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Emel Baylan, Feran Aşur & Sanem Şehribanoğlu

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SENSE OF PLACE AND SATISFACTION WITH LANDSCAPING IN POST-EARTHQUAKE HOUSING AREAS: THE CASE OF EDREMIT TOKI-VAN (TURKEY)

BAYLAN, Emel ¹
AŞUR, Feran ²
ŞEHRİBANOĞLU, Sanem ³

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Structured Abstract

Objectives

This research aimed to provide a greater insight into the relationship between feelings of satisfaction with the landscaping and the sense of place, particularly emphasizing on the planning and landscape design of post-disaster housing environments for the enhancement of the victims' and other residents' well-being on the case of Edremit TOKI (Van) post-earthquake housing area which was built after the devastating earthquakes in 2011.

Methodology

The residents' satisfaction with various parts of landscaping in the housing area; their place identity, place attachment and place dependence characteristics as part of their sense of place; and the interrelations between these were examined through a questionnaire survey. The data collected from 235 locals were subjected to two types of factor analysis including both explanatory and structural equation modelling (SEM) in order to create a model.

Conclusions

According to the SEM results, the proposed model based on the hypothesis, which states that "there are positive relationship between the sense of place and satisfaction with landscaping," was not supported. In contrast, a negative relationship was found between the satisfaction with landscaping and sense of place. This suggests that when the respondents' sense of place has increased, it is likely that there might be lower satisfaction with the landscaping they have.

Originality

This study is original in two aspects; first being focused on the diverse dimensions of landscaping different from the studies mostly dealing with vegetation and visual quality; second being investigated the relationship amongst the satisfaction with landscaping, sense of place and the sub-components of these concepts in a post-earthquake residential area.

¹ Dr. Department of Landscape Architecture, Faculty of Architecture and Design, Van Yüzüncü Yıl University, Turkey E-mail: emelbaylan@yyu.edu.tr

² Dr. Department of Landscape Architecture, Faculty of Architecture and Design, Van Yüzüncü Yıl University, Turkey E-mail: feranasur@yyu.edu.tr

³ Dr. Department of Statistics, Faculty of Science, Van Yüzüncü Yıl University, Turkey E-mail: sehribanoglu@gmail.com

1. Introduction

Experiencing traumatic events and resultant place changing are widely accepted that residents' satisfaction with their living space, thoughts and desires to stay there has been affected by this case. In such periods, the environmental features of the obligatory household area and the opportunities to preserve connections to the previous living area can have remedial effects on the recovery from traumatic experience like earthquakes. Considering the socio-cultural and psychological conditions of the disaster victims and other inhabitants of the post-disaster housing area, landscape planning and design can contribute to create functional, safe and healing spaces and can promote making adaptation to these new living areas.

As stated by Clinton (2001), recreational opportunities, social and cultural services, accessibility to these services and a pristine environment around the households have overly favourable outcomes for victims' satisfaction of their living space, and their overall well-being. Additionally, Tavukoğlu (2008), Şensoy and Karadağ (2012), Jiang (2014), and Silver and Grek-Martin (2015) provided supporting views that regardless of being natural or designed, a landscape is relatively of paramount importance that play a role in enhancing inhabitants' life quality standards and their satisfaction with the place in which they live as well as in the rehabilitation of traumatic experience like earthquakes.

However, while trying to supply such basic needs of sustaining life as safe dwelling, food, health and security services, socio-cultural opportunities, physical and aesthetical/perceptual landscape features and conditions are often neglected in the planning and construction stages of post-earthquake housings, due prominently to lack of time and the resources (Clinton, 2001; Felix *et al.*, 2013). For example, Taş *et al.* (2007; 2010) research in Turkey showed that the inhabitants' experience with planning, design and construction of post-earthquake permanent housing is not satisfactory. Yet, given that the safe-housing needs of the disaster victims are prioritized in such cases, social outfits and related landscape design processes were taken slightly later into consideration, and being usually undertaken by the fact of ruling out the local natural and cultural conditions, and, of course, victims' preferences (Altınışık, 2007; Taş *et al.*, 2007; 2010). According to Oktay *et al.* (2012), deficiencies and inadequacies in landscaping and related services have a negative effect on the inhabitants' satisfaction, connectivity, and bonds with this new residential area.

Having experienced an earthquake, relocate permanent houses or move to another settlement can have a negative effect on the disaster victims' "sense of place" which refers to "an attitude towards a spatial setting" and defined as "the meaning attached to a spatial setting by an individual or the people" (Jorgensen and Stedman, 2001, p. 233). According to Tuan (1979) cited in Stedman (2001, p. 233), "a place is a centre of meaning or field of care that emphasizes human emotions and relationships." As such, "sense of place" is a term related closely to social and physical connections that have been formed with the living environment before the disaster or other traumatic event happens (Brown and Perkins, 1992; Fried, 2000; Miller and Rivera, 2010; Giuliani, 2014). According to Stedman (2003) and Marans and Stimson (2011), the physical and social qualities of a household are important factors that affect the "sense of place" and that personal satisfaction with the living environment.

As the result of the 7.2 magnitude earthquake in the autumn of 2011 in Van-Edremit, Turkey, town centre, central villages and Edremit and Erciş districts were devastated in terms of loss of

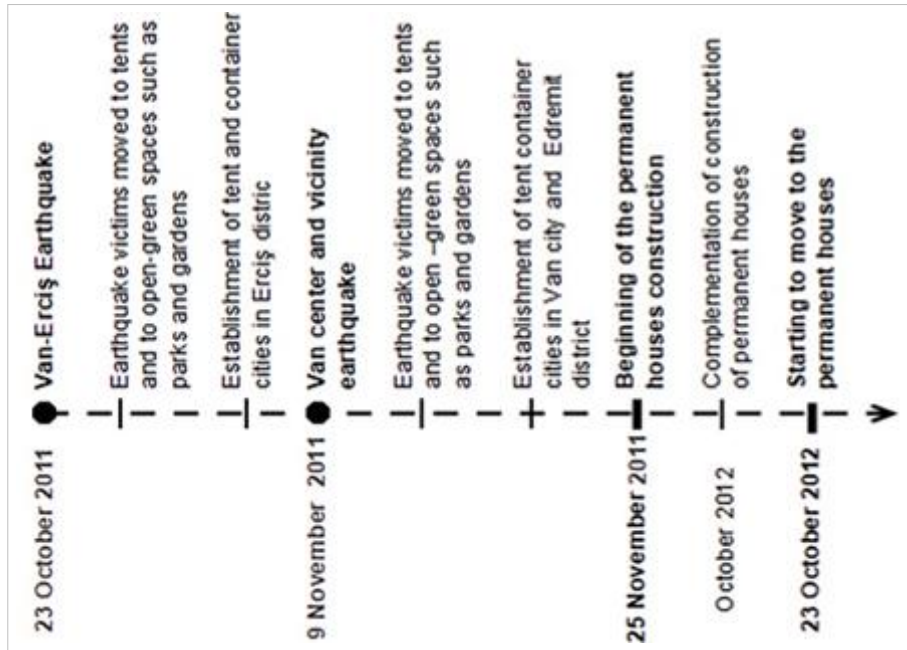
lives and property. The earthquake resulted in casualties of hundreds and injured thousands of people, in addition to damaged or destroyed thousands of households and buildings. As a result, at least 60,000 people were left homeless. After the first minutes of the earthquake, survivors were able to be sheltered in large gardens, parks, and other open areas in panic. The survivors' temporal accommodation needs were supplied by tents, which were later replaced with the container. The tents and containers were distributed to the earthquake victims were pinpointed nearby the place where they live, for example; their own gardens, in front of their houses, over the pavements, playgrounds, and even inside the cemetery. Tent-cities and container-towns were later built into locations which were next to the highways and empty areas close to the city centre in Erciş and Edremit districts of Van, being determined by Disaster and Emergency Management Administration (AFAD). At the first stage, AFAD built 13 tent cities and then 35 container towns as the second stage. A total of 29486 containers were provided that 17570 survivors were temporarily accommodated within the container towns. Yet, at the less positive side, the victims had to struggle with the severe weather conditions which came across soon after the Van earthquake. As a result, a number of challenges were emerged during and after the earthquake, such as on-going aftershocks, problems in meeting basic needs of food, heating and clean water, the delivery of aids, and the need to sustain the children' compulsory education, and permanent or temporary migration from the city (Anonymous, 2015b; Anonymous, 2018a).

Some 39 days after the earthquake, Ministry of Environment and Urbanization and Housing Development Administration (TOKI) jointly began to lay the foundations of the permanent housings in the geologically-stable areas in Edremit and Erciş districts, and a total of 17489 residences were built. As the permanent housings were completed nearly 10 months after the earthquakes, container-town residents were notified with eviction orders in October 2012. The victims living in temporal accommodation areas of Van and different parts of the country (e.g. Ankara, İstanbul, Antalya, Trabzon, Adana, Mersin etc.) were allocated to move into TOKI's permanent flats which were completed in 2012 (Anonymous, 2018a). Post-earthquake period is summarized in Figure 1 and pictures of temporary and permanent housing units are given in Figure 2.

After two earthquakes, the ruins of 21692 structures were moved from Van center to the rural places of Erciş and Edremit districts. More than 200.000 residences, workplaces, and barns were inspected for damage control. 26% of which were found to be heavily damaged, while 8% had average damages and 36% were lightly damaged. The remaining part (30%) had no damage. The permanent residences built after the earthquakes were constructed as multiple apartment blocks in accordance with the national earthquake legislation which strongly advises that the flat should have resistant to high volume earthquakes (Anonymous, 2015b; Anonymous, 2018a).

In this case study, although there are five post-earthquake mass residential areas, Edremit (Van) TOKI Mass Housing area was selected as the study area. Not least, because it is convenient reasons such as its location to the city centre (22 km distance from the town centre in Edremit district) (see Figure 3). The flats were built on an area of 2294 kilometre squares, it is now and accommodating around 6700 people. The place's altitude varies between 1700 and 1860 meters. Apartment blocks have two height variations with 12.5 meters and 18.5 meters, and a single block was built on an area of 446 m² area, each floor consists of 4 flats. Residence in these multi-story blocks were designed as one plus three rooms, which accounts for an area of 99.5 meter squares in total (Anonymous, 2015a).

Figure 1. The timeline of relocation process after Van' 2011 earthquakes



Source: Anonymous, 2015a, 2015b, 2018a.

Figure 2. A visual illustration of timeline in relocation process after Van' 2011 earthquakes



Source: Anonymous, 2015a, 2015b, 2018a.

According to land use development plan, the mass residential zone contains civic bodies like a municipal administration area, a trade area, a market area and an lay-by, along with social infrastructural places including the schools, medical, social, cultural and religious facilities and open-ground sport areas. In terms of urban technical infrastructure, 1st, 2nd and 3rd degree urban roads, pavements, a public parking lot and a gas station were constructed within the mass residential zone.

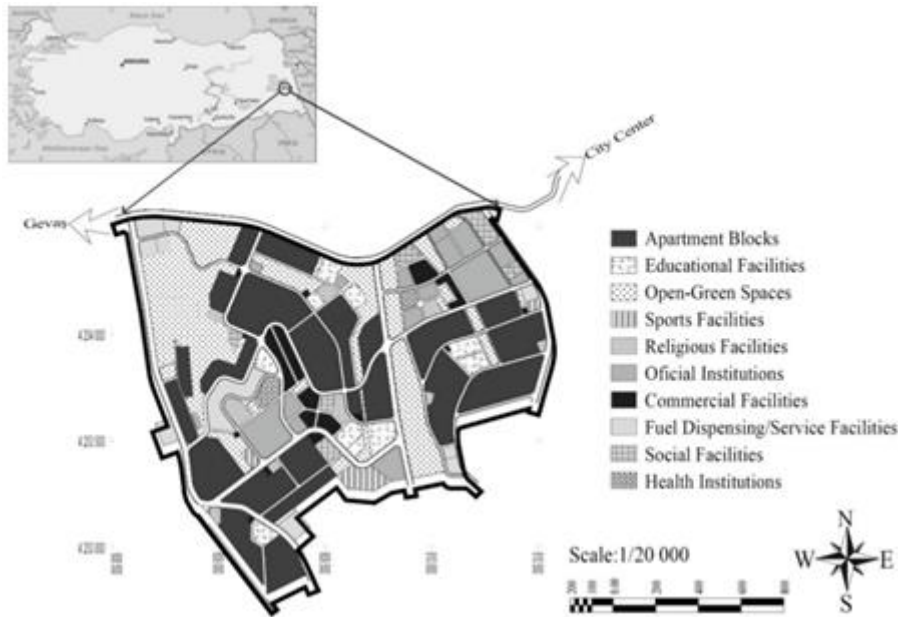
Under the classification of urban open green spaces, parks, commercial and recreation areas were created in accordance with the development plan, and some areas were selected to be afforested (Anonymous, 2015b) (Figure 4).

Figure 3. A view from Edremit TOKI post-earthquake permanent houses



Source: Anonymous, 2015a, 2015b, 2018a.

Figure 4. A map of the study area and its land use development plan



Source: Anonymous, 2015b

Although hitherto studies have demonstrated the presence of a link between feelings of satisfaction with the living area and the sense of place, further research is required to provide a greater insight into the relationship between them, particularly emphasising on the planning and landscape design processes of post-disaster housing environments. Most importantly, this study will make contribution to literature with respect the landscaping about the required landscape qualities in the areas which might promote the enhancement of well-being of the victims and other local inhabitants. In order to achieve this aim, this research intended to pursue answers to the following questions of whether the inhabitants are satisfied with the landscaping and its sub-components in their new living environment and, of whether the sense of place properties and the satisfaction with landscaping properties of the inhabitants are interrelated. All these dimensions are studied, on the case of Edremit TOKİ (Van) post-earthquake housing area. In this context, a survey including participants' personal and experiential characteristics, their satisfaction levels with the designed landscape features of the housing area and their sense of place were implemented. In this regard, participants' (1) satisfaction with various parts of landscaping and their general appreciation for the landscaping in the housing area, and their (2) place identity, place attachment and place dependence characteristics as part of their sense of place, (3) and the interrelations between the overall satisfaction with landscaping and the sense of place were examined.

1.1 Literature Review

The term “satisfaction” has different definitions, depending on the perspective and subject. It is therefore the fact that when the place is matter, it was nicely defined as “the utilitarian value of a place to meet certain basic needs” by Lee and Guest (1983, p. 234). These multidimensional and utilitarian values include the perceived quality of physical and socio-cultural characteristics and services of a place through affective, cognitive, experiential and behavioural evaluations for meeting residents’ needs (Canter, 1983; Parkes *et al.*, 2002; Stedman, 2002; Bonaiuto *et al.*, 2006; Ramkissoon *et al.*, 2013). In this regard, large number of studies in the literature of residential satisfaction rest on two fundamental approaches: “actual-aspiration gap approach” and “purposive evaluation approach” (Ibem and Aduwo, 2013).

It is a fact that people might prescribe “ideal standards” or “reference points” towards various parts of a residential area, based on their personal needs, experiences and desires. In case of compatibility of the residential area with such reference places or conditions, the people inclined to improve their satisfaction. According to this approach, the gap between the people’ expectations and existing conditions can be considered as a mean to measuring the people’ satisfaction with the place. As such, an individual’s evaluation of a place depends on the physical and social qualities of place, the reference points regarding the place qualities, the personal meaning attributed to the place, and personal needs, preferences, expectations and desires (Galster, 1985; Ibem and Aduwo, 2013). Finally, Galster (1987) stated that according to actual-aspiration gap approach, residential contentment has influence over an individual’s attitudes on leaving or staying the place.

According to “purposive evaluation approach”, Canter (1983) and Galster (1985) emphasised that people expects a place and its components which might allow them to actualizing their life goals and supply their needs. With this approach, residential satisfaction was measured by the fact of how the people’ life expectations were met and how far the place help in reaching their goals. It should, meanwhile, be noted that experiences and ideas on various scales or parts of a given place are in interaction with each other. As an example, happiness with plants or a river in a small part of a place may enable the residents to gain the satisfaction of whole place (Canter, 1983; Ibem and Aduwo, 2013).

While measuring the level of satisfaction in various residential areas, the research were also conducted on the subject of whether the residences and their physical and socio-cultural landscape qualities could help meet residents’ demands, expectations and desires (Canter and Rees, 1982; Oktay *et al.*, 2012; Parkes *et al.*, 2002, Kahana *et al.*, 2003; Şensoy and Karadağ, 2012; Ibem and Aduwo, 2013; Ibem *et al.*, 2017). The findings of these studies showed that various geographical regions, scales and scopes, natural landscape features (e.g. the scenery/aesthetic), climate, vegetation and naturality, and built landscape characteristics (e.g. parks, recreational areas and facilities, parking areas, and street furniture), are amongst the factors that affect the satisfaction of a residential area. The relationships between these factors and the satisfaction of residence have been evaluated under various topics, but there is still room to be studied in a holistic way in which the integrity and multidimensionality of place and landscape have been discovered.

Additionally, the literature has also focussed on the interrelationships between the satisfaction of the residential area, sense of place, personal and experiential properties such as age, dwelling period, ethnical properties and social relationships (Lee and Guest, 1983; Galster, 1987; Parkes *et al.*, 2002). Findings showed that personal experiences and characteristics can also make positive/negative impact on an individual's relationship with a place. Nevertheless, there is still a gap in the relevant field of literature that the relations between sense of place and satisfaction with built landscape among inhabitants of post-disaster housing areas have been underwritten.

People are known to be unconsciously built emotional, cognitive and actual bonds with the place they live within their lifetime (Bonaiuto *et al.*, 2006). The connections with the living place, in this regard, present an entangled and interconnected structure that include individuals and their cognitive processes such as beliefs, values and preferences with which they identify themselves, as well as their behavioral and emotional connections with the place (Scannell and Gifford, 2010). According to Stedman (2003), physical environmental features of a place have significant effects on the development of "sense of place" and "place satisfaction" within the context of interconnected structure.

The term "a sense of place" was originally coined by Yi-Fu Tuan. Tuan (1977) postulates that, "What begins as undifferentiated space becomes place as we get to know it better and endow it with meaning" (p. 16). He argued that experiences of places through all the senses involve perception, cognition, and affection. Thus, "People demonstrate their sense of place when they apply their moral and aesthetic discernment to sites and locations. (...) However, other than the all-important eye, the world is known through the senses of hearing, smell, taste, and touch. These senses, unlike the visual, require close contact and long association with the environment" (Tuan, 1979, p. 410). As such, sense of place involves an interaction of people with a reference setting that results in meanings, attachment, satisfaction, knowledge, behaviours and actions (Stedman, 2002; Nielsen-Pincus *et al.*, 2010).

Tuan was referred to places which were lack of a "sense of place" as "placeless" or "inauthentic." Relph (1976, p. 90) defined the concept of "placelessness" as "a weakening of the identity of place to the point where they not only look alike but feel alike and offer the same bland possibilities for experience" (cited in Liu and Freestone, 2016). The term "placelessness" was used to describe the ubiquitous landscape —"a flatscape, a meaningless pattern of buildings" by Relph (1976) as a result of homogenization through modernization and globalization forces those neglect the local characteristics of societies and landscapes (cited in Liu and Freestone, 2016). According to Relph (1976), modernization and globalization forces such as mass communications, mass culture, centralized economic power and centralization of planning culture have resulted in the emergence of "placelessness" through transformation and loss of the meaning of place amongst the people as well as through changes in the people' attachment to place and sense of place (Arefi, 1999; Liu and Freestone, 2016).

As suggested by Jorgensen and Stedman (2001, 2006), in this paper, under the umbrella term of "sense of place" covering cognitive, affective and behavioural domains of human–place relationships and the notions of place attachment, place identity and place dependence was preferred to use in order to investigate the people' relations with their living environment. As stated by Stokols and Shumaker (1981), Stedman (2002), Ramkissoon *et al.* (2013) and Smith

(2011), components of residents' sense of place, like "place identity", "place attachment" and "place dependence" are significantly associated with, and have positive influence on, feelings of satisfaction with the place. Place identity, which is a part of sense of place, refers to "dimensions of self that define the individual's personal identity in relation to the physical environment by means of a complex pattern of conscious and unconscious ideas, beliefs, preferences, feelings, values, goals and behavioural tendencies and skills relevant to that given environment" (Proshansky, 1978, p. 155). Duncan (1981) states that a given environment's physical components like housing, infrastructure and services could be considered as indicators of personal and social identity, since they are parts of cultural and social structure (cited in Lawrence, 2008).

Today's landscapes are a reflection of individuals and society experiences which derived from human-nature interaction and socio-cultural characteristics such as beliefs, values, social relations and institutions. In this multi-dimensional space, as a product of urban planning, architecture and landscaping, housing areas are also a part of the landscape that can be thought as a reflection of the communities' identity (Greider and Garkovich, 1994; Miller, 2008). Besides the place identity, residence, residential areas and their environments are amongst the most important components of place attachment and place dependence for individuals and the society. "Place attachment", which forms affective dimension of sense of place, is defined as positive emotional attachment that develops an idea as a result of interaction between a place's physical and social properties and the people' living experience (Fried, 1963; Altman and Low, 1992; Williams *et al.*, 1992; Fullilove, 1996; Jorgensen and Stedman, 2001). The third component of sense of place, the notion of "place dependence", is described as the strength of connection between a person and the place that forms as a result of the opportunities which the place offers to help reaching their personal objectives and life expectations. In this form of connection with a given place, the people always compare the differences in benefits of being there and those of being on alternative places. Even all of the alternatives have only negative sides; it is not necessarily true that the best one would be preferred (Jorgensen and Stedman, 2001).

According to Manzo (2005) the people' sense against the place can be changeable as either "positive" or "negative". For example, Guiliani (2003), Scannell and Gifford (2010) stated that people having experienced traumatic events might feel negative emotions towards the place. Also as stated by Fried (1963) and Brown and Perkins (1992), forced and involuntary displacements are regarded as disruptions on place attachment. Interestingly, Anton and Lawrence (2014) asserted that traumatic events such as earthquake strengthen the connection of people with the place. Twigger-Ross and Uzzell (1996) express that, in face of unfavourable situations and risks about the physical features of the residential place, people with stronger place attachment are less likely to move away compared to those who have weaker place attachment. According to Hunter (2005), the people' temporary or lasting migration behaviours after disaster events develop according to their social, demographical and economical characteristics, along with the expectation-value relationship they attached to the place where they live. However, it is also stated that the people can be satisfied with the place they live without being strongly attached, and vice versa (Stedman, 2003). On the other hand, Stedman (2003) found that where the people indicated high level of satisfaction with the place tend to stay longer, those with lower level of contentment inclined to moving out from the place in a

rather shorter period of time. After all, satisfaction with the place is potentially an important factor behind the length of stay in a particular place.

However, there is a need for further research on the people, who live in the post-disaster houses, satisfaction with built landscape and sense of place and on the relationship between those two important issues in order to inform the landscape planning and designing process which might contribute creating healthy and sustainable communities. After all, both the potential benefits and negative outcomes of place satisfaction and sense of place outlined above, although the successful construction of permanent post-earthquake houses after the Van's devastating earthquakes in 2011 seems to be robust for any potential earthquake in the region,, there is still further issues to be discovered in the study area such as; a) whether the inhabitants in this new housing areas are satisfied with their living environment, b) whether the qualities of the housing environment help to develop a sense of place among the inhabitants. For this study, the proposed model including relationship between the satisfaction of the place and sense of place and all associated sub-dimensions of these two main constructs is theoretically presented in Figure 5.

The model is tested using the data collected from the survey participants that are living in Edremit (Van) TOKI Post-Earthquake Housing Area in Van, Turkey. In this context, this article focuses on the human-residential environment relationships on the case of post-earthquake housing area that has been built after the Van devastating earthquakes in 2011. More specifically, the study examines three focal issues: first how do the people satisfy with the place where they live regarding the area's landscape design; secondly, whether there is relationship between their satisfaction with designed-landscape and the sense of place; thirdly how do the way of the people experiencing a devastating earthquake attitudes towards the new living environment. In order these issues to be discovered, the local people' experience, personal characteristics, the level of satisfaction with landscaping, and the level of sense of place were investigated in addition to providing definition for the inner relationships amongst the given concepts.

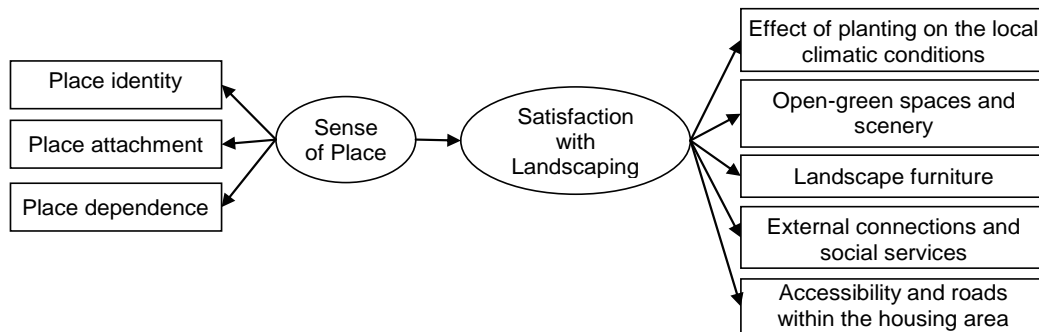
2. Methods

2.1 *Data collection and instruments*

Respondents and survey procedure

The main material of the study is comprised of the TOKI- post-earthquake housing area of Edremit district of Van and the inhabitants living in these housings. The data used in this research were collected from 18 years old and older participants who live in the housing area and who were voluntary to filling up the questionnaire which implemented in the dates between May and July of 2015. According to the Civil Code in Turkey, every individual over 18 years old have complete authority and responsibility in terms of juristic acts. Based on this fact, questionnaire was directed to every individual available either 18 years of age and over this age, without any restriction of gender, education level, race, or economic status.

Figure 5. Proposed theoretical model for positive relations between Sense of Place and Satisfaction with Landscaping



Source: By authors

The questionnaire includes five sections comprised of statements about satisfaction with different features of landscaping in the housing area, the contexts of sense of place (place identity, place attachment and place dependence), the willingness to stay in the household and the reasons of moving into the housing area as well as some socio-demographical information about survey participants. An earlier literature referring to satisfaction with the landscaping (e.g. quality of life, environmental quality, residential and satisfaction) were taken reference while designing the relevant items in the survey (Lansing and Marans, 1969; Bonaiuto *et al.*, 2003; van Kamp *et al.*, 2003; Marans, 2003; Ibem and Aduwo, 2013; Jurkovič, 2014; Hassinee *et al.*, 2014). Within this context, the study investigated the satisfaction with the landscaping, through 21 items related to the satisfaction of the architecture and town-planning, organization of roads and accessibility, welfare services, environmental health, green areas and recreational services, landscape furnishing, the effect of planting on local climatic features, and visual/scenery characteristics of surrounding natural landscape which are widely regarded as sub-categories of landscaping in the housing area. In addition to the statements about satisfaction with landscaping, 12 statements adapted from earlier studies (Jorgensen and Stedman, 2001; 2006) were also used to measure the sub-dimensions of sense of place, namely place identity, place attachment and place dependence (Table 1). In the survey, respondents were asked to rate their level of agreement with the both scale items according to 5-point Likert type scale where 1 is “strongly disagree” and 5 is “strongly agree.”

The survey was conducted via face-to-face with the volunteer inhabitants, at their houses, which took approximately 20 minutes to complete. In some cases, questions were asked with the help of local Kurdish native speakers to some Kurdish dwellers, as they did not necessarily know Turkish language. Of 400 questionnaires distributed, a total of 235 questionnaires were involved into the analysis process, accounting for 58.8 % response rate. The sample size represents 3,5 % of the total housing population. Due to the lack of previous descriptive data (e.g. education, income), the sampling was calculated based on the type II error rate. To avoid from the type II error, the confidence level of the sampling was chosen at the level of 90 percent. While determining the sample size, the formula was used as follows:

$$n = \frac{N \times t^2 \times p \times q}{d^2(N - 1) + (t^2 \times p \times q)}$$

Note: N =Universe size; n = Sample Size; p =the ratio that possibility of investigated phenomenon to be occurred; q = the ratio that possibility of investigated phenomenon to be not occurred; t =the value in the t table depend on the sampling error ratio and its degree of the freedom; d =ratio of the sampling error.

Table 1. Scale items for the dimensions of sense of place

Place Identity (PI)
Everything about this housing area is a reflection of me.
This housing area says very little about who I am.
I feel that I can really be myself at this housing area.
This housing area reflects the type of person I am.
Place attachment (PA)
I feel secure being in this housing area.
I feel comfortable being in this housing area.
I really miss this housing area when I'm away from it for too long.
I feel happiest when I'm at this housing area.
Place dependence (PD)
This housing area is the best place for me to live.
For doing the things that I enjoy most in a living area, no other place can compare to this housing area.
I am not satisfied living here to do things I most like to do in my living area.
There are better places to live than in this housing area.

Source: Adapted from Jorgensen and Stedman (2006).

According to calculation of this formula, when p and q values are accepted as 0,5, the number of required minimum questionnaire is 64. However, although this number of survey is adequate for the variance tests and the multi-factor analysis, the ratio of respondents to variables should be at least 10:1 as stated by Kline (1994). It is therefore the fact that, according to the Likert type 21 statements, the minimum questionnaire collected should have been 210 questionnaires that a total of 235 usable questionnaires were achieved at the end of the fieldwork. Missing values, outliers, and distribution of all measured variables in the completed questionnaire forms were examined to purify the data and reduce systematic errors.

2.2 Data analyses

First of all, descriptive statistics was used to analyse the profiles of the respondents. A reliability analysis (namely Cronbach's alpha) was run to see whether the scale items (satisfaction with landscaping and sense of place components) were reliable, using the SPSS version v24 (IBM Corp., Chicago, IL, USA) statistical software program. At the second stage, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) was performed to test if the data suitable for the factor analysis. Since KMO value was over 0.70 for both of the scales, the items of the scales were found to be moderately suitable, and adequate to run factor analysis.

The scale items to measure the survey participants' satisfaction with the landscaping in the housing area were designed according to the purpose of this study. In this context, because there was no specific factor or component structure that has defined in advance, in order to define the factor structure of the satisfaction with landscaping scale, first of all an exploratory factor analysis (EFA) with analysis of principal components and following Varimax rotation method were employed. The identified factor components were named according to the factor loadings and related literature.

In order to define the validity of the questionnaire items related to the sub-divisions of both satisfaction and sense of place, the exploratory factor analysis was separately conducted for each sub-section. The EFA is a commonly used analytical method in quantification models. According to Jöreskog and Sörbom (1993), EFA was used to verify the accuracy of the constructed model by using the results of previous studies.

To assess factor validity, the overall fit of each of the confirmatory factor analysis models was assessed using the ratio of chi square according to the degrees of freedom (χ^2/df), a goodness of fit index (GFI), a comparative fit index (CFI), a normed fit index (NFI) and a root mean square error of approximation (RMSEA). These six indicators (χ^2/df , RMSEA, NFI, CFI, GFI) range from 0 to 1, with values closer to 1.00 indicating a good model fit (Schermele-Engel *et al.*, 2003).

Structural equation modelling

To test the proposed model for the relationship between sense of place and satisfaction with landscaping in the study, structural equation modelling (SEM) was employed. SEM is a comprehensive statistical approach to test hypotheses of relationship between observed and latent variables.

In this study, the observed variables (PI, PA, PD, effect of planting on the local climatic conditions (EPLC), open-green spaces and scenery (OGS), landscape furniture/ equipment (LF), external connections and social services (ECS), accessibility and roads within the residential area (ACR)) were placed within the scale items of the survey, and the latent variables were represented by the sense of place (SoP) and satisfaction with landscaping (SwL). These eight variables were identified through the explanatory factor analysis that was initially run through 21 scale items of satisfaction with landscaping and for 12 scale items of SoP. Accordingly, SEM was performed using R program to test the eight variables representing the satisfaction with landscaping and sense of place.

2.3 Limitations

The socio-cultural structure and literacy level in the housing area were main restrictions that limited to increasing the number of surveys from the potential participants. This is an influencing factor on the analysis and results. There is, also, a caveat that being a very newly built housing area with many inadequacies in the post-earthquake period, the landscaping in the area was not in the projected conditions, particularly, for its different components such as landscape furniture, social services and planting.

This issue underlines the fact that there is a need for further research in the study area. As such, iteration of similar studies in the following years might investigate interactions between personal and such experiential properties as age and dwelling period-, sense of place, and satisfaction levels and the improvements in the housing area, which may give more elaborative results as long as they are applied within the same area, and if possible, with larger target group.

3. Findings

3.1 Socio-economic characteristics of the respondents

The earthquakes have caused a decrease in the city's population with 35% compared to those of 2010, yet returning families after the quakes and migration from near cities and districts resulted in a recovery of city population from 2012 (Alaeddinoğlu *et al.*, 2016). Total 2011 population in the Edremit district was 24.677. Of which, while 12.408 were male, 12.269 were female. Only three years later, when the study took place, the total population of the district reached to the total of 118.768. Of which, 59.894 were male and 58.892 were female. In the study area, the total population of the neighborhood was 5883 in 2012, yet later the number increased to 6700 in 2015 at the time of research (Anonymous, 2018b).

The demographic features of the survey respondents are presented in Table 2. 66% of the survey participants were female and 81% being married, while 56% were in the 26-40 age brackets. 45 percent for over 30 years resided for 11-30 years in the city of Van, while 77% of the participants were born in the province of Van.

Of 67% respondents, length of residence in the study area was between 13-24 months. Some 51% of participants stated that the reason for their move in the housing area was the earthquake, while economic concerns and other reasons were stated by the remaining respondents (49%). A question asking if they have had an opportunity whether they would move out to another place with the same properties as this one, 45 percent stated they would like to move to a place within the city, while 24 percent expressed a preference of moving to another city.

The overall mean of satisfaction levels (SwLm=2.83) with the landscaping of the housing area showed that the survey participants are either undecided or neutral. The findings for the overall mean level of the sense of place (SoP) of the survey participants-which was obtained from evaluation of the mean values of place identity, place attachment and place dependence components- is a value of SoPm= 3.81. When sub-dimensions in the sense of place were separately examined, results revealed that overall mean values for place identity is 3.71, for place attachment is 3.65 and for place dependence is 4.07. These results indicate that the survey respondents tend to be agreeing in a way in which they have bonds with the housing area. The informal conversation with the survey participants have also provided a detail that the kinship and neighborhood relationships with people in Van, and the ability to sustain these relationships in the new housings had a positive influence on the place identity and the individuals' attachment to the location. Another factors reinforcing the respondents' the sense of place in this new location were the visual, functional and iconic presence of landscape elements such as the Van Lake, Ereğ Mountain and the Citadel of Van, which helped them to feel like they were home.

3.2 Survey items reliability

According to the analysis, a Cronbach Alpha reliability of both the measurement scales is higher than the acceptable level of 0.7. Table 3 shows that the Cronbach's alpha coefficients for the scales have acceptable reliability ($0.7 \leq \text{Cronbach's alphas} < 0.8$). This proves that the research instrument is reliable for the analyses process. Having Satisfaction with landscaping scale was

subjected to an exploratory factor analysis, five factors were clearly separated. The results of the assessment for the overall fit of each of the confirmatory factor analysis model showed ($\chi^2=4.08$, $df:4$, $CFI = 1$, $GFI = 0.99$, $NFI=0.98$, $RMSEA = 0.009$) that the Satisfaction with Landscaping scale was acceptable and had a goodness of fit model on the basis of RMSEA, GFI,CFI and a goodness of fit on the basis χ^2/sd .

Table 2. Respondents' demographic and socio-economic characteristics

Variable	Level/Category	Frequency	Percent
Gender	Women	150	66.1
	Men	77	33.9
	Total	227	100.0
Age	18-25 years	39	17.1
	26-40 years	128	56.1
	41-55 years	40	17.6
	over 56 years	21	9.2
	Total	228	100.0
Marital Status	Married	184	80.7
	Single	43	18.9
	Other	1	0.4
	Total	228	100.0
Place of Birth	Van	178	77.4
	Batman	6	2.6
	Bitlis	6	2.6
	Hatay	7	3.0
	Other	33	14.4
	Total	230	100.0
Ethnic origin	Turkish	81	34.5
	Kurdish	138	58.7
	Arabian	6	2.6
	Other (Circassian, Persianetc)	10	4.2
	Total	235	100.0
Length of residence in Van	1-10 years	37	17.1
	11-30 years	82	37.8
	Over 30 years	98	45.1
	Total	217	100.0
Reason of moving to the housing area	Earthquake	115	51.1
	Economic conditions and other	110	48.9
	Total	225	100.0
Length of residence in the housing area	0-6 months	29	12.4
	7-12 months	48	20.4
	13-24 months	158	67.2
	Total	235	100.0
Number of children	None	80	35,4
	1 child	53	23.4
	2 or 3 children	39	17.3
	4 or 5 children	42	18,6
	Over 5 children	12	5.3
	Total	226	100.0
If you could move to another place with the same standards / conditions, where would you move to?	I would continue live here	52	22.9
	I would move in the centre of Van	102	44.9
	I would move to another city	54	23.8
	Undecided	19	8.4
	Total	227	100.0

Source: Survey results by SPSS v24.

Table 3. Validity and reliability of satisfaction with landscaping and sense of places scales

Factors	KMO	Cronbach Alfa	R ²
Satisfaction with the designed landscape (SWL)	0.746	0.712	0.47
Sense of Place (SoP)	0.710	0.831	0.75

Source: Survey results by SPSS v24.

The variance (R²) of these factors in the scale explains 47% of total variance. As a result, five factors were labelled as “Effect of planting on the local climatic conditions” (EPLC), “Open green spaces and scenery” (OGS), “Landscape furniture” (LF), “External connections and social services” (ECS), and “Accessibility and roads within the residential area” (ACR) according to factor loadings levels and to the literature. Table 4 shows the identified factors and their factor loadings.

As illustrated in the Table 4, two items have lower factor loading than 0,5, whereas the remaining have higher factor loadings than 0,5. Since these two items have very close factor loadings (0,473 and 0,438) to 0,5, it has been decided to include these items into the factor analysis.

Table 4. Major loadings for each factor of satisfaction with landscaping items: Principle Components Analysis (Varimax Rotation Matrix)

Factor	Measured Item& Codes	Factor Loadings				
		1	2	3	4	5
1. Effect of planting on the local climatic conditions (EPLC)	The landscape planting in this housing area is pleasing because the plants create shade in summer	,845	,024	,146	,081	-,061
	The tree planting in this housing area is pleasing because the trees limit the impacts of winds	,817	,028	,187	,161	,043
	I am satisfied with the safety of pedestrians in frost days in this housing area	,743	,054	,017	,257	,247
	The number of the lighting furniture and the lighting in this housing area are sufficient	,522	,457	-,173	,189	,006
	The number of sitting benches are sufficient in this housing area	,522	,457	-,173	,189	,006
2. Open-green spaces and scenery (OGS)	Open-green spaces in this housing area are satisfactory for spending time with family members and friends	,075	,663	,298	-,049	,255
	The number of playgrounds are sufficient	,008	,640	,461	-,002	,137
	In this housing area, distance between the blocks in this housing area are pleasing	,056	,592	-,002	,143	,090
	Nature beauty and scenery is pleasing	,040	,576	,184	,135	-,030
3. Landscape furniture/ equipment (LF)	The number of gazebos are sufficient	,053	-,001	,839	,134	,113
	I am satisfied with the green areas and parks in the housing area	,096	,239	,766	-,085	,033
	The number of trashcans are sufficient	,261	,078	,616	,095	,271
	This housing area is pleasing because there are opportunities to benefit from winter sun	,015	,157	,473	,031	-,094
4. External connections and social services (ECS)	This housing area is pleasing for being far away from city crowd	,133	,030	-,008	,720	,086
	Safety of connections to parking lots and houses are satisfactory for disabled and elderly residents, and other people in this housing area	,100	,257	,166	,711	,058
	Accessibility from my house to the city centre is satisfactory	,201	,424	-,129	,651	-,177
	The location of my house is pleasing	,277	-,137	,129	,616	,026
5. Accessibility and roads within the residential area (ACR)	Social infrastructure (e.g. school, market place, health care centre) is sufficient	,038	,388	,009	,438	,069
	Vehicle roads are sufficient in the housing area	,100	,144	,005	,011	,846
	Pedestrian roads and pathways are sufficient in the housing area	,080	,342	,029	-,016	,804
	The parking lots are sufficient	,022	-,249	,377	,220	,551

Source: Survey results by SPSS v24.

The first factor represents the satisfaction with planting in the hard local climatic conditions. The highest loading items involved in this factor explain the satisfaction with the planting which means their positive effect on protection from disturbing climatic features. The second factor represents the satisfaction with open-green spaces and scenery in the housing area. The highest loading items in this factor suggest the importance of open-green spaces for social bonds amongst the respondents. The third factor represents the satisfaction with landscape furnishing in the housing area. The highest loading items in this factor suggest the importance of gazebos for respondents that provide a room to spend time outside of the flat with family members and neighbours. The fourth factor represents the satisfaction with the location of the housing area and its connections with the city centre. The highest factor loadings suggest the satisfaction with being in a salient environment. The fifth factor represents the satisfaction with the connections for pedestrian roads and vehicles within the housing area. In this factor, highest loading items include the importance and satisfaction with vehicle and pedestrian roads, and pathways.

In order to test the hypothesis of if there is a relationship between the sense of place and satisfaction with landscaping, first, the relations between the components of these two concepts were determined through confirmatory factor analysis. The table 5 provides the details of the result of the Principle Component Analysis which was performed to achieve the aim given. As illustrated in Table5, effect of planting on the local climatic conditions factor appears to be the most influential factor with a rate of 60% communalities and a factor loading of 77.5% in shaping the satisfaction with the landscaping in the research area. The place dependence factor was found to be the most influential factor with a rate of 75% communalities and a factor loading of 86% in the sense of place.

Table 5. Factors of satisfaction with landscaping and sense of place

Factors	Communalities	Factor loading	Factor Loading
EPLC	,602	,775	
OGS	,453	,673	
LF	,401	,622	
ECS	,316	,551	
ACR	,595	,770	
PI	,699		,836
PA	,790		,882
PD	,751		,863

Source: Survey results by SPSS v24.

3.3 Construct relationships

The proposed structural model was tested by structural equation modelling (SEM) using R 3.4 program, which included a test of the overall model as well as individual tests of the relationships amongst the latent constructs. Model estimation resulted in a model fit as demonstrated by Table 6 and regarded as acceptable according to the goodness of fit model indexes.

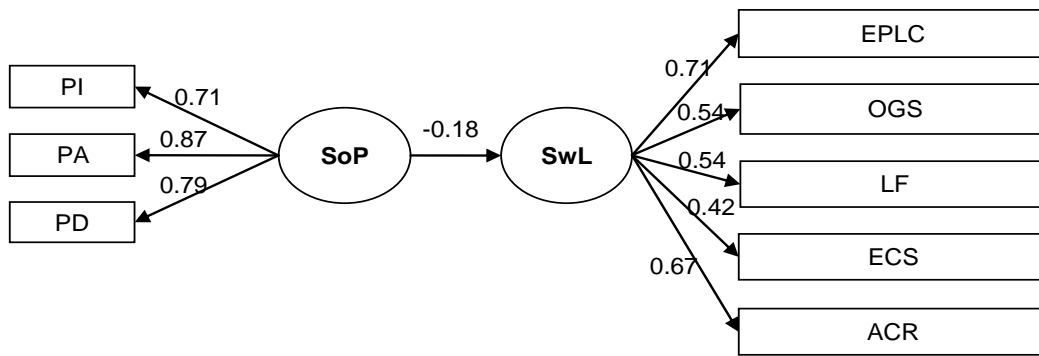
Table 6. Goodness fit indices results for the proposed structural equation model

Model	Chi-square	df	RMSEA	GFI	CFI	NFI	NNFI	RNI	IFI
Proposed model.	31.263 (Pr(>Chisq) =0.037)	19	0.053	0.967	0.973	0.937	0.961	0.973	0.974

Source: Survey results

As illustrated in Figure 6, having the model iterated 25 times, the prediction levels for the factors were obtained. The statistical analyses showed that that the model was not supported by the observed data. Rather, a negative relationship was observed between satisfaction with landscaping and sense of place ($\gamma = -0.18$) which was simply rejecting the hypothesis tested in the model. Figure 6 and Table 7 shown that all factors of satisfaction with landscaping were predictors of the overall satisfaction with landscaping at different levels. Satisfaction with the effect of planting on local climatic conditions had the highest positive effect ($\lambda_1 = 0.71$) and the satisfaction with the accessibility and roads within the housing area ($\lambda_5 = 0.67$) also had a high positive effect whereas the satisfaction external connections and social services ($\lambda_4 = 0.42$) had the lowest effect on the level of overall SwL. It was also observed that sense of place construct significantly explained by the sub-dimensions such as the place attachment ($\lambda_7 = 0.87$), place dependence ($\lambda_8 = 0.79$), and place identity ($\lambda_6 = 0.71$).

Figure 6. Residents' Sense of Place and Satisfaction with the Landscaping Measurement Model R 3.4 Output



Source: Survey results

Table 7. Factor values for the Sense of Place and Satisfaction with The Landscaping Measurement Model

Factor Name	Factor Loading	R ²	Z Value	Pr(> z)
PI	0.7120	0.50	11.433	2.838
PA	0.8713	0.76	14.473	1,785
PD	0.7816	0.61	12.727	4.173
EPLC	0.7133	0.51	10.249	1.195
OGS	0.5427	0.30	7.595	3.057
LF	0.5479	0.30	7.676	1.631
ECS	0.4270	0.18	5.829	5.568
ACR	0.6657	0.44	9.519	1.747
SoP<->SwL	-0.1754		-2.163	3.051

Source: Survey results.

4. Discussion and implications

This study aims to examine how the people who experienced a large scale earthquake feel about their new living environment, questioning how satisfaction with landscaping related to sense of place on the case of a post-earthquake housing area in the Edremit district of Van. While most studies on satisfaction with landscape and on sense of place were about urban residential areas, natural areas and their visitors, very few focused on the relationships between

post-disaster residential housings and their inhabitants' sense of place and, their satisfaction with landscaping and its different aspects. This study is, therefore, original in two aspects; first being focused on the diverse dimensions of landscaping different from the studies mostly dealing with vegetation and visual quality; second being investigated the relationship amongst the satisfaction with landscaping, sense of place and the sub-components of these concepts in a post-earthquake residential area. Therefore, this research have provided strong evidences that inform the housing environment design, landscape research and landscape architecture practice and that shed lights on the weaknesses and effective factors of landscaping in inhabitants' satisfaction with post-earthquake built landscape and on their interactions with the sense of place. After all, data on satisfaction levels with landscaping in the post-earthquake housing area in Edremit district of Van and the inhabitants' sense of place were gathered, from the dwellers of the housing area that was built after the 2011 earthquakes via a Likert type questionnaire and then analysed, performing several statistical techniques. The results showed that the residents in the housing area have diverse socio-cultural background and by no means confined to the earthquake victims. This suggests that the housing area meets the housing needs of different groups, especially of the low income families, which is consistent with the findings in the work of Tester *et al.* (2011). According to the findings; participants' satisfaction with landscaping is approximately either neutral or undecided. Additionally, according to the actual-aspiration gap approach, the results for the overall SwL in the housing area show that the overall landscaping in the area is lacking and inadequate in some qualities compared to areas that inhabitants consider as reference points.

The results of the analysis for the sense of place and its components show that the respondents have tend to build bonds with their new residential area ranging from emotional to functional at different levels, which are higher than those of SwL. However, if any further opportunities had emerged, the preference of half of the respondents would be moving into the city centre. This suggests that the respondents wish to have more connection with the city, continue or rebuild connections with their pre-disaster lives as part of their identity which is in accordance with the result of previous studies (Hidalgo and Hernández, 2001; Manzo, 2005). Nevertheless, the results confirmed that this new residential area also slightly supports the respondents' attributes to the place identity. According to the field observations and interviews with the questionnaire respondents, this could be related to living together with the neighbours who share the same earthquake experience along with similar socio-cultural and ethnical background as well as could be related to still living in the same city which is an important part of the respondents' place identity. This suggests the need for further research on social bonds such as community attachment and its influence on place satisfaction and well-being amongst disaster victims with a focus on the landscaping strategies that have potential to support community attachment.

In accordance with Jorgensen and Stedman's work (2001), participants' decision to stay in the post-earthquake housing area suggests that they find this residential area to be the most suitable to their current conditions (considering their economic limits and inabilities). This is also supported by the high level of determined place dependence amongst the respondents even the unfavourable features of the housing area compared to the availability of other dwelling options. This may also be related to experienced threats or losses with their homes which remind the respondents the importance of this new housing and, in turn, result in a high place dependence, which is aligned with the previous discussions of the researchers (Proshansky *et al.*, 1983; Relph, 1976; Anton and Lawrence, 2014). Compared to place identity and place dependence, the respondents' higher level of place attachment with their new dwellings can be explained by

the development of positive emotions towards the new residential area. According to the results, this is mainly related to the satisfaction with their demand of security and to the feeling of comfort based on the physical properties of the housing area after the traumatic earthquake experience.

Since there are a number of landscaping components and a number of variables influencing the SwL, exploratory factor analysis was performed to determine the variable groups' satisfaction with landscaping and the influences of these variables on the SwL. As the KMO value for the satisfaction scale, explained variance of the factors and factor loadings then considered that the scale is a valid instrument. Explanatory Factor analysis performed in this study was particularly helpful, not least because many items in the survey were gathered in the more meaningful and conceptualised forms which allowed us to make judgement for satisfaction with landscaping at multiple scales. This result also shows that the landscape is a multidimensional concept as underlined in previous landscape research. The detection of correlations coefficients and different factor loadings in the SwL also suggests that experiences with different aspects of landscaping are interrelated with each other and are contributing to each other as noted by the work of Canter (1983) on satisfaction with place. Therefore, the scale developed for the SwL in this study, would be preferred by the researchers who want to measure the SwL in different contexts.

Additionally, when the participants' satisfaction levels with different factors of landscaping is evaluated according to the purposive evaluation approach, effect of planting on the local climatic conditions are found to be the most influential factor on the overall satisfaction with landscaping in the rather extreme continental climate conditions due to geographical location of the housing area. The factor analysis results also reveal that the external connections and social services are found to be inadequate in supplying the demands of inhabitants in remote housing area experiencing severe weather conditions at the different times of the year. The distance between the city and the housing area and, the inadequacies of accessibility in particular, are also one of the reasons of intention of moving into the city depending on emerging opportunities. These results show parallels with the studies (Fried, 2000; Hunter, 2005; Bouraoui and Lizarralde, 2013) which state that the accessibility features and the distance from the facilities and from the inhabitants' former living places are important factors in place satisfaction.

According to the SEM results, the proposed model based on the hypothesis, which states that "there are positive relationship between the sense of place and satisfaction with landscaping," was not supported. In contrast, a negative relationship was found between the satisfaction with landscaping and sense of place. This suggests that when the respondents' sense of place has increased, it is likely that there might be lower satisfaction with the landscaping they have. Although these results do not coincide with the findings of the studies by Stokols and Shumaker (1981), Smith (2011) and Ramkissoon *et al.* (2013), however, this result is in accordance with the Stedman's work (2003) on the fact that without being strongly satisfied, people can still be attributed to the place in which they live. This again suggests that when residents have developed strong bonding with their living place, their judgements might be offering detail and focused on the inadequacies and weaknesses in the landscaping with a demand for living in a better environment and also with a comparison of the ideal or reference landscaping along with the intention to continue living in their current living place.

When the mean values of place attachment and place dependence and, the factor loadings of these in the sense of place are considered together, it appears that the satisfied physiological needs such as security and comfort are the characteristics of the built environment which supports the sense of place as opposed to satisfaction with landscaping. This result may also indicate that the landscaping qualities does not hold much representative value within the context of cultural value systems and does not have influencing effect on the respondents' building bonds with the living place. On the other hand, this situation might be explained by the fact that the housing area in this case was constructed in a rural context. Indeed, as pointed out in Marans (1976), landscaping would be more valuable in metropolitan/urban areas. However, it can also be explained by the predominantly poor earthquake victims who those being more concerned with the high-priority needs such as shelter, health services, accessibility and socio-economical needs compared to landscaping.

To sum up, based on the survey results and related literature, a set of recommendations which might support the decisions of urban planners and landscape architects in the inhabitants' sense of place and satisfaction with landscaping in post-disaster housing processes are listed as follows;

- i. The peculiar characteristics of local landscape such as local climate, hydrology, topography, native plants, local building materials, and building practices should be considered in disaster housing planning and landscape design to develop an authentic housing environment that helps the residents to connect and give meaning to their new living place while avoiding the "placelessness".
- ii. Native planting and water resources could be incorporated into landscape design to create distinctive smells, sounds, and pleasing views in the housing area which can also contribute to the quality of residents' experience in their new living place.
- iii. While planting native plants, biodiversity could be supported this can also allow the residents to touch on the nature.
- iv. Considering natural characteristic and conditions of the local landscape in permanent housing areas may also help to develop a sustainable and resilient housing environment.
- v. To improve the satisfaction from and to help to build bonds with a post-disaster permanent housing area, planners and landscape architects should attempt to provide some of the local natural and cultural elements that might remind them their previous living places.
- vi. The urban planners and landscape architects should consider the local social rituals such as cultural ceremonies or practices in design of social facilities and open spaces for building identity and sense of place for the new living place.
- vii. Considering local natural and cultural landmarks in landscape design can also help in the development of place identity in the housing area.
- viii. Victims' and other groups' behaviours, needs and aspirations should be effectively incorporated into the planning and design processes to shift the place identity, to avoid "placelessness" and also, to improve sense of place amongst the residents of the housing area.
- ix. In permanent housing areas that are designed as block clusters, landscape design approach should support the spatial and social networks in the neighbourhood.
- x. A more accessible public transport system should be provided within the neighbourhood, with the previous living areas and with external centres.
- xi. Walking and cycling roads should be designed, considering the natural landscape conditions in order to improve the accessibility in the housing area as well as to help the residents to experience their new living landscape.

- xii. Collaboration between residents, landscape architects, architects, urban planners and environmental psychologists during the planning and construction of housing areas for disaster victims may help to improve well-being of the residents and to build sustainable and resilient communities in these areas.

So, during the site selection for post-disaster housing, planning and construction processes, special consideration must not be given only to the aspect of resistance to disasters, but to disaster victims' shaken psychological conditions and local landscape potentials. As such, post-disaster housing environments should have the architectural, spatial, and infrastructural and landscape qualities that can help the different groups of residents to feel at the right place to live and make them feel at home. Creating such kind of living places by considering aforementioned approaches and solutions may also raise awareness on the importance of landscape quality for well-being of individuals and local society.

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