

Sustainable Development in Disaster Affected Rural Areas: The Case of Dinar Villages

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Abstract—Post-disaster reconstruction projects offer opportunities to facilitate physical, social and economic development and to reduce future hazard vulnerability long after the disasters. Sustainability of post-disaster reconstruction project conducted in the villages of Dinar following the 1995 earthquake was investigated in this paper. Officials of the Government who were involved in the project were interviewed. Besides, two field surveys were done in 12 villages of Dinar in winter months of 2008. Beneficiaries were interviewed and physical, socio-cultural and economic impacts of the reconstruction were examined. The research revealed that the post-disaster reconstruction project has negative aspects from the point view of sustainability. The physical, socio-cultural and economic factors were not considered during decision making process of the project.

Keywords—Dinar, Post-disaster reconstruction, Sustainable development, Turkey.

I. INTRODUCTION

DISASTERS are becoming more severe in recent years. Reason for that is not only the damage and life losses caused by the disasters, but also the unsustainable post-disaster reconstruction works. Decisions and actions are taken in a short time without giving adequate attention to long-term development of the disaster affected areas.

The post-disaster recovery period offers an opportunity to strengthen local organizational capacity to facilitate economic, social and physical development long after the disaster. To alter the physical development patterns to reduce future hazard vulnerability is another opportunity [1]. Post-disaster reconstruction approach should be sustainable: financial, material and technical resources must be available locally to maintain the housing in a good state of repair, the housing must be appropriate to the needs of the family, suitable to the local environment and in the area where there is employment and where services are adequate to the needs of the occupants [2].

Post-disaster reconstruction is a complex issue with several dimensions. Governmental, nongovernmental and international organizations have their own stakes in disaster recovery programs, and links must be established among them, as well as with the community. In other words, post-

disaster recovery programs should be seen as opportunities to work with communities and serve local needs [3].

Sustainability of post-disaster reconstruction project conducted in the villages of Dinar following the 1995 earthquake is discussed in this paper. First, sustainable characteristics of rural areas in Turkey are described. Second, the 1995 Dinar earthquake and the post-disaster reconstruction project conducted in the area are explained. Then, observations based on the field surveys and interviews with the beneficiaries and the officials of the government are expressed. Finally, the reconstruction project is evaluated from the point view of sustainability.

Information about the post-disaster reconstruction project conducted in Dinar was gathered through the interviews with the officials of the General Directorate of Disaster Affairs, General Directorate of Construction Affairs and Directorate of Public Works and Settlement in Afyonkarahisar. Then, two field surveys were done in 12 villages of Dinar in winter months of 2008. Characteristics of the existing and new settlements, post-disaster houses and cattle sheds were observed. Users of some of the post-disaster houses were also interviewed during the field surveys.

II. SUSTAINABLE CHARACTERISTICS OF RURAL SETTLEMENTS IN TURKEY

In Turkey rural areas have sustainable characteristics. They form an organic pattern with narrow streets and houses and service buildings with different properties. It can be said that rural areas are formed by physical, socio-cultural and economical factors.

Physical factors include site, climate and geology. Site is an important factor that shapes rural settlements. Topography, orientation, presence of water resources and fertility of land are always taken into consideration in the formation of rural settlements and houses in these areas [4]. Rural settlements are always in consistency with the climate. Wind, precipitation, radiation and light are important variables that influence architecture in rural areas [5]. Geology determines the materials used in the buildings. Materials in nature are selected for longevity not just for immediate efficiency and function. Those, requiring minimal maintenance and durability contribute to the visual quality through their ability to withstand deterioration under climatic stresses [6].

Socio-cultural factors that shape rural settlements involve family structure and size, safety, privacy and religion [7]. It is

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known that number of the rooms of the houses, spatial arrangements of these buildings and type and size of the service buildings on the lot are related to the life style of the users.

It can be regarded that, a house in a rural settlement is determined by the economy attributing its form, the owner's goods and animals to be close together, since husbandry takes place just near the house [4].

III. THE 1995 DINAR EARTHQUAKE AND IMPACTS OF THE RECONSTRUCTION AFTER THE DISASTER

A. The Earthquake and Reconstruction Period Following the Disaster

An earthquake with a magnitude of 5.9 shook Dinar, Evciler, Kızılören, Dazkırı and Başmakçı districts of Afyonkarahisar province in Turkey on the 1st of October, 1995. 2473 houses were heavily, 1218 houses were moderately and 2076 were lightly damaged due to this earthquake, which caused about 200 deaths and 100 injures (Balta, 1998). Post-disaster reconstruction works started immediately after the earthquake and 2018 permanent post-disaster houses and 1400 cattle sheds were constructed in the villages of the region nearly in two years. 1234 of the 2018 permanent post-disaster houses and 873 of the 1400 cattle sheds were erected in Dinar district, where most of the damage occurred.

The reconstruction project was initiated and controlled by the General Directorate of Disaster Affairs with the support of Directorate of Public Works and Settlement in Afyonkarahisar. It was decided to construct a typical house and cattle shed project from the archive of the Ministry of Public Works and Settlement and hire firms for the construction of the buildings. The brick masonry post-disaster house type with an area of 76.61 m² and brick masonry cattle shed type with an area of 50 m² were constructed in the villages. 9 construction firms worked in the region and most of the constructions were completed in 1997. 898 of the 1234 permanent post-disaster houses were erected in 15 new settlements and the rest were constructed in the existing villages.

B. Observations in the Study Area

It was observed that the traditional settlements and the houses in the region show the characteristics of rural areas in Turkey. However, there are differences between the settlements erected after the disaster and traditional settlements. In spite of existing villages' organic form, new settlements were erected on a grid pattern. It is very difficult to distinguish the new settlements from each other, however the existing villages and the buildings in them have their own characteristics related to physical, socio-cultural and economical factors. Fig. 1 shows an existing village and Fig. 2 illustrates a new settlement.



Fig. 1 View from an existing village (Dikici Village)



Fig. 2 View from a new settlement (Gencali Village)

Research reveals that villagers modified the post-disaster houses and the cattle sheds. In addition, some of the beneficiaries constructed new buildings on their lots. Common additions are leans to roofs, storerooms and bread houses (space used for making bread) and most common new buildings are straw houses and cattle sheds (Fig. 3). Economy is dependent on agriculture and animal rearing in this region. Research in the region shows that some of the beneficiaries who rear animals did not get cattle shed, however some villagers who do not have animals got cattle shed during the provision period. Because of this, villagers who rear animals constructed cattle sheds and straw houses, beneficiaries who do not have animals changed the functions of cattle sheds.



Fig. 3 Addition to the post-disaster house and new buildings on the lot (Kızıllı Village)

Generally married son lives with his parents in the villages of Turkey, therefore there are extended families as well as nuclear ones in the villages of Dinar. Because the house type is not suitable for extended families, these families had to

enlarge the houses by adding spaces or constructing additional storeys.

Since the villagers can not afford to use contemporary building materials and hire constructors, new buildings were constructed with indigenous building materials and indigenous construction techniques without any engineering assistance. This makes these buildings vulnerable to future earthquakes.

There are workmanship problems on some of the houses. Since metal claddings on the roofs of the cattle sheds were not fixed properly, the claddings have moved up in some of the villages (Fig. 4). Also, drain pipes of some houses and cattle sheds have fallen down. In addition, cracks were observed on the walls of a few houses. Some villagers, who could afford, repaired the buildings. One family left their post-disaster house, on which there are cracks. They said that they did not feel safe in the house.



Fig. 4 Cattle shed with its moved up roof cladding (Kızıllı Village)

Research shows that some of the new settlements were erected on the agricultural lands and village pasture. Because of that villagers are not able to put their animals out to graze in some of the settlements.

The survey also revealed that the post-disaster houses were oriented to different directions. For instance, houses in a village were oriented to the South; in other they were oriented to the North. According to the information gathered through the interviews with the officials of the Government, orientation was not taken into consideration during the planning of the new settlements. Villagers living in post-disaster houses, which were oriented to the North, complain about the orientation of their houses. They claimed that there was no adequate sun light in their houses and it was difficult to keep the houses warm in winter months. Because of that some villagers changed the functions of the rooms in their houses.

IV. RESEARCH FINDINGS

The physical, socio-cultural and economical impacts of the post-disaster reconstruction in Dinar villages were revealed based on the field surveys and interviews with the officials of the Government. Findings of the research are as follows:

A. Physical Impacts

Research revealed that physical factors that shape rural

settlements were not taken into consideration during the planning period. Since every site has its own characteristics, factors such as topography and orientation should be considered during the design phase. Decision making and planning processes of the reconstruction project in the villages of Dinar were completed without doing research in the area.

B. Socio-Cultural Impacts

It was seen that the villages and the houses in them are the products of the socio-cultural factors in the study area. The houses in the villages have different characteristics depending on the life styles of the users (Fig. 5). However, the post-disaster houses, designed years ago for any region and any family, do not meet the needs of some of the families. The users had to make additions to the houses and construct new buildings on the lots.



Fig. 5 A traditional house (Karahacıllı Village)

C. Economic Impacts

Economic dependence were not considered during the decision making process. This lead some of the beneficiaries construct cattle sheds and straw houses. In addition, some of the users had to repair parts of their houses because of the problems on the buildings due to workmanship. Making additions to the houses, constructing new buildings and fixing the buildings are additional burdens to economy of the families. As a result, it can be said that the reconstruction project have negative effects from the point view of economic factors.

V. CONCLUSIONS AND RECOMMENDATIONS

This study shows that post-disaster reconstruction project conducted in rural areas of Dinar district has negative aspects from the point view of sustainability. The physical, socio-cultural and economic factors were not considered during decision making process of the project. Post-disaster reconstruction projects should offer opportunities to facilitate physical, social and economic development long after the disasters. They should also provide opportunities to reduce the vulnerability of the affected area to future disasters. In order to achieve sustainable development in disaster affected areas, decisions taken should be based on specific characteristics of the regions and needs of the users. Thus, investigation should be done in disaster affected areas during the decision making process.

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