

Feasibility Study on Using Community Based Approaches for Earthquake Risk Reduction in Tehran

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SUMMARY:

In order to protect local people from earthquake damages, it is important for all disaster-related organizations to take necessary measures. In addition, each local resident has to get a concept of self-protection, obtain enough knowledge, learn countermeasures of disaster by experience and implement these activities. The measures for disaster preparedness can be more effective if the local community cooperates with existing community based organizations and establishes community-based groups of disaster preparedness. In this paper considering the difference in socio-economic characteristics of residents in different parts of Tehran, some sample groups (including local government, students, households, teachers and volunteers) were selected and requested to participate in some workshops and training courses about earthquake risk reduction. Then the level of changing their attitude was evaluated to prepare a plan for promoting public awareness and participation in risk reduction. The results of these activities will be presented in this paper.

Keywords: Tehran, Community, Earthquake, Risk, Disaster Management

1. INTRODUCTION

The role of local residents is very important in risk reduction and disaster management. Local residents should have the intention of securing their safety by themselves and to implement the necessary measures of disaster preparedness steadily both in the normal condition and in the outbreak of earthquake. However, it is more effective if the disaster preparedness measures in the community are implemented in collaboration with community-based groups such as CBOs, NGOs, and residents' association in housing complexes (Victoria, 2002). The main activities of such groups can be listed as follows:

- Dissemination of disaster-related knowledge;
- Collecting and transmitting the information;
- Prevention of secondary hazards (such as fire);
- Rescue and relief activities;
- Participating in evacuation and temporary shelters plans and activities (measures how to evacuate, responses for the disaster weak, evacuation routes and places, etc.)
- Supplying food and water;
- Assisting in storage and management of equipment and tools for disaster management (procurement plan, storing places, management ways, etc.)

Tehran as the Capital of Islamic Republic of Iran is also at the risk of potential earthquakes. The city has experienced several earthquakes in its history and seismologists expect the occurrence of a strong earthquake in or around the city in near future (Amini Hosseini and Hosseini, 2007). Considering high seismic risk in Tehran, and expected damages and casualties of potential earthquake in the city (CEST and JICA, 2000), involving local residents as well as the community based organizations in risk reduction and disaster management activities of the city have been considered as a basic need by relevant authorities. Accordingly, some approaches were carried out to identify the level of awareness and preparedness of residents in the city for potential earthquake and evaluate their willingness for participating in risk reduction activities. In this line a survey was carried out in Tehran to see the level

of awareness of different groups of residents about the importance of preparedness against earthquake that the results will be summarized in the following sections.

2. TARGET GROUPS AND SAMPLING METHOD

In order to evaluate the level of public awareness and preparedness against potential earthquakes in Tehran, some workshops were organized and questionnaires were distributed among the participants (500 samples). The participants were selected among different groups, including local governmental disaster-related organization staffs, neighborhood councils, NGOs, and CBOs members, local people, schools children and teachers, and civil defense forces (Bassij). The groups were selected among the residents of northern to southern parts of Tehran, having different socio-cultural background.

The respondents were asked to identify the major characteristics of their districts. Those in the southern neighborhoods generally identified vulnerable structures, poverty, high density, low levels of literacy, young populations, and in some cases high rates of immigration and prevalence of industrial or commercial units. The central districts share some of the southern characteristics to a lesser degree but also have some of the city's cultural buildings and have a much larger population in the daytime as compared to the nighttime. The northern districts were characterized by stronger and often newer structures, higher incomes, and higher rate of literacy. The new peripheral districts are for the most part better designed and have much more open spaces. However, they lack much of the social cohesion seen in the older neighborhoods. Table 1 presents general characteristics of the selected areas (JICA and TDMMO, 2004).

Table 1: The Main Characteristics of the Selected Districts

Criteria Community	Economic Level	Religious Base	Relationship Among the People	Willingness of District Managers in Risk Reduction	Vulnerability for Earthquake	Housing Condition
District 2-1 (Marzadaran Highway)	High	Weak	Weak	Strong	Middle	Official Residences
District 2-2 (Shahrake Gods)	High	Medium	Medium	Strong	Middle	Modern and High-Rise Buildings
District 10	Middle	Medium	Strong	Medium	High	Low-Rise Buildings, Blind Alleys
District 17 (Hasht Metri Toos)	Low	Strong	Strong	Strong	High	Low-Rise old houses, Narrow Alleys

The major difficulties that districts faced were reported as low or mixed levels of social and cultural capital, scarcity of social, cultural and sports facilities, low income in several cases, vulnerability of structures, high population density, vulnerability against earthquake, all kinds of pollution, high levels of traffic, and existence of industrial units within residential areas.

The participants were also asked to declare their opinion about the way of improving public participation for risk reduction in their districts by using existing community based organizations. The main responses were as follows:

- By evaluating their role and capacity and attracting them to neighborhood associations;
- Through defining joint projects;
- Through the structure of disaster management at community levels;
- Through workshops and exhibitions;
- Through mosques and Bassij as well as cultural/community centers activities.

Most respondents indicated the mosques officials, neighborhood councils, local leaders, teachers, and Bassij could be instrumental in pre-crisis guidance and post-crisis operations and play the role of the

appropriate link between existing NGOs with the local residents. However, some respondents stated that all active local persons should be considered. Of course, several respondents identified that their levels of cooperation with the local organizations were minimal. The results of the survey depicted the following points.

2.1. Limited Disaster Resources

The households had few extra resources that could be used in case of an earthquake. Very few had water resources other than those of the municipality and a great number reported no available facilities for evacuation in case of an earthquake. Parks and places of worship were considered the main evacuation possibilities followed by schools and cultural centers.

Using retrofitting loans was also not very common among the respondents. Even, the percentage of planning to use such loans in the future is very low. A great number of respondents thought that the lending system required improvement. In particular, they believed that such loans should cover all or a greater percentage of the total cost of the retrofitting. Furthermore, a large number of surveyed households thought that interest rates should be lower while repayment periods should be longer. While no overwhelming difference in loan usage was discovered to exist between various socio-economic strata, in general low income families were more likely to have used such a facility.

2.2. Experience with Earthquake

A significant number of the respondents had not experienced big earthquakes and the majority of them had heard stories about previous earthquakes. As an indicator of potential spirit of cooperation in disaster situations, most respondents reported some form of neighborhood cooperation during the war between Iraq and Iran in the 1980s. Indeed many respondents had participated in the formation of neighborhood organizations during this period. Other activities ranged from exchange of information to provision of assistance to others in need.

2.3. Earthquake-Related Knowledge

While the most important source of general information for the respondents was public television followed by newspaper and radio, about half of the respondents had received no earthquake-related training or information. Very few people had heard of the relevant projects of earthquake preparedness. Similarly, very few respondents knew of the year of the last big earthquake in Tehran or about the National Disaster Mitigation System in Iran. The respondents did, however, have some general information about what to do in case of an earthquake. Overall, the higher the socio-economic level of the respondents the more likely it was for him/her to have more knowledge about the risks.

Most respondents thought that the earthquake would occur within their lifetime; many thought that it was imminent. Also, a large percentage of the respondents thought that when the earthquake occurs, there would be widespread devastation. Around two-thirds of the respondents thought that their neighborhoods were very dangerous or relatively dangerous. Very few people thought that they would be fine after the earthquake whereas close to 4% of the respondents thought that they would either die or be injured.

There was a difference between the south and the north of the city in terms of attitude toward risk. Respondents in the north had a more reasonable attitude toward risk, while more of those in the south thought that God would decide their destiny. Similarly, there was more or less a relationship between socio-economic level and risk attitudes. The majority of respondents stated that they were either completely or to some extent ready for the earthquake. However, the number of respondents who state that they had talked about earthquake preparedness and mitigation at home or in the office was generally low.

Similarly, preparation for earthquake at home or in the office was limited according to the respondents' statements, and a small percentage had insurance against earthquake. While level of food storage was reasonable, water storage was minimal among the respondents. It seems that the

medium and high socio-economic categories generally have high storage levels. However, there was little difference across socio-economic categories in terms of overall preparedness.

2.4. Social Organizations

A general scarcity of local groups was found by the survey. Among the few local groups that the respondents reported, most were either religious or sports-related. This said, most organizations were reported to meet more or less regularly and also hold festivals. Overall, southern districts were more likely to have locally organized groups as well as festivals than northern districts. In line with these findings, social bonds were found to be stronger in the southern districts of Tehran and in the lower socio-economic strata.

3. PLANNING FOR PROMOTING EDUCATION ON DISASTER PREPAREDNESS

One of the best ways for improving cooperation among community based organizations and local residents are to provide necessary information for all relevant groups. For this purpose some training programs were implemented in Tehran for different target groups as follows.

3.1. Education for Governmental Staff at Tehran Municipality and District Levels

For developing the appropriate cooperation to be used in case of an earthquake and taking emergency activities smoothly, a group of the staff of local government and disaster-related organizations were given disaster education thoroughly. Also, necessary knowledge and preparation as local government staff have been given so that they can actively promote measures to reduce risks from disasters during the performance of their administrative work and be able to initiate the implementation of the disaster preparedness activities in the covered area. Some of the educations provided to these groups were as follows:

- Basic knowledge of earthquake and seismic risk of Tehran;
- Vulnerability of Tehran to earthquake and potential impacts of such event in the city;
- Plan, laws and regulations related to earthquake and disaster management in Tehran and Iran;
- Responsibilities of local government staff in case of earthquake (system of mobilization and tasks of staff), and;
- Countermeasure of earthquake at home and measures for developing and strengthening community-based groups for disaster preparedness;
- Their main roles and responsibilities to promote public participation in risk reduction and disaster management.

Furthermore, to improve the skills of disaster preparedness and emergency responses for the staff of municipality and district offices, they were participated in some drills.

3.2. Education for School Students

It is important that students understand the dangers that could arise in case of earthquake and take safe actions according to the development level of students. For this purpose, Ministry of Education and International Institute of Earthquake Engineering and Seismology (IIEES) annually implement a national drill to guide students to understand well the concept of earthquake and effective activities (safe sheltering) at the time of seismic events and basic emergency responses that they need to do through school curriculum, and extracurricular activities.

The workshop organized to some groups of students depicted that the provided trainings is not sufficient for improving their preparedness for potential earthquake. It was shown that the ability of teaching and guiding of educational staff should be improved, appropriate training courses, seminars and drills should be prepared and a quick response system in case of emergency should be developed. Furthermore, disaster know-how by devising drills for disaster preparedness (evacuation) and

development of the concept of self-help, mutual cooperation, local voluntary activities and public assistance should be considered as well.

3.3. Education for the General Public

If a large-scale earthquake were to occur, government would become inundated with many calls for help and it would be difficult for the government to deal with all the emergencies. People’s living patterns differ and nobody knows where they will be when an earthquake hits. They might be working, studying, involved in social activities, or be at home. Therefore, the local residents should protect themselves and act on their own judgment.

In the workshop organized for ordinary households, the existing plans and information prepared by the Tehran Municipality, Ministry of Education and IIEES have been presented to the local residents. Some of the presented public trainings in this light are summarized in Table 2.

Table 2: Components of the Enlightenment

Before Earthquake	After Earthquake
<ul style="list-style-type: none"> - Diagnosis of earthquake resistance of houses, measures to prevent furniture from toppling over (fixing furniture), retrofitting and earthquake-proof renovation, prevention of brick walls falling down, protection against glasses flying, breaking into pieces, etc. - Awareness of vulnerable area in Tehran - Securing of the communication system among the family members - Ways of acquiring information on the disaster - Prevention of fire - Training first aid and evacuation - Preparation of hand-carried items for emergency such as food, water, personal belongings, etc. - Storage of food and drinking water for 3 days - Participation in the voluntary activities including community-based groups for self disaster preparedness 	<ul style="list-style-type: none"> - Road transportation regulation and driving behavior - Activities with understanding of the possible hazardous area in case of earthquake - Temporary shelters and evacuation routes - Rescue/relief and first aid - Protection against fire and fire extinguishing - Understanding of the damages around the house and community - Collecting information by Internet, TV and radio - Activities in temporary shelters and evacuation site

4. DESIGNATION OF MODEL COMMUNITIES FOR ORGANIZATION OF COMMUNITY LEVEL DISASTER MANAGEMENT GROUP AND SYSTEM

As shown the public awareness of disaster preparedness among the Teheran inhabitants is low. This is because the community has not experienced a large earthquake, and been provided little information of earthquake and its potential disastrous aftermath. There are many community-based organizations (CBOs) and NGOs dealing with various fields such as health, education, women, environment and religion. Many of their activities are seasonal and performed independently from other groups. They have worked for rescue and relief for a short time in emergency case but have not followed up. Systematic works have not been implemented yet and disaster-oriented groups are not found. Even if some people want to take actions for disaster management, nobody can instruct them how to do it and what to do (Hosseini and Amini Hosseini, 2009).

Since there are many NGOs, CBOs and small groups working for the community for a long time, these existing groups should be utilized as much as possible for disaster management. Many of them have close relationships with the local people, while the size of members, budget, objectives and coverage are various. Since characteristics of each community and group are different, the government just started to study socio-economic conditions for involvement of the local people into the urban planning and improvement of the living standard.

Some district offices such as those in districts 17 and 4 have already started their own activities involving the local communities in order to improve living conditions and life style. NGO centers are established in most districts and utilization of activities of NGOs and CBOs are considered for

community development. Also, some communities (e.g. housing complex) are trying to promote disaster preparedness and management by themselves in collaboration with local governments, recognizing the importance of the community disaster preparedness and management. However, in terms of Tehran disaster management as a whole, the public awareness level of disaster is still low and systematic and planned community involvement has not been established.

In order to increase awareness of the local people for disaster and develop their capacity for disaster management, it is necessary to understand their present socio-economic conditions, capacity and possibility of receiving education and training. There are many types of communities and groups in Tehran to be considered as disaster management groups. Since different target groups have different socio-economic background, structure, members, etc., the contents and approaches of disaster education and training will naturally vary from one place to another. The major target groups found so far are residents in high-rise housing complex, Bassij members, members of neighborhood council, school students, adults and elders coming to mosque and cultural center, inhabitants living in old and traditional areas with high vulnerability, residents in newly developed area and NGOs and CBOs working for community.

Each group may have some similar lifestyle, idea and principle, etc. Therefore, representative community should be selected as a model community in each district, and some patterns should be formulated for further application to analogous communities. Disaster education and training need to be experimented and evaluated in each community. Also, disaster education and training policy and manual should be prepared and community-based activities should be promoted using these materials. In order to achieve the objectives, the following steps are necessary:

- To organize a committee of the project consisting of the related organizations (Districts Municipality, Red Crescent Society, Fire Dept, etc.);
- To select model communities by the above committee based on the conditions of the existing communities and community leaders;
- To make a policy and plan for community disaster management, education/training of community leaders to be used in each model community by the above committee;
- To organize a committee for disaster-related members in each community (consisting of key persons, elders, community group leaders, etc.) to consider applying the prepared policy and plan to each community condition;
- To implement the above plans in each model community;
- To monitor and evaluate all activities by the above committees.

The concrete activities to be carried out by model communities are as follows:

- Objectives, detailed contents of disaster management and organization of the community disaster group including education and training, disaster drills depending on the capacity and socio-economic conditions of the residents in each community will be decided and implementation plan will be prepared;
- The functions, roles, responsibilities and specialties of human resources, industries and organizations to be cooperative with community for disaster management will be recognized in advance;
- Training and education programs and materials to be used for community disaster leaders will be prepared;
- Education and training of community leaders in charge of disaster management will be planned and implemented with the disaster-related organizations;
- Disaster drills (for fire and earthquake) will be implemented with support from the related organizations;
- The necessary training and educational materials for the community members will be prepared;
- Information network of disaster management will be set up, dangers existing in the area will be confirmed regularly and a common understanding of situations will be established;
- Community disaster map will be prepared.

It is clear that rescue/relief teams cannot reach the damaged people soon after the disaster and local residents cannot do anything to help themselves, which is exemplified by the Bam, Iran, Earthquake case of 2003 (Mirhashemi et al, 2007). Therefore, it is required to increase awareness and capacity of the local people. The public awareness for disaster is, however, still low even among the governmental staff. The project had better start with districts having strong willingness and leadership of governmental staff, leaders and key persons in the community and also good cooperation between the government and local people. The existing community-based groups and NGOs with close relationship with and influence on the local community should be utilized and activated for disaster-related activities, if possible. If there is no such a group, establishment of a new community disaster group may be considered.

5. CONCLUSION AND DISCUSSION

Disaster will cause heavy damage across a wide area regardless of age, sex, occupation, and living conditions of the people. In order to protect oneself and families from disasters, daily preparedness and mitigation efforts against various damages are necessary. Once earthquake occurs, however, an individual's or a family's capacity is very limited to prevent the further damages and difficulties that will follow. In this case, it is helpful that the neighboring people should get together and cooperate actively and systematically for disaster.

The community members should be prepared for response to disaster daily, and of course, in emergency case. There are many cases that neighbors cooperated and saved many lives and mitigated the damages after the occurrence of earthquake. It is required that the people take necessary actions by themselves because rescue and relief is a fight against time and the people cannot just wait for the support from government and organizations outside the area. Additionally, collaboration of the people and the related organizations can promote the basic activities effectively for disaster management and emergency management. This fact has been considered in preparing the Master Plan of Tehran by IIEES for Tehran Municipality (Jafari and Amini Hosseini, 2005).

The results of this survey depict the readiness of local residents for improving their preparedness for potential earthquake, if a systematic plan for this purpose can be prepared and implemented by the relevant authorities. In addition, it was shown that the existing NGOs and CBOs suffer from insufficient knowledge and resources to manage local activities in risk reduction and disaster management. Therefore, it is essential to prepare necessary plans and policies for institutionalizing these organizations, providing necessary trainings and improving their capacities.

However, activation of community-based groups and establishment of disaster management groups are just some of the measures to strengthen the community disaster capacity. For this purpose, the people and the groups with special knowledge and experience related to disaster should be utilized and community disaster activities without enough capacity should be supplemented financially and technically. Once community disaster groups are organized, they can work not only for preparing for earthquake but also for establishing safe and comfortable community. They will check the safety of the area daily, diffuse and enlighten the disaster knowledge to the local people, implement disaster drill in order to make the local people act appropriately and mitigate the damages in case of disaster. Additionally, in emergency, the groups will be able to perform important roles on emergency response such as fire fighting, rescue and relief of the suffered, information collection and operation of evacuation sites.

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