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Understanding Working of Community Resilience in Flood Management

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Abstract—*Our world is becoming more uncertain to Natural and manmade changes like climate change and urbanization. Risk to the people, property and environment is resulting due to these changes. Disasters are the major risks increasing in frequency and severity with devastated consequences for people and property. Natural disasters are inevitable, though human activity has a gradual effect on occurrence of such disasters but there are many elements that are beyond human control or influence. There is always a response measure seen after the disaster. Instead of following the tradition of response there is a need to move towards a culture of prevention and a culture of resilience. When we talk about resilience two questions strike, resilience from what? And resilience of who? In the process of mitigation of risk, there is a need to make a community resilient and also the city resilient. Resilience is needed for a community because healthy, socially connected and well prepared people can make for a stronger communities that are better able to withstand, manage, and recover from natural disasters. This paper focuses on part one which talks about the resilience of a community from natural disaster specifically floods. In making a community resilient there is a need for a coordinated framework required to react when the city is hit by a disaster. The main objectives of this research is reviewing different coping mechanisms of different communities in pre, during and post events of floods and to understand how community preparedness can help mitigation of risk from a disaster. The paper further throws light on understanding the concept of resilience and resilience network of a city.*

Keywords*: Mitigation, Resilient, Flood Management, Coping mechanisms, Community resilience.*

1. INTRODUCTION

1.1 What is Resilience?

Coming from the Latin root resi-lire, meaning to spring back, resilience was first used by physical scientists to denote the characteristics of a spring and describe the stability of materials and their resistance to external shocks. - [1] When we talk about resilience there are many theories which define different types of resilience like engineering resilience, ecological resilience, urban resilience, individual resilience etc.

The same author defines ecological resilience as "the magnitude of the disturbance that can be absorbed before the system changes its structure". – [1]Urban resilience is often defined as the capacity of a city to rebound from destruction with the focus often being on whether the city has recovered in quantitative terms, its economy, and population or built form. Individual resilience is something to do with withstanding the pain and stress.

Resilience is not an adapt concept, it's not a word that is thrown around in the development circles. Resilience is about a different response from the communities and the government. Resilience is not a new subject but it has become a subject to the new interest and attention because today we live in an age of multiple challenges and risk, and despite of being sharp and focus on tackling with difficulties we many a times fail in the recovery part. Rather than wait for disasters to strike it is better to prepare people and communities so that they can handle risks and challenges on their own. This is not only better for services but is better for the people and the communities who feel more in control as a result.

1.2 Resilient City

A city that can regain its original form (means normal life, normal activities) in a short time after disaster. A city could be resilient from many aspects, this study mainly focuses on natural disaster. The document Climate Resilient cities defines Resilient city as "the capacity of individuals, communities, institutions, businesses and systems within a city to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience."- [2] What makes a city resilient to natural and human-induced hazards can be seen as a combination of resilience accumulated through the process of urbanization and planning on one-hand, and the result of specific actions to reduce disaster risk on the other. – [3]

1.3 Disaster management cycle

The disaster management cycle contains three main stages- Pre Disaster Stage, During Disaster, and Post Disaster stage.

The pre disaster stage is the time when a disaster has not happened but mitigation at this stage is required to lessen the risk. Preparedness is again an important part in this stage. Being prepared can mean the difference between life and

death in a short time frame. Preparedness and mitigation are the two parts which are taken care of pre Disasters.

In post disaster there are three parts which need attention, Rescue, Relief, and Recovery. Rescue is the primitive move to protect life and property. Rescue and Evacuation are the combined terms generally is used post disasters. But evacuation is helping people to move from areas that are been hit by a disaster to a safer place. Relief and recovery are important part of the respond stage, wherein there is a time constraint to bring back things to normal situation as quickly as possible.

In the below Figure -1 , the yellow spot represents the time when the disaster is hit i.e. the during disaster stage.

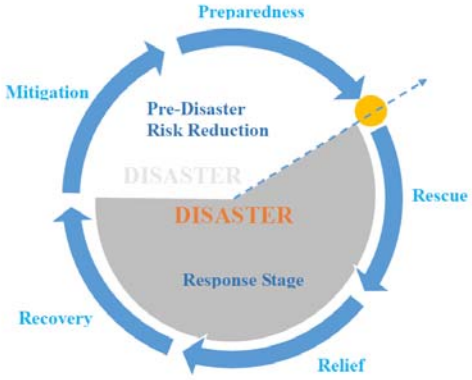

Figure-1

1.4 Resilience Network

In disaster studies urban resilience is often defined as the capacity of a city to rebound after it is hit by a natural disaster with the focus often being on whether the city has recovered in quantitative terms, its economy, and population or built form. When we talk about resilience two questions strike, resilience from what? And resilience of who? In making city resilient there is a need for a coordinated framework required to react when the city is hit by a disaster. This framework consist of various organizations involved in flood management. The detail study of this resilience framework is covered in the second part of the paper – "Making a city resilient" which basically deals with city resilience. The resilience framework consist of a network of formal and informal organizations working and reacting in a particular way in the disaster management cycle. Working of this network at different stages of a disaster management cycle i.e. response, relief, recovery, mitigation and preparedness is very important for a city to be disaster resilient.

This paper discusses more about the resilience approach of communities. For learning and reviewing the coping mechanisms of different communities, Surat is taken as the context area for the study. Surat has a long history of floods. Surat being also one of the coastal city has observed recurrent floods once in every 4 years.

2. ROLE OF COMMUNITIES

Communities are the first respondent to disasters. The role in a disaster event is to protect their people from it. Neighbours, families, relatives are the people who are the first one to provide quick help in relief and rescue. The role of community in preparedness is as important as the involvement of government in disaster management. Community helps in building trust and confidence among the residents by involving them in various participatory and decision making activities during disaster preparedness. Local volunteers and representative groups from the community help in the training and preparing people in educating them to react properly during a disaster event to help themselves and their people. Preparedness means a lot of difference in saving lives and property. Community role in disaster mitigation is to make contingency plans, providing basic infrastructure services needed during disaster and in the recovery process.

2.1 Resilient Communities

Towards resilient communities in developing countries– [4]

In developing countries, there is not enough material and people for educating all sections of society about disasters and their risks. Awareness is equally important with mitigation, hence the best way to educate people is by introducing these awareness about disasters in children's education and activities.

Children under 18 years of age are more capable to gaining these knowledge, skills. This education and information can be easily used to motivate children as population in developing countries contains half population of children under 18 years of age. Children are a good source of spreading this knowledge among their societies and families. Parents and families accept easily knowledge shared by their children.The objective is to look at awareness-raising as a core to all disaster mitigation program and focusing on earthquake education through children. The program proposed, fulfils the need for making community resilient to bounce back during disaster and emergency situations.

2.2 Coping with floods

Coping is when people know in future the event is going to occur on certain assumptions as it was happened earlier in past. For such events people set up certain ways to deal with that recurring event and the experience which they had in the previous event act as a guide to make future strategies.In case of natural disasters these strategies are based on the experience and action of people before, during and after the disaster. There are always some structural measures people take to cope up with the futuredisaster but here the study will be talking about some non-structural measures or the simple coping strategies communities and their people have adopted during their past experience. Coping does not mean coping only during the event of flood, coping strategies are before the

event, during and post event. Measures to cope with floods by non-structural ways can be broadly divided in Regulation, flood defense and insurance. In regulation, zoning and coding are important, in flood defense forecasting, warning, flood proofing, evacuation and relocation. Insurance can be of governmental, private and mixed properties.

In Bangladesh floods the recovery part is completely undertaken by self-organized communities and no formal institution is in place. In Bangladesh, community resource management, awareness, flood proofing measures, building infrastructure like shelter, raising house levels and tube wells were all undertaken with the help of local administration, local NGOs and a committee within the community was set up with all local representatives elected. For building confidence and trust within the community, local people were involved in decision- making of flood mitigation strategies. Local school-teachers, businessman, mosque leader were involved in this process. Many awareness, training, health and sanitation programs were introduced. To reach this education and knowledge within wide range of females in the community a mother's club was launched in which all mothers were given training which further was taught by trained mothers to other females. Thus by connecting of community participation with local government there were new evolvement in coping strategies.

3. PREPAREDNESS APPROACH

Preparedness in disasters is a crucial stage, being prepared for disaster can mean a lot of difference in reacting to situation at risk. Preparedness means increasing readiness and preparing yourself with proper knowledge and techniques which can used to save lives. The activities required in preparedness are public education, creating awareness, increasing readiness by emergency planning, training people, use of new and advance technologies for warnings etc. Flood forecasting is very important in preparedness. If proper warnings are given on proper location and time many people get enough time to grab resources and can be saved. When awareness part comes, government is responsible in preparing people before floods. Also NGO's help in such kind of awareness approaches by creating workshops, street play, training, drills in schools and communities.

3.1 Community Preparedness

This study includes understanding the existing coping mechanisms of the two different communities residing in vulnerable areas of Surat.

One community, Bapunagar slum which is located near the bank of the river was affected by river flood. They are two streams passing through the southern part of Surat which causes Creek flooding also called as khadi floods. These streams flood during heavy local rains and can cause serious damage to settlements located near their banks. This happened in 2004, 2005 and 2007. The other community is Nehrunagar which is affected by the creek (Khadi) flooding. These two communities were examples of communities which faced different types of flooding.

Figure 2 (Surat map)

Bapunagar community had majority of Muslim population with families living since 40 years. The internal roads in the community were improved during various slum improvement schemes. The people had their own coping mechanisms used to protect their belongings during floods. Slum dwellers have developed a system of storing all their valuable documents in aPlastic pouch which is carried by the members shifting to temporary shelters, while the able bodied members stay as watch and ward to their valuable assets like TV, furniture etc. – [5]

During 2006 floods, the slum along west bank of Tapi was devastated. A slum community Bapunagar in the south of Makai pool was exposed to the river bank which was directly affected during floods. Currently a river front development can be seen between the slum and the river in figure-3 (Bapunagar Community).

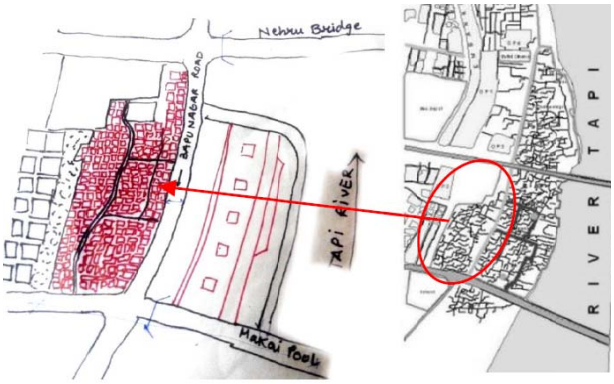

Figure- 3

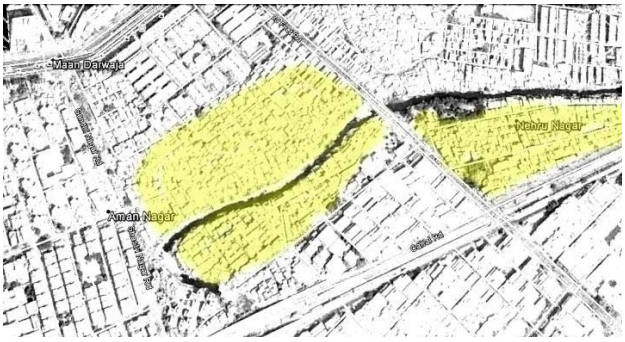

Figure – 4

Nehrunagar community (figure-4) is situated along the creek. During heavy rainfall and tidal effect, probabilities of Khadi/Creek flooding are seen thereby making a devastating situation for the communities residing along its sides. This was due to the poor practices in the slum which resulted in clogging of this creek and increasing the vulnerability. The peoplein this community have faced floods of 2004 which were khadi floods resulted from heavy rainfall. Community people along with the help of NGOs, government bodies like Surat Municipal Corporation (SMC) and Health & Sanitation Department generated awareness programs and carried out cleaning of all water bodies. Currently, community participation has resulted in daily house to house Solid waste collection and regular cleaning of the creek.

4. CONCLUSIONS

Community Preparedness part comes when most of the people are completely unprepared for the disaster event. We cannot eliminate the risk of disasters, but we can mitigate the risk. We can reduce damage and can save more lives. Education on disaster risk reduction can provide lifesaving information and skills that protect children and young people during and after disasters. Creating awareness through Education is equally important part in community preparation thus making communities resilient. There are many public awareness and preparedness approaches to better prepare individuals and communities in decision making during critical hours.

There are many NGOs working for the betterment of people, providing relief and rescue measures. There is a trust and confidence seen among communities which are capable of providing help by volunteering during the events.

5. ACKNOWLEDGEMENT

I dedicate my report to the self-organizing communities of Surat who have developed and are still trying to cope with the flood events by protecting their community.

6. SUGGESTIONS

Community can be made resilient by improving the capacity of individuals, households, and institutions. Community should reinforce livelihoods and evolve coping mechanisms by creating different awareness programs at a community level. Strengthening linkages between stakeholders, government and communities can serve a major evolution of strategy making, and emergency planning before such events. The survival strategies adopted by different communities should be a good practice examples taken up by other communities facing such disasters there by creating many such resilient communities within a city.

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