

Strengthening community participation in disaster management by strengthening governmental and non-governmental organisations and networks

A case study from Dinar and Bursa (Turkey)

This paper focuses on issues and weaknesses related to disaster management in the 1995 Dinar (Turkey) earthquake, and subsequent attempts to apply the lessons learned from this earthquake into a study of strengthening community participation in Bursa, a province of Turkey which is located in the first-degree seismic zone, specifically focusing on earthquake disaster. The study in Bursa is a pilot one included in a general project for strengthening Turkey's disaster management system. The first step involved the study of a disaster-stricken community following the 1 October, 1995 Dinar (Turkey) earthquake. The findings related to attitudes and evaluations of the Dinar community and local and central authorities on some aspects of disaster management will be presented. Subsequently, the initial stages of the pilot study in Bursa, partly employing the findings from the Dinar study will be described. The paper will focus on important dimensions of disaster management, the facilitating and hindering aspects of disaster management in Turkey and will provide a discussion of the findings in relation to the sustainability of disaster management.

Introduction

Disaster management is a multi-faceted process that entails various stages. These stages are commonly conceptualised as the disaster impact phase, relief and rehabilitation, reconstruction, mitigation and preparedness phases. Effective planning and action for disaster reduction involves various social units such as central and local governmental agencies, NGOs, local communities and international agencies. The importance of strengthening the capacity of local communities in disaster reduction has been repeatedly stressed (Dynes, 1993; World Conference on Natural Disaster Reduction, 1994). Therefore, it is crucial to understand the attitudes, expectations and resources of the local community in order to develop plans that can be integrated into the ongoing social life of the communities living in disaster prone areas.

Natural disasters, like earthquakes have extensive psycho-social impacts on the affected populations (Durkin & Thiel, 1993). Survivors of natural disasters have

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Presented at the Disaster Management: Crisis & Opportunity: Hazard Management and Disaster Preparedness in Australasia and the Pacific Region Conference, James Cook University, Centre for Disaster Studies, November 1-4, 1998, Cairns, Queensland

to adapt to drastically altered physical environments, economic losses, disruption of activities and homelessness. They also have to cope with the emotional trauma of witnessing loss of lives, injury and property loss (Baum *et al*, 1983; Karanci and Rustemli, 1995; Rubonis and Bickman, 1991). Adversities following the disaster, such as lack of housing and break-up or displacement of families, were found to be related to the continuation of psychological distress (Goenjian, 1993). For effective disaster management it is very important to have plans for mitigation and to create a community awareness for the risks of future disasters and to empower local communities and authorities by giving information on how to mitigate future disasters. For the sustainability of disaster management plans it is essential to institute community participation. In order to create awareness of future risks and to motivate preparedness it is fundamental to understand the attitudes, expectations, political, economical and socio-cultural contexts of the communities living in risk areas. (Habitat International Coalition, 1996; Bates *et al*, 1991; Karanci, Aksit & Sucuođlu, 1996).

This paper will focus briefly on the legislation concerning disasters in Turkey and will report findings related to some aspects of disaster management from the 1995 Dinar earthquake. Subsequently, the preliminary stages of an ongoing project aiming to strengthen community participation in disaster management in Bursa, which is a metropolitan city located in the first degree seismic zone, but which has not yet experienced a recent earthquake will be presented.

The Turkish Disaster Law and institutional framework

In Turkey, the first law concerning disasters was enacted in 1944 and solely focused on

earthquakes. The reason for this being that the major type of natural disaster affecting Turkey is earthquakes. This law was a response to the 1939 Erzincan earthquake and several similar subsequent earthquakes and it was the first law to stress the need for plans for rescue, material aid and temporary shelter prior to the occurrence of earthquakes. The law also had a clause that emphasised compensation for the loss of property. The formation and the funding of provincial rescue and emergency aid committees was also introduced (Severn, 1995). In 1959, the 1944 law was replaced by a new more extensive law covering disasters other than earthquakes, like fires, floods, landslides and similar disasters. The responsibility for the execution was given to the Ministry of Public Works. This law established the duties and the responsibilities of the 'Provincial Rescue and Aid Committees'. The main emphasis is to make and keep the plans for provincial rescue and aid updated and to clearly delineate the personnel involved in such plans. In 1983, in order to ensure the coordination between the central and provincial administration an 'Extraordinary Status Co-ordination Council' has been developed which is established if the need arises by the government.

The development of earthquake zonation maps in Turkey started in 1944 and with numerous revisions the most recent one was developed in 1996. Similarly, construction specifications were revised several times and the most recent one was published in 1997.

As can be seen, although detailed responsibilities are given to the provincial and central governmental institutions, the non-governmental organisations and the private sector are not involved in the system. Furthermore, measures on mitigation are not included.

The October 1, 1995 Dinar earthquake

The aim of this study was to examine the attitudes and expectations of the survivors of the Dinar 1995 earthquake, about different phases of disaster management. More specifically the aims were to examine the impact of the earthquake on social-economical dimensions, to explore the attitudes about the houses constructed

after the earthquake by the state, beliefs in the possibility of hazard mitigation and who is regarded as responsible for such action and future risk perceptions.

Dinar city is located at the juncture of the Aegean, Central Anatolian and Mediterranean regions in Turkey. The estimated population before the earthquake was around 40,000. Agriculture and trading and small crafts were the dominant activities. An earthquake of magnitude 5.9 struck Dinar on October 1, 1995 at 17.57 p.m. The mainshock of the earthquake was preceded with foreshocks for four days, the largest one having a magnitude of 4.7. These foreshocks initiated structural damage in many buildings which were then severely aggravated by the mainshock. Numerous aftershocks were recorded in the following days, which continued for more than three months. The mainshock having a duration of 20 seconds was immediately followed by a strong aftershock two hours later with a magnitude of 5.0. The Dinar earthquake caused a death toll of 90, and more than 200 injuries. The economical losses were estimated at US\$250 million.

The total population affected by the earthquake in the region is 100,000 and the number of residential units is about 24,000. The damage observed in the city is beyond the expectation when it is considered that the Dinar earthquake is not a severe one. According to the damage survey conducted in the affected region after the earthquake, out of 24,000 residential units, 4340 (18%) were heavily damaged, 3712 (15%) were moderately damaged, 6104 (25%) were lightly damaged and the remaining 9844 (41%) were undamaged. Since 4340 units were either collapsed or severely damaged, a death toll of 90 might be considered as less than expected. The foreshocks in the preceding four days of the main shock considerably reduced the death toll because many residents had already left their houses or the city before October 1 by fear and expectation of a big quake.

Building stock in the city mainly consisted of one- and two-storey adobe, brick and stone masonry buildings, and 3–6 storey reinforced concrete-framed buildings. There are also 3–4 storey masonry buildings that were originally constructed as single or two-storey buildings, with upper stories added by permission from the municipal administration, which is strictly against the Turkish Seismic Design Code.

Examination of the disaster management aspects of the Dinar Earthquake

Our study of the Dinar earthquake took place in two stages. The main findings

related to disaster management from the two phases of the study will be presented separately.

Stage 1

This part of the study took place within the six months following the Dinar earthquake. The main objectives were the assessment of the mitigation and preparedness, relief, rehabilitation and reconstruction phases of the disaster management cycle in Dinar and to formulate the weaknesses and the strengths of the existing disaster management system.

The data sources for this stage were in-depth and focus group interviews with Dinar residents, experts and officials in Dinar and surrounding cities and in

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Ankara, the capital of Turkey, observations during the field trip to Dinar and the examination of written documents related to the Dinar earthquake.

Mitigation and preparedness

Dinar had its first urban planning in 1971 and subsequently two revisions were made on the first plan. The final plan before the 1995 earthquake was prepared in 1990. The fact that there had been three urban planning experiences since 1971 is an indication of movement towards rational planning. However, the results of the 1995 earthquake showed that the enforcement of the urban plan and the building codes were evaded, monitoring and evaluation of these enforcement activities were not carried out. Our analysis revealed that a number of actors, such as the owner, the project engineer, the contractor and the controller, the municipality, and the community members, share responsibility in this state of affairs.

Rescue and relief

The majority of officials and community members pointed out that rescue and relief

activities were poorly coordinated and that the local administrators were inefficient because *a.* they were victims themselves and *b.* they were inexperienced in disaster management. Adequate national and international aid (tents, food etc.) was available, however its distribution was unsystematic and aid was delivered for a very lengthy period (6 months).

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Thus, it can be suggested that the formation of regional civil defense teams and professionalism and specialisation in relief and rescue work is necessary. It also seems essential to establish the involvement of the local community. Aid should be distributed systematically and the community needs to be informed regularly about the activities.

Temporary settlement

The General Directorate of Disaster Affairs conducted a survey with earthquake victims just a few days after the quake. Four choices were given. Ninety-eight per cent of the respondents chose 'receiving rent allowance'. All victims with heavy or moderate damaged houses (7166 families) were provided with rent allowance which was delivered for 12 months. However, this decision was afterwards criticised because:

- the survey was conducted when the victims were still in shock
- it led to the desertion of Dinar by its residents and paralysed economic activities
- it created a substantial increase in rents in neighboring provinces
- it forced the most needy segment and some of the civil servants to stay in Dinar in spite of receiving the rent allowance and live in tents
- it compelled children to separate from their families, friends and their schools.

The majority of community members and officials stated that prefabricated disaster housing situated in Dinar would have been a better option. Thus, care should be given to settle the community in their own neighborhoods.

Reconstruction

The preferences of the Dinar community and the local officials were mainly one- or two storey buildings without soft stories, the separation of shops and residences, and the supervision of construction by honest and technically-expert engineers. It was also stressed that the final approval should be given by the state and not the muni-

ciality. Another main point was the need to educate engineers and skilled workers on earthquake resistant construction.

What is constructed by the State

The new settlement plan for Dinar suggested three- and four-storey buildings and also contained buildings with shops in the basement. As a result of damage surveys 1480 new units were constructed and 1300 units were strengthened. The new residential units were distributed to the right holders with long term loans in October 1996 (one year after the earthquake).

As can be seen, the preferences of the community on one- or two-storey houses was not taken into account, with the new houses being three- or four-storey buildings with shops in the basements. The attitudes of the right holders towards the newly-constructed disaster housing were assessed in the second stage of the study.

Stage 2

This part of the study involved the administration of an extensive questionnaire in order to examine attitudes related to different aspects of disaster management and some psychological variables like distress, coping and social support. Only some of the findings related to disaster management will be presented here.

The questionnaires were administered to 315 adult residents [165 (52.4%) females and 150 (47.6%) males] of Dinar. The female sample was selected from the twenty-six neighborhoods in Dinar on the basis of the type of current housing (disaster housing, built after the earthquake; houses that had moderate, light and no damage from the 1995 earthquake) and some of the female but the majority of the male sample was selected on the basis of status at work (self-employed; State employee and wage workers). 31.7% of the respondents were living in government-built disaster houses, 22.5% in houses that had no damage from the 1995 earthquake, 27% in lightly damaged, and 15.9% in moderately damaged and repaired houses. The mean age of the respondents was 34.3 (sd = 11.48) and the mean number of years of education was 8.3 (sd = 3.73). The mean household size was 4 persons. 90% of the respondents stated that they were in Dinar during the 1995 earthquake. 70.8% of the sample were born in Dinar and 72.4% were married.

The questionnaires were administered by 11 trained undergraduate and graduate students from the Departments of Psychology and Sociology of the Middle East Technical University, Ankara, Turkey in February, 1997, sixteen months after the earthquake. The interviewers went either

to the houses or work places of the respondents and individually administered the questionnaires as structured interviews with a few open ended questions and recorded the replies themselves. The administration of each questionnaire took about approximately 45 minutes. Data was analysed by using the SPSS program.

Attitudes and evaluations related to housing

The questionnaire contained 19 items tapping views on current houses, neighborhoods, relationship with neighbors and services provided by the municipality and the availability of social institutions. Each item was rated on a 4-point Likert type scale by the respondents (1= Completely

The (reconstruction) preferences of the Dinar community and the local officials were mainly one- or two storey buildings without soft stories, the separation of shops and residences, and the supervision of construction by honest and technically-expert engineers.

disagree; 4= Completely Agree). The factor analysis of the responses (varimax orthogonal rotation) yielded five factors explaining 50.2% of the total variance. These factors were labeled as 'satisfaction with the current house', 'satisfaction with the relationships with neighbors', 'satisfaction with the neighborhood', 'satisfaction with the currently inhabited building' and finally 'satisfaction with social services'. Mean factor scores for each respondent for

the five factors were calculated by summing the scores on the items that had above .35 loadings on each factor and dividing them by the number of factors. An analysis of variance was conducted examining gender by type of current house (disaster; no damage; lightly damaged; moderately damages) by the five satisfaction factors as the repeated measure. The results yielded only a significant interaction effect for type of house by satisfaction factors ($F=3.52$, $p<0001$).

As shown in Table 1, the most pronounced differences on satisfaction seems to be between those living in disaster houses and those living in moderately damaged houses. For the house and the social services satisfaction, those living in the disaster houses are significantly more satisfied than those living in moderately damaged and repaired houses. For those living in the moderately-damaged houses, although there is governmental aid to strengthen their houses, the owners need to pay for the non-structural repairs and at the time of the study these houses were not strengthened. Thus, this state of affairs might have caused the relatively negative evaluations of this sample. The disaster houses were distributed to their owners one year after the earthquake, and the occupants were very recently settled in their houses. Thus, they were quite satisfied with the speed of reconstruction and seemed to be satisfied with their houses and the social services. However, since the disaster houses are distributed randomly to the right holders, they had no choice in determining their neighbors. This lack of control over choosing neighbors seems to be reflected in their lower satisfaction with their neighbors compared to the other groups, especially to the no damage group. However, considering the fact that four is the maximum satisfaction score, their mean satisfaction rating of three still reflects quite a favorable attitude towards their neighbors.

| Mean satisfaction scores of the sample living in different types of houses | | | | | |
|--|------------------|-----------|-----------------|--------------------|-----------|
| | Disaster housing | No damage | Lightly damaged | Moderately damaged | F |
| House Satisfaction 1, 2 | 3.20 a | 3.10 a | 2.98 a | 2.60 b | 10.19 *** |
| Neighbor Satisfaction | 3.09 a | 3.42 b | 3.28 a b | 3.27 a b | 5.51 ** |
| Neighborhood Satisfaction | 2.50 | 2.57 | 2.48 | 2.47 | 0.31 NS |
| Building Satisfaction | 2.85 | 2.70 | 2.97 | 2.62 | 0.34 NS |
| Social Services Satisfaction | 2.67 a | 2.50 a b | 2.48 a b | 2.24 b | 3.15 * |

* $p < .05$; ** $p < .001$; *** $p < .0001$, N.S. $p > .05$.
1 Means with different subscripts are significantly different from each other.
2 The range for the scale scores is 1-4, higher scores reflecting more satisfaction.

Table 1: Presents the mean satisfaction scores on the five factors of the sample living in four different types of houses.

Beliefs on mitigation and hazard perceptions

For the planning of disaster reduction measures it is important to explore the beliefs of the community on the possibility of mitigation and their perceptions of future risk. In order to examine these dimensions six questions related to mitigation, future earthquake expectations and evaluations of the current house on its resistance to future earthquakes were used. All of these questions were rated on four point Likert type scales. The responses to these questions were factor analysed in order to reduce them into appropriate dimensions. The varimax orthogonal rotation yielded three factors explaining 74.2 % of the total variance. The factors were labeled as 'doubt about the resistance of the house', 'belief in mitigation', and 'perceived risk'. Mean factor scores were computed for the three factors. A Multivariate Analysis of variance using gender by type of present house (Disaster; No damage; Light Damage; Moderate Damage) by the three earthquake-related cognitive factors was conducted. This analysis showed that the type of house (Wilks = .94, $p < .03$) and gender (Wilks = .95 $p < .002$) effects were significant.

As shown in *Table 2*, the only significant difference was about the evaluation of the safety of the houses. There was a systematic increase in doubt as we moved from the disaster housing and houses with no damage from the 1995 earthquake to houses which suffered light damage. The inhabitants of the moderately damaged houses were least confident about the safety of their houses.

These results point out that the evaluation of the disaster housing is quite favorable and may reflect trust in state supervised construction practices. For the moderately damaged houses the decision was repairing and strengthening the buildings. However, this doesn't seem to be a satisfactory solution for the inhabitants. Thus, it may be valuable to inform them of the strengthening procedure and give details on how strengthening will improve the resistance of their houses.

When the earthquake related cognitions were examined according to gender, it was seen that the only significant difference was on beliefs in mitigation. Women tended to believe less in mitigation ($M = 2.33$; $s.d. = .81$) as compared to men ($M = 2.62$; $s.d. = .73$; $F = 10.76$; $p < .001$). Further analysis revealed that education is positively related to beliefs in mitigation for both females and males. However, for females being employed was also related to beliefs in mitigation. Employment may enable

| Mean factor scores of earthquake cognitions for the subjects living in four different types of houses 1 | | | | | |
|---|------------------|-----------|--------------|-----------------|---------|
| | Disaster housing | No damage | Light damage | Moderate damage | F |
| Doubt about the safety of the house | 2.23 a | 2.29 a | 2.75 b | 3.32 c | 34.36 * |
| Belief in mitigation | 2.59 | 2.48 | 2.41 | 2.23 | 2.46 NS |
| Perception of risk | 3.13 | 2.29 | 2.75 | 3.32 | 0.41 NS |

* $p < .001$; N.S : $p > .05$
 1 Means with different subscripts are significantly different from each other.

Table 2: Mean factor scores on the three earthquake cognition factors for the four types of houses.

women to have access to more information in regards to what is being done and what can possibly be done, and thereby may increase their beliefs in the possibility of doing something for disaster reduction. This finding implies that for community

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participation it may be important to built networks that can also reach housewives.

The present results seems to point out that the Dinar community is perceiving the risks of a future earthquake and that they believe to some extent in mitigation. However, to the question 'have you done something as a preparation for a future earthquake?' only 14% replied affirmatively. Thus, it seems that although the social base is cognitively ready for mitigation they have not turned this into action. The answers to the question on assigning responsibility for mitigation ('Who should take actions for mitigation?') seems to solve this puzzling finding. The respondents believed that mitigation measures should be taken by the state (41%), the municipality (38%), the major (15%), Civil Defense Units (6%). Only 26% stated that it is their own duty. Thus, although they believed in mitigation, they placed the responsibility for mitigation on external, mostly governmental

agencies. Thus, for future action plans on disaster reduction it seems important to shift this externalised and centralised responsibility locus to internal and local sources.

Conclusions and suggestions

The evaluations of the state-built disaster houses were very positive. The inhabitants seemed to be satisfied with the houses, the social services and had trust in the seismic safety of their houses. This is a very favorable picture and seems to reflect the appropriateness of the decisions about where and how these houses were built. The fact that the construction was completed within one year may have also contributed to these favorable attitudes. However, the same picture was not true for the occupants of the moderately damaged houses. Sixteen months after the earthquake the strengthening process was still not completed and the inhabitants anyway did not seem to trust the safety of the strengthened buildings. Therefore, it may be necessary to hold workshops using participatory adult learning principles, in order to understand the reasons for their distrust and dissatisfaction and modify their beliefs on the strengthening process.

Although the respondents perceived risks for future earthquakes and believed in the possibility of mitigation, very few engaged in preparatory activities. Furthermore, they believed that taking measures for mitigation is the responsibility of agents outside themselves. Thus, it seems important to investigate ways of initiating and maintaining community participation. Women tended to believe less in the possibility of mitigation. Therefore, in the plans for community participation it seems important to give special emphasis to integrating women.

Project to strengthen community participation in a province not recently struck by an earthquake: Bursa as a metropolitan city located in the first-degree seismic zone

Bursa has been chosen as a pilot city to identify existing and prospective local institutions and networks and strengthen

or empower them so that local people will be able to better prepare for a future disaster when it strikes or have greater welfare if disaster does not strike.

Bursa is one of the seven metropolitan centers with a population of 500,000 and over. These metropolitan centers have main municipalities consisting of city portions of more than one district, each of which has its own municipality (SIS, 1993). Bursa metropolitan center with a population of more than one million has three district municipalities. All of these three municipalities, but especially two, have received a massive influx of migration. According to recent calculations in the period between 1980–85 Bursa received 15,600 migrants every year. In 1985–90, yearly migration inflow increased to 25,000. Among seven metropolitan centers in Turkey, Istanbul, Bursa and Gaziantep are the only three cities where yearly migration rate has increased from one period to the next.

In 1990, the city population of main or metropolitan Bursa was 834,576. However, the urban population in Bursa province as a whole was 1,157,805. Over the last 70 years a complete reversal has taken place. In 1927, 28.6% of population in Bursa Province was living in city centers in the province, while 71.4% was living in the villages. In 1990, 72.2% of population was living in the cities, while the percentage living in the villages was only 27.8%. These figures indicate mass migration from the villages of the province as well as from the villages and cities of other provinces in Turkey, including immigrants from South-Eastern European (Balkan) countries, such as Bulgaria.

Bursa is in first degree earthquake zone and last major earthquake took place in 1855. Close to one and a half century elapsed and according to earthquake engineers and geologists it is very likely that a major earthquake will take place in the region.

Our aim is to see how local organisations can be set up so that the local populations will be ready for such a disaster before it strikes. Our interviews in Bursa have shown that it is possible to bring together central government agencies, main or metropolitan municipality and district municipalities and Non Governmental organisations to establish community networks in the neighborhoods. We have observed that this local need has already some beginnings in the establishment of *Local Agenda 21* in Bursa, which is a global initiative set up in 1994 during the Rio Summit Meeting of United Nations. It is a global initiative to organise local communities.

Dinar city was not prepared for a disaster. Existing zoning and housing regulations were not enforced by the municipality. Building construction was carried out to maximise urban rent. But this was not combined with minimising losses in a disaster such as an earthquake. As we have shown in the previous sections households and the community are not still organised for a better mitigation and preparedness for earthquakes.

We are hoping that Bursa will be more prepared for a disaster through the local organisations that will involve men and women as individuals and households as groups into community networks. We have already noted that *Local Agenda 21* has already been set up in Bursa. A pilot Local Consultation Center in one of the neighborhoods within the boundaries of Nilüfer district municipality of Bursa Metropolitan Municipality has already been established. However they admitted that they do not know how to involve local people into such networks. Community participation in these new forms are not readily forthcoming. Old forms of community participation should be unearthed and new forms should be devised and implemented. Some NGOs such as Chamber of Civil Engineers, Chamber of Commerce and Industry, Rotary Club and so on needs to be involved. The problem is to get it going. One of the ways to start it rolling will be to have a large meeting with the already existing Urban Council by inclusion of new partners or stake holders. If smaller groups are established in such a large meeting it will be possible to carry out training workshops in community participation. These workshops and committee organisations should be carried from metropolitan municipality level to district municipality levels. Then these should be repeated in neighborhoods.

Note

This research was supported by a grant from the Middle East Technical University Applied Research Fund and the UNDP. We are also grateful for the assistance of the Turkish General Directorate of Disaster Affairs.

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