



# Housing after disaster: A post occupancy evaluation of a reconstruction project



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## ABSTRACT

The permanent post-disaster houses constructed in the rural areas of Cankiri Province in Turkey, were investigated as part of a post-occupancy evaluation of the reconstruction project, undertaken by the Turkish Ministry of Environment and Urbanisation. The aim of the study was to examine whether houses constructed with *Typical* or *Custom Designs* met the needs of the users in the region or not. Field surveys were undertaken, and face to face interviews were conducted with the beneficiaries of the reconstruction project and the Ministry officials who were responsible for the project. A questionnaire was distributed to the beneficiaries of the housing loans and four case studies were carried out on selected houses with various typologies. The data collected from the interviews and questionnaire survey as well as a survey of the modifications in the architectural design of the houses revealed that there was a high level of dissatisfaction with the *Typical Designs* supplied by the Ministry. On the other hand, since the *Custom Designs* were closer to traditional houses from the point of view of occupants needs, satisfaction rate was higher; although the beneficiaries indicated that traditional houses were more appropriate to their lifestyles. This paper presents data collected and details regarding the modifications made or desired by the occupants in their permanent post disaster houses.

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## 1. Introduction

Natural or manmade disasters are known to cause and aggravate homelessness in well settled communities also [26]. To overcome the problem post-disaster (re)construction practices are regulated through governmental policies which do not always pay attention to the connections between certain dynamics amongst local governments, civil organizations and international agencies; the dynamics between public and private sectors; the amount and source of reconstruction funding; and the need for communities to voice their opinions, express their needs and assert their demands [2].

Before post-disaster reconstruction can be undertaken many decisions have to be made, including the choice of whether to repair or retrofit slightly damaged houses as opposed to demolishing them; and what can be done to enhance design and construction methods [12]. The most frequent risks identified in post-disaster reconstruction projects appear to be the non-acceptability of the project outcomes and the absence or lack of satisfaction amongst the project beneficiaries with their houses [14]. The

reconstruction of housing usually begins before taking into account the people's needs, resulting in a clear avoidance of the human factor. In other words, if the reconstruction programmes fail in rebuilding the lives of the disaster victims, they may even end up worse than they were before [21]. On the other hand, it is possible to help them avoid further personal disasters and resume their lives through the application of a well-thought rebuilding project [22]. The notion of 'Building back better' after such disasters, enables a sense of understanding amongst political, cultural, social and economic constructs, along with the wider function of homemaking [3]. One of the most effective results of housing reconstruction remains in the community's sense of dignity, social understanding, economy and cultural identity [1]. Hence, the reconstruction of housing after these disasters may also be viewed as an act of building blocks in society, rather than solely as an individual family-aid act [3].

Unfortunately, a majority of the reconstruction programmes involve a lack of integrated decision making. According to Schilderman and Lyons [21], most of the projects they have studied appear to prioritize rebuilding over individual support, leaving those who needed it to be cared for at a later stage. The authors also point out that in housing finance programme some individuals use the reconstruction loans to invest in improving their lifestyle, rather than rebuilding their house to the required

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standards of living. Others may use the funding to build extensions to their houses; which according to Carrasco *et al.* [4] is an unavoidable act since some people feel the need to improve their living conditions in this way.

There are many international standards that post-disaster houses must meet. According to Da Silva [6] they must be culturally and climatically appropriate, durable and easy to maintain, allow for future living and be developed in partnership with the intended occupants. A house must not only answer to the needs of its occupants but also fit in with their lifestyles, with respect to the size and configuration of living spaces. Any discrepancy between spatial demands of inhabitants and the offered accommodation can give rise to a lack of satisfaction with their living environment [8]. If this lack of satisfaction is persistently on a high level, the occupants may suffer from stress, poor health, delinquency, maladjustment, and pathological conditions. When people are dissatisfied with their housing conditions, they will try to move to better accommodations or, to alter their dwelling unit. However, if they cannot accomplish either because of certain barriers to making these changes, such as lack of choice or resources, they will start to suffer from a chronic state of dissatisfaction [25].

When people decide to buy or build a house of their own free-will the investment is focussed on providing comfort and satisfaction; and the time and money spent is considered worthwhile. However, the level of satisfaction may change over time due to a change in the expectations and needs of the occupants. Clark and Onaka [5] argue that initial satisfaction may decrease over time due to changes in building use, market and institutional structure, household size, employment and tenure; and it may finally result in moving to another house. The authors also point out that all moves are not voluntary and may also be due to forced eviction or destruction due to disasters. The former change in abode is associated with “groundedness” and the latter with “up-rootedness” [26].

Indeed, a house may evolve over time to satisfy the changing demands of its various occupants or the occupants may move to a more satisfying place; but in the case of a post-disaster house, satisfaction with the new home becomes even more important to the disaster struck families, because they hardly have another choice. Additionally, when people lose their homes in a disaster and are forced to rebuild and re-invest vast sums, their trauma is aggravated by the upheaval of having to move to a different and sometimes unsatisfactory place. Hence, satisfaction with their new home takes on another dimension, that of a therapeutic nature.

One way to ensure continuity of life style and avoid relocation is to repair and reinforce structures that have not lost their integrity during the disaster. However, reconstruction is considered safer as professional teams are involved in such projects; even though the house may be inappropriate, and costly to build or maintain [21].

The premise of this research was that if families who are forced to take on the burden of a loan to acquire a new home are consulted, before the standard post-disaster houses are designed, and their spatial and special needs are incorporated into the design of the houses, their initial satisfaction will contribute to their recovery and rehabilitation process also.

Housing is a major asset of economy in every country; its appropriateness is not only attributed to its physical characteristics but also to its compliance with the social, cultural and behavioural characteristics of the users [16]. The spatial organization of a dwelling depends to a great extent upon the family structure, and life style of the occupants, their, customs, traditions, habits and religion [18]. Thus the order in living spaces that is established by the occupants is a reflection of their characteristics [23]. For this reason the vernacular nature of housing is most directly related to a people's culture [19].

In rural areas spatial organization of the houses is directly related to daily life activities of the occupants. Post-disaster houses which are not designed in accordance with life styles of the occupants, who do not have chance to move, may lead to high level of dissatisfaction. According to Ibem *et al.* [11] the aesthetics of residential buildings appear to have a strong influence on occupants' satisfaction with their residential environment. This statement implies that the component of carrying out house reconstruction projects plays an important role in determining the quality of the environment in general. In addition, Mohit *et al.* [15] implies that the judgement of residential conditions from present households is based on their needs and future aspirations. Overall, the satisfaction amongst household living conditions is an indication that there is a lack complaints and a high level of certainty towards their desired goals.

Satisfaction with houses occupied after forced relocation has been explored by different researchers. Barenstein [1] conducted a survey on post-disaster housing reconstruction in Gujarat. Location of the house, size of the homestead plot, size of the house, quality of materials and quality of construction were considered as satisfaction indicators of post-disaster houses in this study. Li and Song [13] analyzed residential satisfaction among displaced people in Shanghai. The authors took dwelling size, interior design, public utilities, broadband network, lighting and ventilation, hygiene and maintenance of public space, building quality, privacy, noise and fire and other safety facilities as indicators of housing satisfaction. Snarr and Brown [22] conducted a survey of housing satisfaction with post-disaster houses constructed in Honduras. Besides open ended questions such as “what do you like most about living in this project?”, the authors asked questions to the residents under following topics: institutional services, work, housing, housing facilities, site characteristics and social environment. The topic “housing” covers material of the houses, floor and roof and acceptability of the interior space.

This paper presents a post occupancy investigation into the appropriateness of the permanent post-disaster houses (PDH) constructed in the rural areas of Cankiri, Turkey. The province of Cankiri lies on the Northern part of Central Anatolia just below the Black Sea Region. Since the province is on the North Anatolian Fault zone, sometimes minor earthquakes occur in the region, where major ones also experienced. There are 12 districts and 370 villages in Cankiri and 48% of the population in the region live in rural areas. Economy depends on agriculture in rural areas of the province. Traditional houses in the villages of Cankiri were formed according to life styles of the occupants. These houses were constructed with indigenous building materials and techniques by local builders.

Post-disaster reconstruction projects were undertaken in the rural areas of Cankiri Province in Turkey, by the Ministry of Public Works and Settlement (now called the Ministry of Environment and Urbanisation). After the earthquake disaster in 2000, the Turkish government decided to provide house building loans to people whose houses were demolished or heavily damaged during the earthquake. Some of the houses were allowed to be built in their original locations in the villages; but, where devastation was widespread, new settlements were designed in proximity to the existing villages. The design of the post-disaster permanent housing was contracted out to a private firm who prepared three “Typical Designs” of varying sizes for the disaster victims.

The project beneficiaries of the reconstruction project were required to choose one of these designs, and if they were not satisfied with any of them, they could commission the design to an architect of their own choice. After the designs and the house-building loans were approved by the Ministry, the beneficiaries were responsible for hiring their own builder and also covering any extra costs beyond the amount of loan provided to them. This

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