

EVALUATION AND COMPARISON OF POST-DISASTER HOUSING IN TURKEY; LESSONS FROM IKITELLI AND SENIRKENT

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Abstract: Most of the cities and towns in Turkey are located on the active seismic regions; however the buildings are generally not designed to be earthquake resistant. Thus there is a big earthquake threat for public life. Not only earthquakes but also other natural disasters like floods and landslides threaten the public who are vulnerable to disasters. In this study two case studies; a rural post-disaster housing settlement example of Senirkent and an urban post-disaster housing settlement of Ikitelli were examined. Some similarities can be observed in the design and construction processes of post-disaster housing in the rural and urban settlements. On the other hand, there have been crucial differences between the dwellers of those settlements in terms of socio-cultural and economic specialities. The ultimate goal of this study is to evaluate and compare the new settlements in terms of design, construction, and post-occupancy problems.

Keywords: disaster, post-disaster housing, post-occupancy problems, socio-cultural.

1. INTRODUCTION

The aim of the study is to compare two case-studies which were conducted independently from each other in different years by the author. However, both of the case studies investigated the post-occupancy problems of the post-disaster housing in Turkey. The problems were investigated mainly under the items of design, construction, management, and socio-cultural problems. The current study aimed to evaluate and compare the problems found out from the case studies according to their differences and similarities.

The following section (Section 2) summarizes the disaster events, and methodologies and findings of the case studies. The third section compares the case studies. The study ends with a comment of the report as the conclusion part.

2. THE CASE STUDIES

The investigations of post-occupancy evaluation of the two cases were conducted in different regions of Turkey. One of the regions is a district of Ikitelli in the metropolis of Istanbul in Marmara Region and the other is a small town of Senirkent in Central Anatolia. The findings from both studies show that the methodologies and strategies for both cases were similar in terms of design and construction periods. However, the post-occupancy problems have presented overlapping cases. These similarities were unexpected results because the regions in which the post-disaster settlements were constructed are crucially different from each other in terms of demographical, physical, climatic, economical, and socio-cultural characteristics. The present study aims to

understand the impacts of similar applications of post-disaster housing which were built by the government of Turkey for two regions, and to compare the similar problems in order to find out better solutions for future applications.

2.1 Marmara Earthquake of 1999 and Ikitelli post-disaster housing example

The earthquakes which hit the Turkish towns of Izmit and Duzce in 1999, known collectively as the Marmara earthquakes, not only took a terrible human toll, they also cost the country around US\$20 billion in damage alone, equivalent to over 10 per cent of annual gross domestic product (GDP). Two earthquakes of 1999 left up to 20.000 people dead and 50.000 injured in north-western Turkey (World Disaster Report, 2002).

After the disaster, a huge emergency sheltering and temporary sheltering demand occurred. It took some time to solve these problems, during the same time Turkish government began to study the rehabilitation of the region and to construct post-disaster housing (permanent housing). As the impact of the disaster was very huge, the need for post-disaster housing was also very big which could be said that thousands of dwellings were needed urgently. However, it was clear that all the needs could not be met in a single region, so the government firstly started to study on finding suitable districts for building post-disaster housing settlements.

Ikitelli district, which is located on European Side of Istanbul, is one of the selected districts for application of post-disaster housing project. In June 2000, the construction started under the control of The Ministry of Public Works and Settlement. The project was composed of 810 dwellings (Figure 1). Both the project and the construction were entrusted to the contractor firms by The Ministry of Public Works and Settlement. The selected firms - UBM, Yavuzlar, Uralsan - finished the first 650 dwellings in September 2001; and the rest, 160 dwellings, were finished at the end of year 2002 (Özden et al, 2003).



Figure 1: Scenes from Ikitelli Post-disaster Housing settlement

2.2 The Case Study of Ikitelli Post-disaster Housing

At the end of year 2002, in October and November, a case study was conducted in Ikitelli post-disaster housing area in order to evaluate post-occupancy problems. The methodology of the study was based on site observations and application of the household survey, consisting of 50 questions, addressing, among other things, (1)

demographic characteristics of the household; (2) sequence, duration, and number of household movements post-disaster; (3) satisfaction levels with former houses (pre-disaster housing) and satisfaction levels with post-disaster housing; (4) satisfaction levels with pre-environment and current environment.

The survey instrument was prepared under the control and supervision of the instructors from Istanbul Technical University, Social Sciences Institute – Masters Program of Housing and Earthquake (Özden et al, 2003). The survey was conducted by a group of architects including the author. Thirty households participated in the survey. During the research period, the occupancy ratio of the dwellings was nearly 40 per cent. The rest of the dwellings were empty because of some problems which will be mentioned in the following. From both the survey and site observations, some important problems affecting the success of the project and adaptation period of victims to their new dwellings and environment were confirmed and established. These problems are listed below with general points for this study:

The uncompleted infrastructure (road and streets, natural-gas lines, telephone etc.), low construction quality of houses and difficult transportation problems were the primary problems which the households complained. It was observed that some households preferred to come and settle in their new houses very late because of such problems. The delay in settling also had been causing the delay in adaptation to new environment of the victims (Özden et al, 2003).

The construction problems of post-disaster housing; water installation systems (especially bathroom installations) were causing some serious problems almost in every dwelling. The exterior walls, facades were not water-resistant (rain, snow etc.) and there was always water leakage from exterior walls of the dwellings. The building materials were of low quality (installations, windows, doors, paintings etc.). Water leakage and humidity were some of the problems faced in basement floors.

The design problems of post-disaster housing; some of the buildings were constructed without basement floors. On the other hand, after the 1999 earthquakes, the building codes and legislations were changed and the basement floors had become a must in new buildings. So, Ikitelli Municipality authorities did not give building inhabiting licence yet at the time of the study to those buildings according to new building codes. Heating systems of the buildings were planned according to natural-gas heaters, unfortunately natural-gas infrastructure (pipe lines) had not been constructed to the area yet. So households could not use this system. They had to establish a traditional-old system, stoves in which wood and coal were burned. However, there were not adequate numbers of chimneys designed in the dwellings.

Infrastructure problems; the roads connecting the area to the main roads and district were not completed yet. Natural-gas and telephone lines were not finished. There were not any public transportation vehicles in the area such as inner city buses.

Institutional problems; there were not any social, cultural, educational, religious or health institutions in the region. The nearest one of these institutions was a few kilometres away, which was out of reach of especially elderly and children. All people had to reach those places with their own resources or vehicles.

Proximity to work; most of the work-places and offices of occupants were generally around the pre-disaster housing areas which were about 10 or more km. away from the post-disaster area. Hence it was hard to reach their jobs from post-disaster housing areas.

Cultural problems; as mentioned above, some of the households did not prefer to settle in post-disaster housings, or they settled there after a long period of time. They generally preferred to rent their houses to other people. However, the houses were rented to immigrants coming from eastern parts of Turkey who belonged to generally low socio economic status. They emigrated generally from rural areas. On the other hand, most of the households of the post-disaster housings belonged to middle and upper socio economic status, and had been living in urban areas, in Istanbul for a long time. Both the financial and cultural differences caused important conflicts between the residents, the households and tenants. Households generally complained about insensitive behaviours of tenants.

Security problems; households generally did not feel secure against crimes such as theft. They thought that environmental security was very insufficient in their living area.

Coordination and management problems; households generally complained about the lack of an authority to talk about their problems and needs. Neither contractor firms, nor The Ministry of Public Works and Settlement authorities established a communication line with households. In addition to this, the firms and authorities generally did not take the responsibility for the problems of post-disaster housing and they accused each other.

The author also had a chance to reach one of the contractor firms and ministry authorities in Istanbul during the research, and carried a short conversation with both of them. From these conversations, it was learned that the most important point which caused problems in post-disaster housing areas was the insufficient time table for design and construction of post-disaster housings and the urgency of the event. On the other hand, there should be another research in order to see and understand the problems and approach of post-disaster housing from the ministry side because the limited time of conversation was not seen enough to reach an opinion. So it should be the subject of another research.

The following section explains the second case study very briefly.

2.3 Senirkent Flood Disaster of 1995 and Senirkent Post-disaster Housing Example

The town of Senirkent is located in a geography where Central Anatolia and Mediterranean region intersect, near one of the biggest lakes of Turkey, the lake of Eğirdir. The town is 1010 meters high from the sea level. The population of the town is 10.738 (Özden, 2004).

On 13th of July, 1995, soon after a heavy rain at the evening hours, a huge and destructive mud flood destroyed a total number of 320 dwellings, of which 195 were completely destroyed, 18 moderately destroyed, and 107 lightly destroyed. The disaster

killed 74 people and injured 46 people (Figure 2). Dwellings that were constructed with mud-brick could not resist to the flood, also called as *cold lava* by the authorities (Özden, 2004).



Figure 2: Scenes from Senirkent Flood Disaster

Soon after the disaster, The Ministry of Public Works and Settlement started to look for an area for constructing post-disaster housing. The main criterion was its flatness and being far from the flood area for choosing the area. The methodology and approach for post-disaster housing project and construction were the same as in Ikitelli example. The ministry entrusted and gave the job to a firm for construction. In fact the projects had been designed for another post-disaster housing area previously, so the revision and application to the new area would not take the authorities of the ministry too long. They could finish the projects nearly in 10 or 15 days, and send to the contractor firm. The construction started in August 1995 and finished in December 1995. 188 dwellings were constructed which were composed of 16 blocks, 15 of which were three-storey blocks and one of which was two-storey (Figure 3).



Figure 3: Scenes from Senirkent Post-disaster Housing settlement

2.4 The Case Study of Senirkent Post-disaster Housing

In July and August in 2003, the author conducted a survey in the region. The methodology of the survey was very similar to the one employed in Ikitelli example. It was based on observations in the region and application of the household survey, consisted of 31 questions which were taken from the Ikitelli survey. As mentioned before, Ikitelli survey questionnaire was composed of 50 questions, but for the Senirkent some of the questions were discarded because they were not necessary for this research.

Findings indicated that about 18 per cent (35 dwellings) of the 188 dwellings were not being used by the households (or victims). Some of them were rented by the households to other people and the others were empty (Özden, 2004). From the demographic data and conversations with the households living in the region, it was determined that the mean age of the households was above 50. Therefore, it could be said that the majority of the residents was elderly people.

In fact 15 households participated in the survey. Additionally, the researcher found the chance to chat and sometimes make longer conversations with the households except the ones who participated in the survey during the research in the region. These conversations sometimes were more useful to get more information on certain cases. So, not only the survey instruments but also the conversation notes established the study report.

The general problems and complaints of households which were found out from the research could be determined briefly as follows;

- The projects were designed without meeting the residents' social, economical, and cultural needs,
- During the design and construction period, the users' thoughts were not taken into consideration by the authorities,
- The decision in the place (area) preferences was thought to be completely wrong, the useful and productive agricultural areas were used in building apartment blocks,
- The infrastructure was very weak and insufficient,
- The quality of construction and building materials was very low,
- The post-disaster settlement was far away to the town centre so this caused difficulties in reaching the town centre and bazaar of the town, especially for disabled people, and elderly people,
- The lack of a (site) management was always mentioned by the households because they could not find any authorities who could listen and help them with their problems. If a management model could have been established by the authorities, people would have been able to find better solutions to their problems.

3. LESSONS FROM THE EXAMPLES OF POST-DISASTER HOUSING

There were, in fact, very deep differences between the victims (households) of two examples in terms of demographic, economic, and socio-cultural characteristics. On the other hand, their problems relating to post-disaster housing, often coincided and many similar points can be observed.

Ikitelli district is located in the metropolis of Istanbul, which is the commercial and industrial centre of Turkey. The life standards, habits, economic life of the people of the region were crucially different from the residents' who were living in a town such as Senirkent. Ikitelli post-disaster housing households had been used to living in apartment blocks for a long time; on the other hand, victims of Senirkent flood disaster had been living in independent-adobe houses for nearly 200 years (Figure 4).



Figure 4: The traditional adobe houses of Senirkent

The authorities had designed the nearly same types of post-disaster housing for both cases, for the metropolis of Istanbul and the rural district of a small Anatolian town of Senirkent. This was, perhaps, the beginning of the problems mentioned before.

However, the other problems which were given for both examples generally gave the similar cases. Both of the regions' households complained about low construction quality and building materials, insufficient infrastructure, lack of socio-cultural institutes, transportation problems, management problems etc.

Mostly, post-disasters in Turkey, victims are relocated by the government to the new environments and dwellings. Relocation outside and away from the community and neighborhoods can compound victims' readjustment and recovery problems. Victims who were relocated must find new jobs, enroll their children in a different school district, and develop social ties to their new surroundings. For those victims that remained rooted in their home community while living in a new community, they must deal with transportation issue (Cole, 2003).

Researchers believe that the vast majority of victims attempt to relocate with relatives, and, if feasible, to return and resettle on the pre-disaster housing site (Cole, 2003). This view was observed from the results of both cases. The answers related to the questions which asked about whether the victims prefer to live in pre-disaster housing or post-

disaster housing, gave the same results for both cases that vast majority prefer to live in pre-disaster housing and site. During the research period, many households were still thinking to resettle in their pre-disaster housing sites, even the same houses.

Especially in rural areas, the ties between relatives and neighbors are very strong. When the victims began to lose those ties, the adaptation period to their new environment becomes very hard and continues long which begins to turn into a painful process. This will cause psychological, social, and cultural problems, even some conflicts among the victims and environment. Therefore, housing recovery process or reestablishing of permanent housing process ends up as a failure. So, as can be seen the relocation approach of victims has been causing more problems than solutions for victims. During one of the conversations in the Ikitelli case study, a household said that “we did not understand that we were victims of a disaster during the emergency and temporary housing periods because we could reach everything, we were living with our relatives and rented houses in the regions where we wanted, just when we resettled to post-disaster housing site, than we understood that we were really victims”.

Similar problems were met in other parts of the world. For example in Japan, after big Kobe earthquake of 1995, the researchers had suggestions that they had to use city centers where victims had been living in pre-disaster housing units. They had similar problems in relocation and some of their suggestions can be pointed out as follows (Miyamoto, 1995);

- Communities should be revived in the heart of the city. To this end, the centre of the metropolis should be devoted to residential and not business use to lure residents back,
- Green open space must be created. In order to revive the inner city, residents and local corporations need to work together to create mid-rise housing and business space that harmonize with open space with green belts and water,
- Through improved land measures, residents should be given the opportunity to rebuild their homes at their previous place of residence or in the surrounding area. To this end, a policy should be enacted to release idle land held by private corporations, as well as publicly owned lands, and the government should rent private housing to residents without homes.

An important point which was generally forgotten by the authorities for both cases in Turkey was the situation of disabled victims, and the elderly people. None of the design and environment was suitable for those people. The importance of universal design, design for all people had never been taken into consideration. The adaptation process of these people could probably be harder than the other ones.

4. CONCLUSIONS

The improvement and welfare of human built environment should be the goals of sustainable development. In relation to this, new settlements are the steps to achieve this ideal. Post-disaster housing should be seen also in this process not only as a part of urgent need but also a part of healthy and sustainable architecture which will improve human life quality in natural and built environment.

Most importantly, policies for reconstruction must create conditions which enable residents to return to their previous location of residence, rebuild their lives, and cooperate in the restoration and reconstruction effort by being the main force behind it. Administrative and financial systems for the future should be created that enable residents and local corporations to independently advance the reconstruction policy (Miyamoto, 1995).

For both cases, Ikitelli and Senirkent, the authorities did never think on the rehabilitation of the areas which were affected from the disasters. The approaches and studies of the authorities were depending on relocation or resettlement of the victims. On the other hand, the methodology and projects of the rehabilitation and restoration, even reconstruction of the buildings in the disaster areas could have been given as a chance or alternative way for the victims in housing recovery process. When the damaged city or town areas could not be used and rehabilitated efficiently post disasters, those areas would become to be useless and unwanted areas of the cities. The value of the land is very high today, and it seems better to rehabilitate and open to people usage of city centers instead of relocation and resettlement of people far away from the city centers. Also it is expensive to open a new settlement area than to rehabilitate the former one because it is urgently needed infrastructure and institutions in the new area, and this way was very high costs especially for developing countries such as Turkey. If there are not enough areas suitable for settlements in the city centers, of course it is certain to use new areas, but if there is a chance to use the disaster areas it is better to choose that way.

It is seen clearly from the experiences that in the design-construction-occupancy periods of post-disaster housing process, both the pre-disaster and post-disaster characteristics of victims and environment should be taken into consideration in order to develop healthy, sustainable and disaster-resistant communities and environments. Finally, in every step of post-disaster housing process, user participation should be taken into consideration as well.

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