buffer zone and to develop appropriate policy that consider both livelihood patters of the community and safety (Nissanka et al, 2008).

Even though top-down approaches dominated the disaster management historically, Allen (2006) asserts that nowadays emphasis is placed on bottom-up approaches that are driven by the community. Allen (2006) views community based approaches to disaster management as a form of participant empowerment and a mechanism that transfer ideas from bottom to the top. The bottom-up approach consists of the development of policies and techniques by considering cultural dimensions and livelihood patterns of the affected community. They ensure the policies and technologies are catering the requirements of the community, provide awareness to the community about the risks that they could encounter and how to protect from them in the future. Further, the community based DRR approaches provide an opportunity for the affected community to provide their contribution thus increasing their commitment and belongingness for the disaster management activities that they are involved in. For instance the study carried out by Rathnayake and Rameezdeen (2008) revealed that the owner driven housing reconstruction activities after the Tsunami disaster was much successful than the donor driven housing reconstruction. The owner driven housing reconstruction were led by the community that were affected by the Tsunami with external financial support and technical assistance where as donor driven housing programmes were completely handled by donor agencies. The study revealed that owner driven housing reconstruction were superior in terms of their quality/durability, space availability, flexibility to make any changes in the future, agreeing to change the design as required, land size, location, overall facilities provided (Rathnayake and Rameezdeen, 2008).

However, bottom-up approach also has certain limitations. Cultural believes and livelihood patters can increase the vulnerability of the community towards disasters. For example, during the volcanic eruption in Mt Merapi, Indonesia in 2006, the community refused to evacuate their village until they get the warnings according to their traditions. Further, community based DRR activities could have inherent problems like inadequate local knowledge to cope up with disasters of high magnitude and infrequent patterns and poor economic conditions that would ignore good technologies. Therefore, activities that only consider the bottom-up approach can have limitations and negative impacts towards effective DRR. This requires making a balance between DRR and community based measures. To reduce the risk of disasters, proactive and systematic engagement with the communities is important as such engagement will widen community's understanding about DRR measures rather than accepting them with blind faith. Hence, community based DRR activities that integrate knowledge and understanding of community with appropriate scientific knowledge are appreciated. The following section evaluates a community based DRR method called as Community Risk Assessment (CRA).

4. What is Community Risk Assessment?

During the past few decades' attention is paid to identify and evaluate root causes of vulnerability of communities towards disaster risk rather than analysing disasters in isolation (Blaikie et al, 1994). CRA is one of the methods that encourage community participation for DRR activities. In addition to the community participation, CRA provides required scientific knowledge that could be a lacking element within the community. CRA places communities at the lead role to assess active planning, design, implement and evaluate activities to reduce disasters (Ministry of food and disaster management, 2008). CRA technique gathers information related to livelihoods of the community, their coping capacity, local risk and hazards. CRA blends scientific information and predictions with the local knowledge of the community to identify, analyse and evaluate disaster risk and to reach consensus regarding the disaster management activities that needs to be taken. Coping capacity, level of vulnerability and requirements varies from one stakeholder group to another depending on the gender, livelihood patterns, occupations, age etc. For example, women, elderly and disable people are highly vulnerable to disaster risks (UN-HABITAT, 2004; United Nations, 2009). Accordingly, CRA identifies vulnerable community groups towards hazards and evaluates the local capacities available to increase the resilience of the community. Further, CRA considers varying requirements of local stakeholder groups within a community.

5. How does Community Risk Assessment work?

CRA can be divided into two main stages: pre-CRA session and CRA workshop. The main intension of pre-CRA session is to get familiar with the community, their livelihood patters, and natural hazards of the region etc.

Pre CRA session:

Pre CRA session starts with the collection of secondary information on hazard events and topology of the area under consideration. For example, information on rain fall, drought trends, cyclone, heat wave trends, and land elevations will be gathered. In addition to the aforementioned secondary information, socio-economic data such as population, literacy rate, livelihood patters, details on educational, government, religious institutions, active NGOs in the community will also be gathered. Collected secondary information will be validated by carrying out discussions with the local people and community disaster management committees.

After the validation of the secondary data about the community, it is a practice to carry out a familiarisation tours which is called as a Transact Walk. Main objective of Transact walk is to get familiar with the geography, natural resources and hazards, land use patterns, and to get an understanding about the current problems of the community. This is carried out by the facilitators with the local people. Focus group discussions with community leaders are also carried out to gather information on the locality, people, common hazards, community's livelihoods, and to gain some insight about the existing disaster preparedness, coping strategies and institutional arrangements available for disaster management. Along with the above activities, social mapping that comprises of collecting and mapping information about topography, housing settlements, physical infrastructure, institutions, commonplaces, land use, disaster prone and impacted areas and natural drainage of the area will be identified. As part of the CRA process, Hazard Venn diagrams are prepared to illustrate the common hazard, their magnitude and likelihood of occurrence.

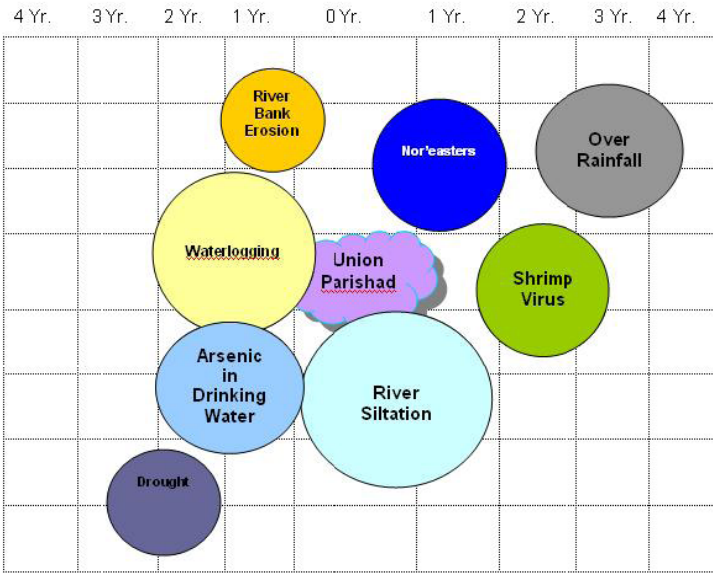

Figure 1: Example for a Venn diagram prepared to show the disasters and their magnitude

Having identified and seen the common hazards and vulnerabilities, socio-economic information, next stage is carrying out the CRA workshop. The prior knowledge about hazards, vulnerabilities and socio-economic situation of the community helps the facilitators to effectively conduct and select appropriate participants to CRA workshops.

CRA workshop

The participants to the CRA workshop should encompasses with all concerned stakeholders by considering adequate representation from household socio-economic conditions and hazard vulnerability. During the initial part of the workshop, vulnerable sector identification (e.g: agriculture, fisheries, livestock etc.), hazard identification (e.g: flood, cyclone etc.), and writing specific risk statements related to each hazard in the vulnerable sector will be carried out within the group. For example:

Table 1: Risk statement for natural hazards

Flood: A major flood above 2 metres will cause water inundation of approximately 300 buildings.
Cyclone: In excess of 25% of the buildings will be seriously damaged or destroyed by cyclones with wind speeds greater than 200 kph and the people with isability, women, elderly and children living in those households are most likely to be affected seriously.

After risk identification, risk assessment that involves identifying the impact of hazard and likelihood of occurrence of the hazard is carried out. At the end of this stage, a list of potential consequences against specific risk statements, its likelihood and whether the risk is acceptable to the community or not will be evaluated.

Table 2: Risk assessment

Risk	Potential consequences	Conseq uence	Likeliho od	Ratin g	Accep tabilit y
There is risk that flooding in the delta will destroy crops and liv estock	Loss of cash crops and livestock. Shortage of food. Damage to property.	Major	Possible	High	Un-accept able
There is risk that most of the tha tched houses / shanty will be de stroyed by tidal surge.	Loss of life among the people with disability, women, elderly and child ren will be high.	Major	Possible	High	Un-accept able

Thereafter, risk reduction options will be identified for each risk event. Risk reduction options will be scrutinised to evaluate the feasibility and suitability of them in terms of technical and financial limitations, political and social impact, and contribution to environmental and sustainable goals. Risk reduction options will be prioritised based on the aforementioned criteria.

Table 3: Impact analysis of options

Option	Purpose	Alternat ive	Political/S ocial	Technical/Fi nancial	Environmen tal	Sustainability
Construction o f submersible e mbankment	- Reduce f lood vuln erability -- Protecti on of rice from wate r logging	- Construc t sluice ga te on the r iver	- Govt. assist ance for dred ging equipm ents - Form local committee - Discuss wit h local chair man and me mbers	- Use dredgi ng machine f or excavatio n - Financial as sistance from Govt. and d onors - Plantation o n the slope o f embankme nt	- Reduce wat er logging pr oblem	- Construction of su bmersible embankm ent for crop security flow and less siltatio n.

Last step of the CRA workshop is to prepare DRR strategy that identifies the responsible group/people, start and end dates, location for the implementation of disaster responses.

6. Discussion

CRA requires the active participation of local stakeholders to come together to prepare a consensus risk reduction strategy. In effect the risk reduction action plan prepared by the CRA process is owned by the community and community leaders. This ensures commitment and active engagement from community and community leaders towards the actions identified within the risk reduction plan. Further, participation of community towards risk reduction action planning reduces the gap between duty bearers (such as local authority representatives, government departments) and the people at risk

due to natural hazards. As a result of the participatory nature requires by CRA activities, and due to the need of getting the involvement of different community groups to identify hazards and vulnerabilities they are facing, CRA provides a platform for the socially deprived communities to share their hazard specific vulnerabilities and to recommend options to reduce the vulnerabilities. Identification and prioritising of natural hazards, vulnerabilities, risk reduction strategies provide a good information base for the local community, community leaders and authorities for their reference and use. Information base would help them to optimise their existing capacity to successfully face a disaster and inevitable identify the support that they may require from external parties. Successfully carried out CRA activities can not only use for disaster related issues but also can be linked with community development, capacity enhancement activities.

Even though the main intention of organisations who conduct CRA is to identify hazards and vulnerability of the people, evidence suggests that these are not the priorities of the community under consideration (Hossain, 2009). Community's priority is most of the time given for maintenance of day to day livelihoods reducing the significance attached to natural hazards and vulnerabilities. Sometimes, communities consider natural hazards and vulnerabilities as factors that cannot be eliminated and adapted to live with them thus giving less priority for them. Further low economic status of the community is a barrier to get their commitment and participation for CRA activities. When CRA activities are carried out in developing countries with the participation of communities who spend their lives with a daily income, it is difficult to attract participants for consultation sessions as it affects their income (Hossain, 2009).

Another challenge of CRA is the human resources that it requires. It requires trained facilitators to coordinate and facilitate the activities in a true participatory manner to get the maximum outcome from the CRA activities. CRA to be successful, it needs to have a proper representation from the community including age groups, vulnerable groups, different gender etc. However, having adequate representations from these different groups challenges the CRA process. Cultural attitudes also challenge the successfulness of CRA activities. Especially in countries where communities are divided based on their income status, cast, race this has become a challenge as elite class people do not accept the participation of under privileged peoples' participation (Hossain, 2009). Van Aalst et al (2007) assert that in some instances CRA cannot assess all aspects of hazards or vulnerabilities of people. For example to assess the hazard risk from buildings subjecting to an earthquake requires specialised knowledge about the structural stability of the building that cannot be evaluated by community.

It is important for the organisers of CRA activities to take on board the activities that cannot be performed or evaluated by the local community to a higher management level. As discussed above,

some communities believe that natural hazards and vulnerabilities cannot be avoided and accept them as fatalism that make people powerless against fate. However, it is important to give a proper understanding to the community through CRA activities regarding the possibilities of reducing the overall severity of disasters when they have proper knowledge and understanding of the natural hazard and vulnerability of the people rather than allowing natural hazards and vulnerabilities to control the lives of communities. Van Aalst et al (2008) state that, CRA can be used as a tool that contributes to climate change adaptation. As CRA is driven by the community, details related to changing conditions of the climate can be gathered as part of the CRA process. Along with the climate change patterns of the community, analysis of risk trends related to climate change also can be liked with CRA process. Linking climate change patterns, risk associated with them with CRA will lead to the development of policies and strategies for better adaptation to climate change.

7. Conclusion

Community based DRR methods attracts a lot of attention as such methods lead to the identification of exact needs of the affected community rather than trying to implement and enforce exogenous policies and practices. This paper discussed a community driven DRR method called as CRA. It was revealed that CRA empowers the community to take a leading role, thus increasing their commitment towards the success of the DRR activities. Such participation of the affected community ease out the social tension that could experienced during DRR activities. Further, the outcome of CRA support and maintain the dignity and self-reliance of the disaster affected community as the strategies developed are initiated within the community itself. However, CRA has its own shortcomings such as extensive use of human resources, need of trained facilitators, cultural attitudes regarding the participation of socially deprived community towards such activities etc. It was also noted that sometimes the communities are not in a position to assess risks and vulnerabilities of some natural hazards and their subsequent impacts. To overcome theses type of situations, the paper highlight the importance of providing appropriate scientific knowledge to CRA activities and taking such concerns to a higher management level. The possibility of integrating CRA activities with climate change adaptation was also identified as a way forward to improve CRA.

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