Existing preparedness capacity of disaster management institutions in urban areas: A case study of local institutions in Delhi, India

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Abstract

Purpose: Over the years flood related risks have compounded due to increasing vulnerability caused by rapid urbanisation and growing population. This increase is an indication of the need for enhancing the preparedness of institutions to respond to floods especially in urban contextThe focus of the article is on identifying the critical factors constituting preparedness capacity of disaster management institutions to respond to floods. It suggests policy options for enhancing the current state of readiness of institutions to respond by considering factors like institutional arrangements, human resources, policy and plans, financial, technical, leadership perception and awareness programs.

Methodology: The study analyses qualitative data collected through interviews and focus groups discussions with the officials engaged in managing disasters at the district and local level in the context of Delhi. Primary data included field visits, interviews with officials from institutions managing disasters and the affected community to identify the challenges faced in engaging district and local level institutions in managing disasters. For focus group discussions, meetings were held with district project officers and coordinators, local officials, community based organisation, civil defence volunteers and community heads.

Findings: Results show that disasters are handled by district authority and the role of local institutions is limited to a reactive role during disaster. Data also indicates that although the existing institutional setup is well coordinated at the district level but needs improvement at the local level. Wide variations exist in awareness and perception among the officials engaged in managing disasters. Additionally, their roles and responsibilities need to be clearly defined with adequate budget and dedicated permanent staff for managing disasters. Institutions need to utilise the existing manpower through proper delegation of work.

Originality: The study suggests that disaster risk reduction needs to focus more towards inclusivity of the local urban bodies. In order to overcome the wide variations which exist in awareness and perception among the officials engaged in managing disasters, awareness programs and trainings need to be conducted more frequently along with timely monitoring and evaluation of the participants undergoing the program. Further, for effective community participation, it is important to address their social and economic problems since such issues can overshadow attempts made for reducing risks. Thus, this paper suggests development of direct linkages among institutions especially at the local level and community level for enhancing the preparedness to respond to floods.

Keywords– Preparedness, Capacity, Disaster, Flood, Community, Institution

1. Introduction

Experiences have suggested that the existing capacities are not sufficient even to deal with the current level of disasters and that the disaster intensities would only increase in future (Burton et al, 2002; McEntire et al, 2002; Sperling and Szekely, 2005). Consideration of such future vulnerabilities becomes important in order to reduce the potential impact of disasters. Long term planning and prioritisation will assist in ensuring that the institutions are well prepared in advance to respond to such disasters. Thus, there is a need to enhance the existing capacity of institutions in order to effectively deal with future disasters and increasing uncertainty (Coutney et al, 1997; Shook, 1997).

In Asia and Pacific, urbanisation has been driven by factors like population growth, rural to urban migration and the reclassification of rural areas into urban areas (UNISDR, 2013). Urbanisation is recognized as one of the main drivers for disaster risk in developing world (Brecht, Dasgupta, Laplante, Murray, & Wheeler, 2012; UNISDR, 2009). Asia exhibits the greatest exposure in terms of population and assets (Jongman et al., 2012). South Asia is home to 6 of the world's 29 megacities: Bangalore, Delhi, Dhaka, Karachi, Kolkata, and Mumbai. Exposure to climate related hazards will vary with differences in the geomorphologic characteristics of cities (Luino and Castaldini, 2011). Heavy rainfall and storm surges would impact urban areas through flooding, which in turn can lead to the destruction of properties and public infrastructure, contamination of water sources, water logging, loss of business and livelihood options, and increase in water-borne and water-related diseases, as noted in wide range of studies (de Sherbinin et al., 2007; Dossou and Gléhouenou-Dossou, 2007; Douglas et al., 2008; Kovats and Akhtar, 2008; Revi, 2008; Roberts, 2008; Hardoy and Pandiella, 2009; Nie et al., 2009; Adelekan, 2010; Sharma and Tomar, 2010; Shepherd et al., 2011).

Enhancing the current capacity of disaster management institutions especially at the local level is vital since the local institutions can help in mediating between local communities and national governments for policy changes in relation to locally relevant development measures. It can further help in addressing differential vulnerabilities and in achieving a collective consensus to resolve the disconnect between needs, knowledge and perceptions. Similarly, Perry and Mushkatel, (1984), suggests the need to focus on local institutions since disaster management is implemented by local governments and they play the most active role in emergency operations (Herman, 1982; Labadie, 1984a). Existing literature points out that role of local government in managing disasters has been limited to developed countries and much less attention has been paid to such institutions in developing countries. Thus, this article describes the factors associated with existing preparedness capacity of institutions engaged in managing disasters in the context of urban cities within developing country. Using example of Delhi, it explains the current state of preparedness of state, district and local level agencies within Delhi. It looks at exploring the objective of
identifying factors affecting preparedness capacity of the disaster management institutions and exploring the current state of preparedness of institutions engaged in managing disasters

2. Institutions engaged in Disaster Management

Disaster management requires a multi-disciplinary approach by involving of various ministries and departments spanning across various sectors of development. Institutional mechanisms help in facilitating and taking charge of disaster management activities interdisciplinary in nature. For this, disaster management institutions from national to local level with representatives from various ministries and departments need to be involved in disaster preparedness, mitigation and management through a well-coordinated approach. According to Young (1998), institutions are systems of rules, decision-making procedures and programs that not only give rise to social practices and assign roles to the participants in such practices but also guide the interaction among the occupants in relevant roles. In order to survive through a disaster, such institutions need effective and efficient preparation in advance for prompt response and strategic recovery (McCool, 2012: 1).

Thus, impacts of disasters can be reduced through pre-disaster activities and a coordinated strategy or plan. Nadian et al. (2014c), defines disaster preparedness as the initiative intended to increase the readiness and knowledge among the staff and community towards a disaster that is likely to happen in future. A critical component of disaster preparedness is the knowledge of the available resources and how to respond at the time of disaster. Further, existing research on preparedness highlights the need for engaging the communities in preparedness activities, rather than just expecting them to respond to passive information sources (Eriksen and Prior, 2011).

Overlooking the local context and the complexity of the social interplay between the local communities and the institutions, can obstruct the success of initiatives undertaken for reducing disaster impacts. It is the local communities and not the national authorities which are always the first to respond to any kind of a disaster (Wolensky & Wolensky 1990; ASEAN 2008 and ADPC 2008). In a similar manner, Waugh and Streib (2006) emphasize the significant role played by communities and agencies in the context of metropolitan areas since emergency and disaster management rely on local capacity. Taking all this into account, this paper identifies and describes the critical factors that determine the preparedness capacity of institutions managing disasters in Delhi.

2.1 Disaster Management Institutions in India

Within India actors are not very involved. Private disaster insurance exists, but there is little reliance on the private market for financing relief (Hoogeveen, 2000). The authorities at the state level take the main responsibility for disaster relief with financial assistance from the central government. Calamity Relief Fund (CRF) constituted using contributions from both the state and central government assists central government in providing financial and other assistance when a disaster overwhelms the capacity of the state government to respond.

Disaster Management (DM Act) of 2005 and National Policy on Disaster Management of 2009 defines the functions to be performed by different stakeholders responsible for managing disasters from national to local level as shown in Fig. 1. National Disaster Management Authority (NDMA) headed by the Prime Minister is the apex body at the national level

responsible for coordinating and implementing disaster related activities. At the state level, State Disaster Management Authority (SDMA) headed by the Chief Minister has the responsibility of laying down plans and policies for disaster management and to ensure that the guidelines are followed by district authorities, line ministries and departments handling disasters. District Disaster Management Authority (DDMA) is headed by the District Magistrate/Collector who plays the role of directing, supervising and monitoring relief measures for disaster prevention and response. Local authorities rest at the bottom of the disaster management framework including urban local bodies (ULB) such as municipalities, panchayati raj institutions (PRI), district board, cantonment board, town planning authority with the responsibility of training their officers and employees for disaster management and for carrying out relief, rehabilitation and reconstruction activities in affected areas.

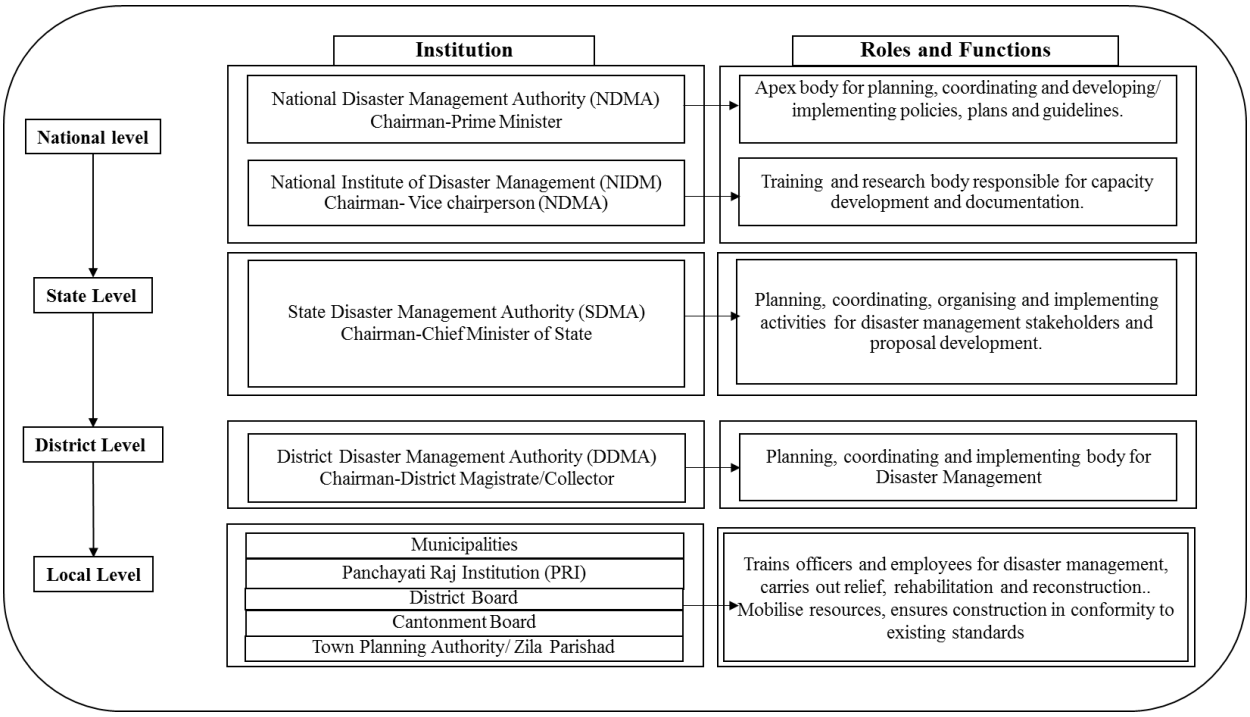

Figure 1 Institutional Structure for Disaster Management in India
Source: NDMA

3. Disaster Management in Urban Areas

Most of the urban growth is happening in hazard prone low lying coastal areas and other hazardous topographies (Brecht, Dasgupta, Laplante, Murray, & Wheeler, 2012). The urbanization process has been accompanied by the impoverishment of the poor and environmental deterioration. This can be attributed to a number of reasons such as rapid population growth, industrialisation, social changes and other factors related with development in urban cities. High levels of groundwater extraction have led to serious subsidence problems in cities such as Bangkok (Babel et al., 2006) and Mexico City (Romero-Lankao, 2010) which damage buildings, fracture pipes, and can increase flood risks (see also Jha et al., 2012).

Damage to such infrastructure like disruption in transport, power, damage to lifeline buildings, civic amenities can have implications not only on the city but on the state and country as a whole ranging from hours to several days since such urban areas are important centers of economic activities with vital infrastructure needing protection.. For instance, the flood that struck the Chao Phraya River in 2011 caused not only caused huge loss of life and damaged several industrial estates in Bangkok estimated around 3.5 trillion yen but also disrupted global scale industrial supply chains (Komori et al., 2012). Thus, the kind of bearing the impacts of urban disasters have is far more widespread than what is found in rural areas.

The speed, at which such megacities are growing makes larger population highly vulnerable to disasters (Parker and Mitchell, 1995). For instance, in Kabul, an estimated 73 percent of the population lives in unplanned areas combined with rapid increase in industry which not only make services provision hard, but start to bring massive changes in the city's land use by encroaching on natural land including agricultural land, water bodies, flood plain and expanding towards the peripheries. This is also evident in other big cities of Asia, population growth and spatial expansion to a large extent has been unplanned with massive changes in the land use of urban cities. This poor and unplanned development has resulted in socio-economic and environmental consequences (Bloom et al., 2008; Dahiya, 2012) and increasing vulnerability to urban disasters. This increasing risk from disasters calls for immediate measures to safeguard people from huge damage and loss from future disasters.

3.1 Role of Local Institutions in Disaster Management

Although the existing literature stresses on the important role played by local government in introducing, managing and implementing disaster risk reduction initiatives (Kusumasari, 2012, Pearce, 2003) and in its engagement in disaster risk reduction and management, local level institutions have been understudied in the developing countries. In present day, attention is being paid to local governments in managing disasters (Kusumasari et al., 2010) since they play an active role in disaster related activities by implementing them (Perry and Mushkatel, 1984). Local government helps in risk reduction activities which serves as a viable strategy for disaster management (Wolensky & Wolensky, 1990) since it plays an active role in managing disasters owing to its familiarity with local conditions, communities and culture (Herman, 1982; Kusumasari et al., 2010). Further, Cigler (1987), points out that there is a need to adopt and develop a sense of locality in emergency planning due to vital role played by local government in terms of responsibility for emergency management. Supporting this, Cheong (2011), states that the central and local institutions should work together in order to develop a comprehensive disaster management framework for reducing the impacts of disaster.

3.2 Disaster Management in Delhi

Delhi with a population of 16 million, spread over 1483 sq. km is vulnerable to hydro meteorological hazards such as floods, heat waves, cold waves, and hydrological droughts and water scarcities (Panda, 2011). Around 25 percent of the total area of Delhi is rural and the remaining 75 percent is urban (Census Report, 2011). Delhi is a city-state of India not having full statehood like other states of India, which are relatively autonomous in making decisions about state related issues. As per the recommendation of the second Administrative Reforms

Commission, the Mayor, assisted by the Commissioner of the Municipal Corporation and the Police Commissioner are directly responsible for crisis management in cities with population exceeding 2.5 million. In states like Delhi, with urban local bodies of considerable size, Municipal Corporations play a major role in provision of various emergency services including response.

Within Delhi, at the state level, Delhi Disaster Management Authority (DDMA) is headed by the Lieutenant Governor of Delhi with Chief Minister and Ministers of concerned departments as members. Divisional Commissioner of State Revenue department is the nodal authority to monitor, direct and coordinate disaster management activities in the State and is the convener for DDMA. The authority functions through a secretariat known as the DDMA Secretariat or Disaster Management Centre (DMC). For instance, for district north east, District Disaster Management Authority is constituted under the chairmanship of Deputy Commissioner (DC) of District North-East followed by an Additional District Magistrate (ADM) as second-in-command and elected representative from urban local body as the co-chairperson. It is responsible for preparation and implementation of district disaster management plans. In the event of a disaster, it organises response measures through the Emergency Operation Centre (EOC) while maintaining linkages with other institutions and departments. The district is divided into subdivisions headed by Sub Divisional Magistrate (SDM). Delhi Disaster Management Authority has provided DDMA's for all the 11 districts and a District Project Officer (DPO) as officer in charge of EOC for carrying out the functions of district authority. The DPO is also responsible for the effective functioning of EOC.

4. Data and Methods

The study is based on qualitative data and analyses statements and outputs collected collected through interviews and focus groups discussions with the officials engaged in managing disasters at the district and local level in the context of Delhi. Primary data included field visits, interviews with officials from institutions managing disasters and the affected community to identify the challenges faced in engaging district and local level institutions in managing disasters. The selection of participants included district project officers and coordinators with knowledge and experience in implementing disaster management activities. Civil defence volunteers with knowledge and firsthand experience working with affected community were selected. From the Hawkers Association, members working directly for preparedness measures and with flood affected population and community heads with past experience, knowledge and good networking were selected. It was conducted to learn about roles and functions, understanding of disaster, community participation and stakeholder involvement in managing disasters., The study points out that although there have been measures undertaken by the institutions for preparedness, however it still faces hurdles in implementation at the institutional level especially at the local level.

Table 1 Factors critical for determining preparedness of disaster management institutions			
	District Officials	**Local Officials**	**Community Members**
Institutional Arrangements A clear structure with predefined roles, responsibilities	• Need for clearly specified roles of district and local level bodies in DM Act would ensure better preparedness and response.	• Lack of clarity of their roles and functions. • Reactive role- limited to disaster response like mobilising equipment, facilities, setting up medical camps, controlling spread of epidemic.	• Community heads said clearly stated roles with proper implementation especially for desilting of drainage lines by the urban local bodies.
Human Resource Human resource deals with adequate number of staff with proper delegation and division of tasks and labour.	• Lacks proper division of workload and tasks among existing staff and employees. • Staff on contractual jobs suffer from fear of losing job affecting their motivation and efficiency.	• Lack of full time employees for managing disaster related activities.	• Frequent availability of assigned people for desilting before and after floods.
Policy and Plans Policy for effective implementation should consist of appropriate policies, rules, and regulations for decision making backed by laws	• Lacks vertical coordination with local bodies and the community.	• Dependency on directions or orders from higher authorities. • Low level of interaction with the community prone to floods.	• Civil defence volunteers and Hawkers association have relatively better interaction with the community.
Financial Resources Refers to availability of enough financial resources to support disaster management activities	• Existing funding needs to be utilised properly and in a timely manner.	• Lack of funding for buying latest equipment.	• For civil defence volunteers, lack of incentives to work during late hours and in emergency was a huge challenge.
Technical Resources Technical resources refer to access to effective logistics and updated technology between different agencies and the	• Absence of GPS and internet based maps of Delhi affects immediate response		• Community aware of flood warnings through radio, television system, police.

community.	• Lack of online availability and accessibility of updated inventory of resources to assist in facilitating quick and timely response. • With assistance from officials from Flood control Department and Boat Club, frequent warnings and alerts reached the flood prone community.		
Leadership Leadership is defined by ensuring local level leadership through community participation for making quick and appropriate decisions.	• Lack of capacity to mobilise and convince community to move to temporary shelters.		• Civil defence volunteers and Hawkers association found difficulty in evacuating people to safe shelters due to more than one resident welfare association head for same area.
Awareness and Perception Awareness refers to existing knowledge and perception of people about disasters and its impact.	• Lack of mobilizing centres • In terms of probability of future occurrences and potential damages from future floods, they were well aware. They appeared fearful, yet more concerned with awareness programs for people's protection from floods impact. • They argued that anganwadi centres anganwadi can help in quick mobilisation of community members.	• Low awareness and risk perception and training since they believed that floods can't happen in near future and seemed fearless. Flood damage could be averted by not letting people settle in low lying areas.	• Community based organisation perceived risks from future occurrences as being high due to changing land use and rainfall. Less concretization over the existing floodplain can reduce risk from floods. • According to community heads and civil defence volunteers, future floods cannot be predicted since it is dependent on time and duration of rain. • Community was fearful about their ability to meet the daily needs over floods and felt future damage could be reduced by construction of embankment.

5. Results

There have been substantial efforts in implementing disaster preparedness programs but existing inefficiencies within the system have limited the effectiveness of response. The findings from the studies presented below reflect significant factors responsible for determining the preparedness capacity of the institutions to respond. Such factors include awareness and perception, financial resources, technical resources, policy and plan, institutional arrangements, leadership and human resources.

Critical factors impacting institutional preparedness

5.1 Institutional Arrangements

Institutional factors refer to a clear structure with predefined roles, responsibilities and relationship between all levels of hierarchy. In the available literature on capacity, clarity and consistency in delegation of roles and responsibilities is a recurring theme (Hamdy et al., 1998; Lundquivist, 2000; Ivey et al., 2002). During the discussion with urban local body representatives from EDMC, it was observed that the local government officials lacked an overall understanding about their roles and functions in the context of disaster management. They believed that their role was limited to disaster response mainly mobilising equipment and facilities and setting up of medical camps while maintaining sanitation, health and hygiene to control spread of epidemic. On the other hand, the district level bodies pointed out that clearly specified roles of district and local level bodies in Disaster Management Act could ensure better preparedness and response to disasters. Further, the community heads added that clearly stated roles with proper implementation especially for desilting of drainage lines by the local level bodies would help to reduce the flood impacts, thereby improving the response. Previously, researchers have suggested that authorities and responsibilities of relevant institutions along with task distribution should be clearly stated (Caymaz, Volkan, & Erenel, 2013) for effectiveness of response.

5.2 Human Resource

Human resource deals with adequate number of staff with proper delegation and division of tasks and labour. District level officials from DDMA mentioned that there is enough staff and employees available for undertaking tasks related to managing disasters, however it lacks proper division of the workload and tasks among the employees. According to Kapucu, (2012), designating self-organized groups with appropriate tasks can help in effective management of disasters. In addition, it is also important to realize the vital role played by permanent and fully dedicated staff in addressing disaster related issues and activities. Staff on contractual jobs suffer from constant fear of losing their temporary job which affects their motivation and satisfaction that eventually reduces the efficiency. This reveals the need for creation of jobs that are permanent in nature for disaster management specialists.

5.3 Policy and Plans

Policy for effective implementation should consist of appropriate policies, rules, and regulations for decision making backed by laws. In addition, procedures need to be flexible with greater decision making power with local authorities since emergency situations may warrant simplified procedures for complex situations. Flexibility and authority needs to be provided especially for disasters taking place during night since disasters at night create difficulty in contacting senior officials for seeking their permission to take instant decisions. Existing literature identifies lack of cooperation and coordination as the most recurring

problem with disaster management (Caymaz, Volkan, & Erenel, 2013). Contrary to this, discussions with the district officials revealed that the existing coordination mechanism is well coordinated horizontally with line ministries and other departments. It provides a well-established channel for frequent communication and sharing of resources such as equipment, facilities, volunteers, skilled personnel, drivers and contact details of stakeholders involved in managing disasters. However, district authorities lack vertical coordination with the urban local bodies and the community. Moreover, the officials from local institutions similarly stated that they work as per the directions of higher authorities in the event of any disaster. In other words, they did not take any initiative on their own unless there was an instruction or order from higher authorities. Similarly, local level bodies appeared to have low level of interaction with the community prone to floods. In contrast, civil defence volunteers and the hawkers association seemed to have relatively better interaction with the community.

5.4 Financial Resources

In developing countries, financial aspects play a critical role in managing disasters (Chen et al., 2013, Lassa, 2013). It refers to availability of enough financial resources to support disaster management activities. Availability of financial support is significant since funding mechanisms can undermine capacity due to lack of flexibility and pressure to show visible results (Hagelsteen & Becker, 2013). Other than the district officials, all the informants agreed that there is lack of funding for effective management of disasters. Mahmud et al., (2006) states that disaster management institutions lack funding especially for training people on ways to deal with floods. In addition, local officials added that adequately designated budget would enable the Municipal Corporation to undertake measures on its own without waiting for directions from higher authorities. Supporting this, Rodriguez Pose and Kroijer (2009) argued that the local government with its own financial resources responds better to local demands and promotes greater economic efficiency. Moreover, civil defence volunteers said that lack of incentives to work during late hours and in emergency situation posed a huge challenge. Therefore, a good way of encouragement and motivation could be providing them with incentives especially for acknowledging their extra ordinary efforts in responding to disasters.

5.5 Technical Resources

Technical resources refer to access to effective logistics and updated technology between different agencies and the community. Absence of GPS and lack of internet based maps of Delhi created difficulties in responding immediately to disasters within Delhi. District officials added that online accessibility and availability of updated inventory of such resources would assist in facilitating quick and timely response all across Delhi. Supporting this, Jasper et al. (2013) suggests that such information sharing helps to prepare the people to get ready to face disaster. With regards to early warning, district officials mentioned that police along with officials from Flood control Department and Boat Club ensured frequent warnings and alerts issued reached the flood prone communities through use of indigenous system such as “Munadi” (a tricycle with mike). However, community seemed to be aware of flood warnings through radio and television system, much before the warnings communicated by police.

5.6 Leadership

Leadership is defined by ensuring local level leadership through community participation for making quick and appropriate decisions. District officials mentioned that convincing the

community to move to temporary shelters was a major challenge. Even after receiving frequent warnings and alerts, people refused to evacuate their houses until water entered their houses. Similar challenge was faced by civil defence volunteers and hawkers association in evacuating people to safe shelters. Some of the civil volunteers argued that existence of more than single resident welfare association head for same residential area, created difficulties in timely evacuation to safety shelters. Thus, there is a growing need to realize and take advantage of people identified as the leaders by the community in order to mobilise the community and resources to make best possible use of existing knowledge, skills and capacities of people to avert the disaster.

5.7 Awareness and Perception

Awareness refers to existing knowledge and perception of people about disasters and its impact. In terms of probability of future occurrences and potential damages from future floods, district officials seemed to be well aware. They appeared fearful, yet more concerned with awareness programs for people's protection from floods impact. They disclosed difficulties faced in implementing awareness programs in flood affected people. They argued that centres (anganwadi) that share a good rapport with the community and help in quick mobilisation of community members were missing within the area which impacted the community participation in awareness programs conducted by the district authorities. At the same time, local officials believed that floods can't happen in near future and seemed fearless. They lacked an overall understanding about disasters since they had hardly undergone any training than one conducted at Vigyan Bhawan three years ago. For this reason, they believed that even if floods happen, the damage could be averted by not letting the people settle in low lying areas. Lake (1990), suggests that building capacity should involve the training of technical and management personnel to enhance institution's capacity to intervene in service provision.

Conversely, the community based organisation perceived that the risks from future occurrences were very high due to changing land use and pattern of rainfall. Additionally, they believed that impact of future floods could be reduced by less concretization over the existing floodplain. According to community heads and civil defence volunteers, future floods cannot be predicted since it is dependent on time and duration of rain. They were well informed about disaster warnings and alerts through police and media updates. People didn't move to safety due to fear of loss of personal belongings, difficulties in shifting livestock, lack of safety within the relief camps and loss of income. Community seemed to be more concerned and fearful about their ability to meet the daily needs over floods and felt that future damage could be reduced by proper structural measures in form of construction of embankment.

Hawker association's representative argued that although they did assist DDMA in mobilising people for awareness programs but they couldn't manage to mobilise the people from the low lying areas who needed awareness programs the most. Moreover, it was pointed out that the low social economic condition of the community prevented the community in participating in such awareness programs since they couldn't afford to lose their daily wage. Pelling (2003), Alexander (2000) and Kusumasari and Alam (2012) argued that socio-economic needs of the community can overshadow the disaster mitigation efforts since disasters have a lower priority for the local community. Therefore, community needs such as safety from theft and socio-economic conditions should be given priority before they could undertake any preparedness measures to protect themselves from impact of floods.

6. Discussion

The study discloses some of the inherent challenges that need to be tackled for the policy and practice to go together. Good coordination between the agencies managing disasters existed at the district level, however at the local level, coordination of urban local bodies was limited to a response centric approach to disaster. Local level bodies seemed to have low level of risk perception with little awareness about its role in disaster situation. Disaster management act clearly needs to identify the roles of local level bodies and community groups for stronger institutional coordination at the local level. Although enough budgets have been allocated at the district level for program implementation but local bodies lacked designated funds for disaster management limited the response of local level bodies to disaster situation. Lack of proper management of existing manpower makes the execution a difficult task by constraining the local level institutions preparedness to respond to floods. Apart from lack of basic understanding about disaster with a low risk perception, lack of budget and permanent staff for disaster management has constrained the local level institutions response to disasters. Thus, there is a need to ensure proper management of existing manpower with clearly designated roles and responsibilities and reserve funding for empowerment of local level institutions and the community.

Table 2 Critical Factors that determine Preparedness Capacity of Institutions

Critical factors for Preparedness	Officials and Community Response	Recommendations
Institutional Arrangements	• Lack of clarity of role (reactive role limited to disaster response).	• Clearly specified roles in Disaster Management Act with proper implementation and evaluation (desilting).
Human Resource	• Lacks proper division of existing workload and tasks. Staff on contractual jobs suffer from fear of losing job.	• Fully dedicated permanent staff with proper division of workload.
Policy and Plans	• Dependency on directions or orders from higher authorities. • Low level of interaction among district, local agencies and community prone to floods.	• Clearly specified policies, plans and guidelines with legal backing.
Financial Resources	• Lack of funding for buying latest equipment. • Lack of incentives to work in midnight disasters.	• Adequately designated budget and incentives for acknowledging extra ordinary efforts.
Technical Resources	• Absence of GPS and internet based maps of Delhi • Lack of online availability of resources	• Availability and accessibility to GPS support, resource inventory.
Leadership	• Lack of capacity to mobilise and convince the community to move to temporary shelters.	• Use existing community channels, community leaders to spread awareness, mobilise community, resources and ensure quick evacuation.
Awareness and Perception	• Low awareness, risk perception and training among local officials • Lack of mobilizing centers • Low social- economic condition, fear of losing belonging, wage, livestock and lack of safety prevented movement of local community	• Resolve socio economic condition related issues on priority basis. • Provide trainings, awareness generation programs. • Establish more mobilsing centers.

To empower the local institutions to avail greater decision making powers at the local levels and provide opportunities for localized solutions to problems posed by natural disasters. Some of the other concerns include development of effective partnerships including engagement and partnerships with nongovernmental actors; civil society, private sector, amongst others, needs to be fostered at all levels to network with other entities to leverage their resources and capabilities. This calls for improved information sharing systems through better accessibility through improved coordination amongst agencies handling database and establishing protocols/mechanisms in place to reach out to the end users. Much of the traditional knowledge to deal with disasters needs to be captured for and integrated with the warning system. Thus, previous experience with disaster events should enhance high capability in disaster management planning, but it seems that most local governments allocate a low priority to comprehensive disaster management, even though some local governments may take an interest in a specific disaster (Cigler, 1987).

7. Conclusion

Disaster management institutions especially at the local level can play a significant role for effective flood risk reduction with support from district authorities and the community. This study has elicited significant determinants for effective preparedness to respond by the institutions. Moreover, to improve the preparedness of local institutions to respond, they should focus on building the awareness and perception of various stakeholders about disasters including issues on how to address the risks i.e. the target people know what are the risks, root causes of risks, available local capacities, risk reduction measures applicable for their respective areas, risk reduction action plan development in participation with local authorities etc. For this, there is a need for an efficient framework for institutional structure comprising of clearly defined power, command and control and coordination mechanisms with legal sanctity as well as clearly defined and established SOP's to ensure strong compliance. Further, it's significant to involve community based organisations in disaster risk planning owing to the capacities and knowledge they possess and for establishing ownership and commitment for effective disaster risk reduction. Developing the collective capacities of communities with district and local level institutions with necessary skills and resources can help to put them in a better position to provide support in the time of disaster. Potential for the local government and the community to work in a complementary and collaborated manner needs to be further explored.

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