



Resilience over Cultural Heritage: The Post-Earthquake Challenges of Architectural Conservation in Gölcük

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ABSTRACT

Vernacular environment presents the learned lessons transferred to the inhabitants in terms of sustainability and resilience. On the contrary, stakeholders participated in the administrative tasks display inconsistent approaches towards the historic built environment especially in Gölcük, Kocaeli. After the 1999 earthquake urban transformation projects as new constructions and improper conservation practices without any values of the area threatens the continuity of the cultural heritage. The discussions were mainly focused on two different neighborhoods Örcün and Saraylı having relatively intense vernacular buildings in the periphery of Gölcük. The post-disaster studies revealed that architecture tissues were dramatically changed in the favor of reinforced concrete especially in urban areas. Three main objectives were sought in order to evaluate the resilience after 20 years in terms of urban, architectural and social aspects. It is aimed to determine the current conditions of listed and non-listed traditional structures; to assess the impact of vernacular systems on the new built environment and to reveal the social tendency toward new urban policy with traditional ingenuity and technology.

KEYWORDS: *Rural heritage, conservation, sustainability, resilience*

Kültürel Miras Üzerinden Dirençlilik: Gölcük'te Mimari Korumanın Deprem Sonrası Zorlukları

Öz

Geleneksel çevre, öğrenilmiş bilgilerin kullanıcılarına sürdürülebilirlik ve dirençlilik bağlamında aktarılmasını sağlamaktadır. Buna karşılık Kocaeli ili Gölcük ilçesindeki tarihi yapıları çevre incelendiğinde, yönetimde bulunan paydaşların tutarsız yaklaşımları gözlemlenmektedir. 1999 depreminden sonra görülen yeni inşaat faaliyetleri ve alanın hiçbir değerini yansıtmayan hatalı koruma yaklaşımları olarak tanımlanan kentsel dönüşüm projeleri, kültürel mirasın sürekliliğini tehdit etmektedir. Bu çalışmada, Gölcük çevresinde nispeten yoğun geleneksel yapılara sahip olan iki farklı mahalle olan Örcün ve Saraylı örnek vaka olarak ele alınmıştır. Deprem sonrası çalışmalar, mimari dokunun betonarme yapıların inşası ile büyük oranda değiştiğini göstermektedir. Depremden 20 yıl sonra kent dirençliliğini araştırmak üzere mahallelerin kentsel, mimari ve sosyal yönlerinin araştırılması hedeflenmiştir. Tescilli ve tescilsiz gelenek yapılarının güncel durumlarını belirlemek,

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geleneksel yöntemlerin yeni yapılı çevredeki etkilerini değerlendirmek ve geleneksel ustalık ve teknoloji ile yeni kent politikalarının sosyal olarak eğilimini ortaya çıkarmak amaçlanmıştır.

ANAHTAR KELİMELEER: *Kırsal miras, koruma, sürdürülebilirlik, dirençlilik*

1. INTRODUCTION

Disaster risks on the settlements indicate the level of resilience and vulnerability of communities. Natural resources, the use of rural and urban areas, demographic conditions, construction policies, traditional techniques of architecture, conservation of cultural and natural assets and intangible heritage are related to the mitigation of risks and capacity for recovery in the post-disaster periods. In this context, socio-cultural, socio-economic structure and urban sprawl policies of areas can be transformed by the huge amount of human loss after the devastating seismic actions. In Turkey, especially the areas located around right lateral North Anatolian Faultline have long seismic activity history. Traditional buildings with the use of vernacular materials display the high capacity for seismicity and sustainability. Specifically, Gölcük was hit by an earthquake with a magnitude of 7.4 (Mw) on 17 August 1999. According to the Ministry of Public Works and Settlement declared that 35.7 % of buildings were severely damaged and 5025 people died in Gölcük (Özmen, 2007, p.22). On the other hand, the sustainability of traditional buildings was influenced due to the side effects of the disaster in the form of uncontrolled urbanization, unqualified housings, and improper restorations of old buildings. New urban settlements as permanent housings were in rural areas. The rural environment, which displays resilient behavior from its nature, has been sustained for decades; however, the various stakeholders display inconsistent scenarios on the historical built environment in the rural villages of Gölcük, Kocaeli after the 1999 earthquake with the activity of renewal, urban transformation projects, neglecting, improper physical interventions or restoration practices without considering rural values of area.

In 2011, detailed studies for the inventory of architectural heritage were performed in Gölcük to reveal the existing cultural heritage (Köksal, 2012, p.10). This study includes the demographical data; urban transformations throughout the years; existing urban tissues; the architectural values of settlements; the architectural properties of the rural heritage. Among the villages, Örcün and Saraylı consist of better and peculiar well-preserved architectural heritage therewithal the villages have been exposed to intense urban transformation projects due to the post-seismic policies. Considering this research, the number of vernacular housings were identified as 31 and 65 respectively in Örcün and Saraylı. The changes, since then in 8 years, have been tracked and the level of conservation approach was investigated in the context of resilience. On the other hand, the team executed the questionnaires in order to determine the attitudes of the inhabitants living in vernacular timber housings and recent reinforced concrete structures towards the vernacular tangible heritage, thus the reason for the failures of sustaining tradition in the context of social values were sought in the socio-economic terms.

This comparison is essential in order to monitor the effect of recent national laws; urbanization impact via infrastructure projects with housing policies; holistic approach projects by local government, non-governmental organizations (NGOs), university and finally the approaches of experts towards architectural heritage. Although cultural heritage is a robust tool for resilience, traditional construction techniques, agricultural production and intangible desire for sustainability were threatened. The challenges in resilience attempt,

recovering from possible seismic actions and the preparedness are unplanned. The number of buildings has been continuously diminished, and the users abstain from timber structures due to the conservation practices. Rehabilitation projects turned into reconstruction process or adaptive modern technology together with the existing heritage become problematic to safeguard architectural heritage.

In this article, the main approaches in the context of resilience and conservation are discussed in the villages. The state of art and national current practices are presented in the aforesaid case area in terms of seismicity, industrialization, and agriculture with the architectural heritage of two neighborhoods of Gölcük. The results of the field studies and questionnaires are demonstrated in order to project the strategies and planning of cultural heritage of the settlements.

2. RESILIENCE AND CONSERVATION IN RURAL HERITAGE

2.1 Conservation

Cultural heritage (CH) today encompasses historic cities and living cultural landscapes with the collections of movable and immovable items including everyday lives. Furthermore, intangible values such as folklore, languages, beliefs, norms, and value systems are the basics of heritage in the case of holistic conservation acts.

CH plays an important role in inclusive economic development. The economic indicator consists of new investments based on indigenous resources and sustainable activities in terms of agriculture, tourism, conservation activities, manufacturing and constructions as well as arts and crafts. Apart from the economic, CH is connected to the fundamental components of social development. The values and identity, powerful symbolic and aesthetic dimensions are the essential aspects in the sustainability of historic environment (UNESCO, 2013, p.15). These assets involving fragile architecture heritage have been exposed to major risks and the approaches have been pursued to preserve and/or sustain them.

Rajcic classifies major risks that heritage can be encountered as environmental and anthropogenic risks. Environmental risks include the sudden environmental impacts expressed in terms of events which affect the asset and which time of occurrence could not be foreseen in advance such as fire, flood, earthquake etc. social risks consist of economic activities, vandalism, wars, unintentional risks etc. The riskiest one is considered as improper decisions in the risk management of historical sites (Rajcic and Zarnic, 2016, p. 328).

In the second half of 20th century, the vernacular architecture in Turkey, were studied under various disciplines such as sociology, architecture, anthropology, engineering, city planning etc. the Marmara Region, which hosts various rural areas has been exposed to transformations due to the legislation, urban policy, industrialization, modern technology, and globalization. Because the area is in the most populated and industrialized area which can lead to improper regional, urban and local decisions as well as in the seismic prone area, problematics of sustainability on rural cultural heritage needed to be discussed with regards to the resilience.

2.2 Resilience

The definition of resilience in the Special Report of the Intergovernmental Panel on Climate Change is defined as: "the ability of a system and its component parts to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures and functions". The resilience concept includes the conservation

(in some references as anticipation and 'improvement' of) of basic structures and it becomes interwoven fact considering the historical environments (IPCC, 2012, p.5). In the areas where the multi-layered historical background with tangible and intangible values exist, the effects of hazardous events make the resilience capacity more delicate, complicated even if managed properly very effective.

Therefore, United Nation Office for Disaster Risk Reduction reported Venice Declaration affirming the guidelines and the important principles on raising the awareness of the inhabitants about the potential of CH for the resilience and integrating all actors of heritage in disaster mitigation plans (UNISDRP, 2012). Considering the aforesaid fact, experience has shown that degradation of natural resources, neglected rural development, urban sprawl and poorly engineered new constructions increase the vulnerability of communities. However, a well-preserved and sustainable historic environment, based on the transferring of traditional knowledge and skills, reduces the vulnerability of areas, strengthens the resilience of communities (Boccardi and Scott, 2014, p.15). In the province of Kocaeli, Gölcük has an important potential of natural and cultural assets in rural areas with the historical background. The area lived a severe earthquake of 7.4 magnitudes that struck Northwestern Turkey on August 17th, 1999 (Ambrasey, 2001). The earthquake which is the dominant disaster type in the resilience studies, present a live lab in the area in order to assess the capacity the peculiar strengths, attributes, and resources available to recover with CH.

2.3 Synthesis

The progressive loss of natural assets, historic tissues, the important monuments, archaeological sites, and cultural landscapes, as a result of earthquakes, civil unrests, floods, fire etc. has become a major concern to lose the memory of places. Furthermore, traditional knowledge codes embedded in CH can play a significant role in disaster prevention, risk management, and mitigation activities. Traditional techniques generated from the lessons learned from the inheritance of knowledge lead to higher resilient levels to local hazards. Disasters especially the seismic events affect traditional knowledge, the practices, skills and crafts and the cultural continuity of architectural heritage in a negative way thus the maintenance and conservation practices were shifted into new materials without considering the prior values of the disasters. The resilience of historic environment can be increased with the continuity of architectural heritage constructed by traditional techniques as well as the interpretation of it with the new constructions.

The capability of mingling the traditional and modern construction practices provide an environment for contemporary architecture productions in the current traditional urban tissue. This way not only enhance ownership of architectural heritage but also strengthen the partnerships between disaster managers, local communities and heritage or other experts in institutions such as universities and non-governmental organizations (NGOs). Apart from construction technology and management, social cohesion and cultural wellbeing promote resilience.

In the post-seismic situation, less attention has been given to understanding the cultural factors that influence the behavior of communities in term of risk definitions (UNESCO, 2013, p.30). It is essential to understand how community interpret and make sense of earthquake safety information, the perceptions, beliefs about competence and responsibility. The concepts in the society such as the sense of community, and norms are defined as significant factors in the intersection area of resilience and CH. It is recommended that *"Understanding how people interpret risk is difficult partly because of the values they attach to different kinds of outcomes (actual and anticipated)."* (Eiser et. al., 2012, p.7). These issues have significant implications for efforts to establish a "culture of prevention",

particularly as they relate to risk communication and mitigation actions. Moreover, education and research, including on traditional knowledge, are the most effective ways of developing a preparedness for the expected and prospected hazards (UNESCO, 2013, p.34). Finally, the management of CH in the risk-prone areas is succeeded when the identification of event in a clear way is done to the decision-makers.

3. CASE STUDY: GÖLCÜK- KOCAELI AND NEIGHBORHOODS

Gölcük, is a town of Kocaeli Province, surrounded by Sea of Marmara on the north, Samanlı Mountains to the south, Karamürsel to the west, Başiskele to the east. Before 2013, Gölcük had two sub-districts which are Center and Değirmendere, the town had 20 villages and 30 neighborhoods in total. After the law called “Act on the Integration of Local Government” (no. 6360) which directly affects the rural settlements has been endorsed, some district and county municipalities were canceled. The rural activities have been transferred to Metropolitan Municipalities or District Municipalities. Therefore, in Gölcük, the villages are named as neighborhood and Kocaeli Metropolitan Municipality has rights to transform them via infrastructure, landscape, and transportation projects. Currently there 52 neighborhoods are administered under Gölcük Municipality.

Considering the district with its neighbors of Başiskele and Izmit, defined with the current administrative divisions has a deep history together rooted back to ancient times. At the beginning of 6th century BC, Bithyns, a branch of Thracians established a city of Astakos, 6 km southeast to the current Izmit city center, nowadays the ancient city is located between the town of Başiskele and Gölcük. In 1326 Ottoman State conquered the region. In 19th century Georgian, Abkhasians and Mohti immigrants from Georgia settled down in the rural areas (Galitekin, 2005).

At the beginning of 20th century, the first steps of urban pattern in Gölcük started to emerge with the proclamation of the Republic. The city, which was subjected to the British and Greek invasion during the Turkish War of Independence, was freed from invasion and taken over by Turkey in 1921. In this context, the urbanization in Gölcük started in 1927, since the navy yard was established. In 1936, the center having tissue of building area was accepted as the county town and connected to the province of Kocaeli. Although, the tissues of vernacular architecture, existed in Ottoman Empire, were transformed by non – agricultural activities such as industrialization and urbanization as well as national regulations on agricultural policies at the end of 20th century, their presences are partially felt currently. The rural areas of Gölcük are highly vulnerable to nonagricultural effects. On the other hand, it is realized that the consequences of especially the 17 August 1999 earthquake influenced the whole rural spatial tissue. The earthquake caused the village to be surrounded by the city center and to construct permanent earthquake housings by expropriating the active yards. This situation resulted in both reduce in rural lands and to rise in the value of agricultural areas as urban lands by the pressure done by urbanization at the periphery of villages. These areas can be defined as living and recreation areas now for especially elder people because the functions based on the rural agricultural activities are lost due to aforesaid reasons. Consequently, they are exposed to the general effect more stringently than the other villages in rural areas. Besides the earthquake resulted in the collapse or heavy damage to the buildings. After the earthquake, settlement areas are moved to the south of the city, to foot slope of Samanlı Mountains due to better load – bearing soil conditions (Köksal, 2012, p.26; Köksal and Kishalı, 2012).

The holistic documentation of Architectural Heritage was started in this century. In 2011 – 2012, a project titled as “The Inventory of Architectural Heritage of Gölcük, Problems and

Tangible Proposals for Its Conservation” supported by the stakeholders of Gölcük 2023 Vision, Gölcük Municipality and Kocaeli University was performed. 420 non – listed and 70 listed buildings were identified. According to the research, 490 architectural and cultural assets were identified in urban and rural areas of Gölcük. Most of the neighborhoods do not include these cultural assets since they were established just after the earthquake or traditional buildings were not survived. Furthermore, twenty-two cultural visible assets including mosques, mausoleum, mills, archaeological remains, Roman grave monument, hammam, Roman hot spring, two listed plane trees, and a caravanserai were identified (Köksal and Kışalı, 2012).

Among the villages, Saraylı and Örcün consist of relatively well-preserved vernacular housings heritage in the villages. The archaeological remains in Örcün showed that the settlement hosted the Roman and Byzantium Empire. During 15th century, Örcün was mentioned as a village in the Ottoman Archive (Galitekin, 2005, p.275). Additionally, many archaeological assets are found in Saraylı and they are used in the social life and activities of the square. The name Saraylı literally means “with Palace” in Turkish which indicates ancient Roman Palace assumed to be in the graveyard of the village. Moreover, it is stated that Saraylı is the first village which is established after the Ottoman Rule of territory in 1326. In the 1970s and 80s new constructions were observed in the agricultural areas. After the earthquake two villages have been exposed to intense urban transformation projects due to the post-seismic policies. These neighborhoods not only display the peculiar rural tissue with the architectural heritage but need to be administrated by the holistic conservation plan. The numbers of vernacular housings were identified as 31 and 65 respectively in Örcün and Saraylı. The changes, since 2011, have been tracked and the level of conservation of them was questioned in the following parts (Köksal, 2012).

4. THE SURVEY

4.1 Scope

In the case study, rural architecture heritage involves timber-framed structures, filled with earthen blocks, wattle-and-daub, adobe or timber logs on stone masonry foundations. On the other hand, in some cases stone masonry is noticed up to ground floor or even first-floor level; timber – framed with aforesaid filling materials are built on the stone masonry.

This vernacular architecture of the neighborhoods is under danger considering the urban planning policies together with the conservation approaches towards architectural heritage and urban resilience in terms of any possible disaster. The area was devastated by a short-term earthquake and have been constantly under pressure via urbanization and industrialization with the changing legislation and the increasing number of infrastructure projects. Furthermore, the tools of sustaining architectural heritage and its impact could not play an essential role to make a resilient and sustainable environment.

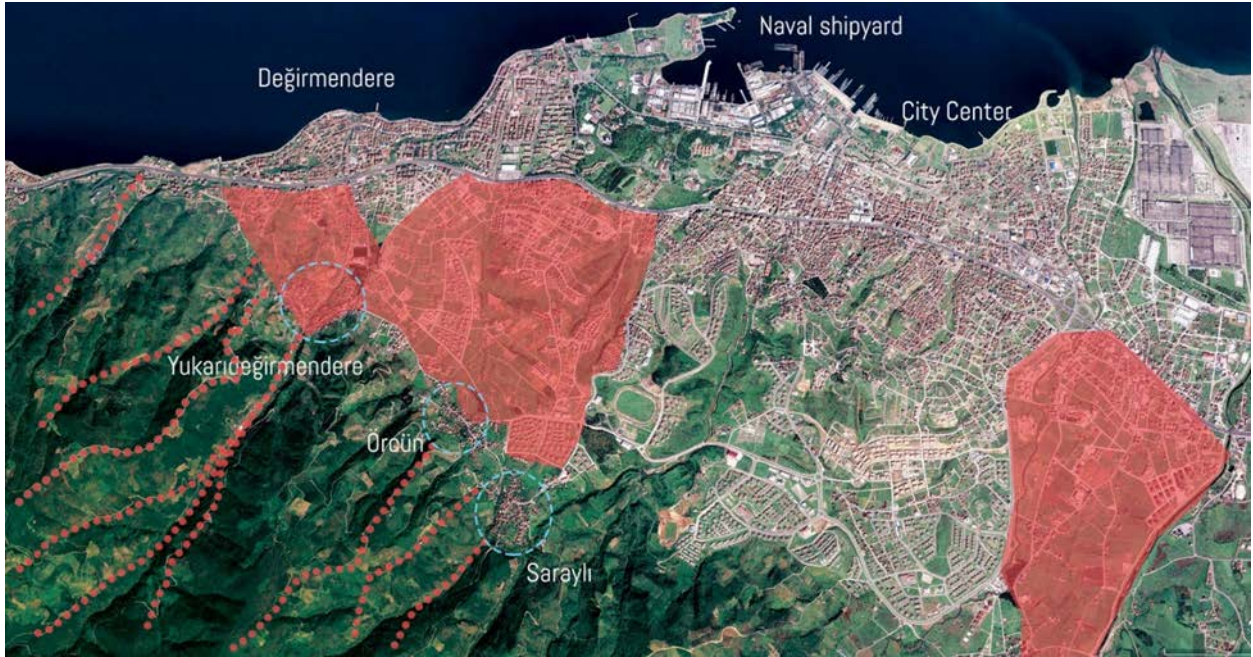


Figure 1: Aerial map of the north of Gölcük in 2009 (red areas indicate the major transformation in urban tissue).

On the other hand, the intangible values of areas were started to be blurred especially in the continuity of construction material productions, craftsmanship and spiritual values of the spaces. These values are the main parameters to continue the vernacular productions and to adapt them to contemporary life. As Rapoport defines, vernacular architecture is both a product and a process including peculiarities; the conservation and learning from vernacular is a critical issue (Bretonne, 1979, pp. 121 - 122).

Furthermore, spending time with the local people, empathy with the communities, seeking their opinions and experience on providing holistic conservation, and resilience of the villages is essential. To take advantage from CH as an instrument of the resilience, heritage managers need to collaborate with disaster management authorities, NGOs, academics, research and technical institutes, politicians at national and local level, and the private sector (UNESCO, 2013, p.39).

4.2 Methodology

The outcomes of the direct investigation in the field study performed in 2011 was repeated in 2018 and 2019 to make a comparison of the number and the conditions of architectural heritage. In 2011, with the collaboration among Gölcük Municipality; Gölcük City Council and Kocaeli University, systematic field survey by visual inspection and detailed inventory analysis were carried out. The inventory of 490 historical buildings of urban and rural parts of Gölcük was presented to the stakeholders. In 2018 and 2019, two neighborhoods (ex-villages as the legislation) Örcün and Saraylı were revisited in order to present the change. It is obvious that the level conservation and the restoration is questionable; therefore, the current situation in terms of urban fabric and architecture was picturized with the recent visits.

The comparison of urban tissue was done by aerial images of 2009 and 2019 (Figure 1). The urban tissue was intense, and the red areas have been hosted new reinforced concrete structures. Moreover, the agricultural areas started to be new settlement areas. Next, CH including civil architecture was compared to identify whether there has been the loss of

structures or worsening of structural integrity. Moreover, the questionnaires were executed in order to determine the attitudes of the inhabitants living in vernacular timber housings and recent reinforced concrete structures, thus the factors and the assessment tools of sustaining tradition in the context of social values were sought.



Figure 2: Aerial maps of Örcün in 2009 (a) and 2019 (b).



Figure 3: Aerial maps of Saraylı in 2009 (a) and 2019 (b).



Figure 4: New buildings in the vernacular rural fabric of Örcün in 2019.



Figure 5: A comparison study of typical rural housing of Örcün between 2011 and 2019.



Figure 6: A comparison study of typical rural housing of Saraylı between 2011 and 2018.

4.3 Results

The comparison study reveals that urbanization pressure on the traditional tissues of both Örcün and Saraylı result in the changes over time (Table 1). In Örcün, two vernacular buildings were lost in 8 years. Moreover, new reinforced concrete buildings were erected in the neighborhood. The changes in agricultural areas with the urban-rural tissue can be easily identified in Fig. 2. Particularly the historic part of the area has not resisted the post-seismic planning activities. The new, relatively massive reinforced-concrete housings were built juxtaposed to vernacular housings without any contextual relations with rural tissue and life (Figure 4). The comparison of the documentary also revealed that two housings were lost after 2011. One of them was heavily damaged and disappeared in 2012 and the other could be restored but not survived (Figure 5).

In Saraylı, new urban planning impacts can be read by the new residential blocks located in the north of historic settlement. The comparison of aerial maps indicates the new residential building close to the vernacular tissue (Figure 3). In this context, 65 CH assets were revisited, and it is deduced that 5 civil architecture buildings were completely lost or heavily damaged (Figure 6 - 7 - 8). In Fig. 4 one of the vernacular building has been damaged by the fire. Those buildings were partially in bad condition or not in use in 2011, however, there have not any maintenance plan actions for restoring them which leads to the loss of architectural heritage. If the buildings were not used in 2011 and continued to be abandoned for 8 years, the degradations, loss of materials and structural safety are worsened.

In Saraylı, a bazaar mainly organized by the woman cooperative result in the commercial activities held once a week (Fig. 9). Organic products are being marketed close to the village square. The promising event results in tourism from the surrounding whereas the intervention

of architectural heritage without considering the traditional architecture and materials of vernacular pose the problem.



Figure 7: The heavily damaged building (a) was completely lost in 2018 (b).



Figure 8: The heavily damaged building (a) was partially lost in 2018 (b).



Figure 9: The bazaar area organized by the woman initiative.

It is obviously known that architectural conservation is related to social aspects and awareness. Therefore, the loss of architectural heritage is linked to the economic, politic and socio-cultural parameters. The survey continued with the questionnaires of 50 inhabitants living in two villages from different ages and genders. The profile of the participants is presented in Fig. 10. The participants were asked about the construction type of their current housings; the condition of use opportunities, the conditions of wet areas in the houses and finally the general problems of housings.

Table 1: The change in the cultural heritage in Örcün and Saraylı

Cultural Heritage	Örcün		Saraylı	
	2011	2019	2011	2019
Civil architecture/ commercial/ warehouse	23	21	62	57
Mosque	2	2	1	1
Hamam	1	1	-	-
Fountain	3	3	-	-
Plane tree	2	2	1	1
Archeological ruin	-	-	1	1
TOTAL	31	29	65	60

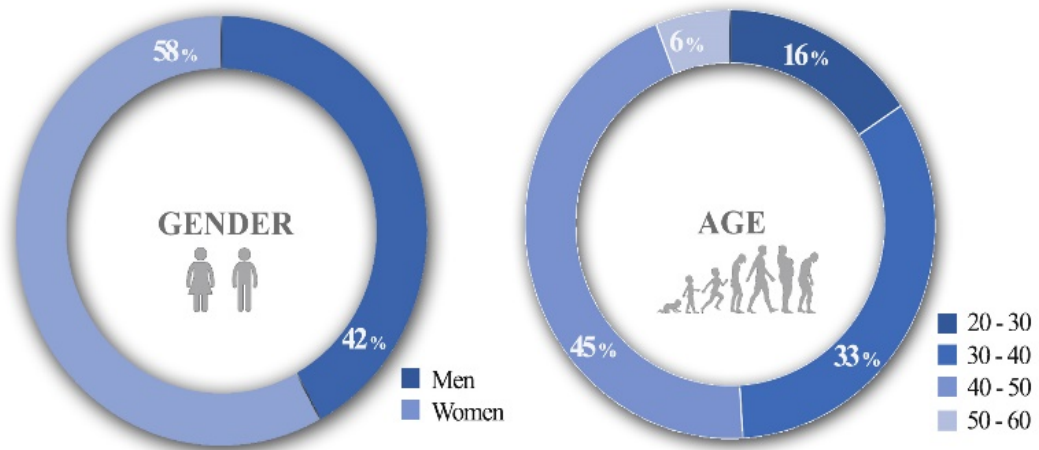


Figure 10: The participants of the survey; gender and age ratios.

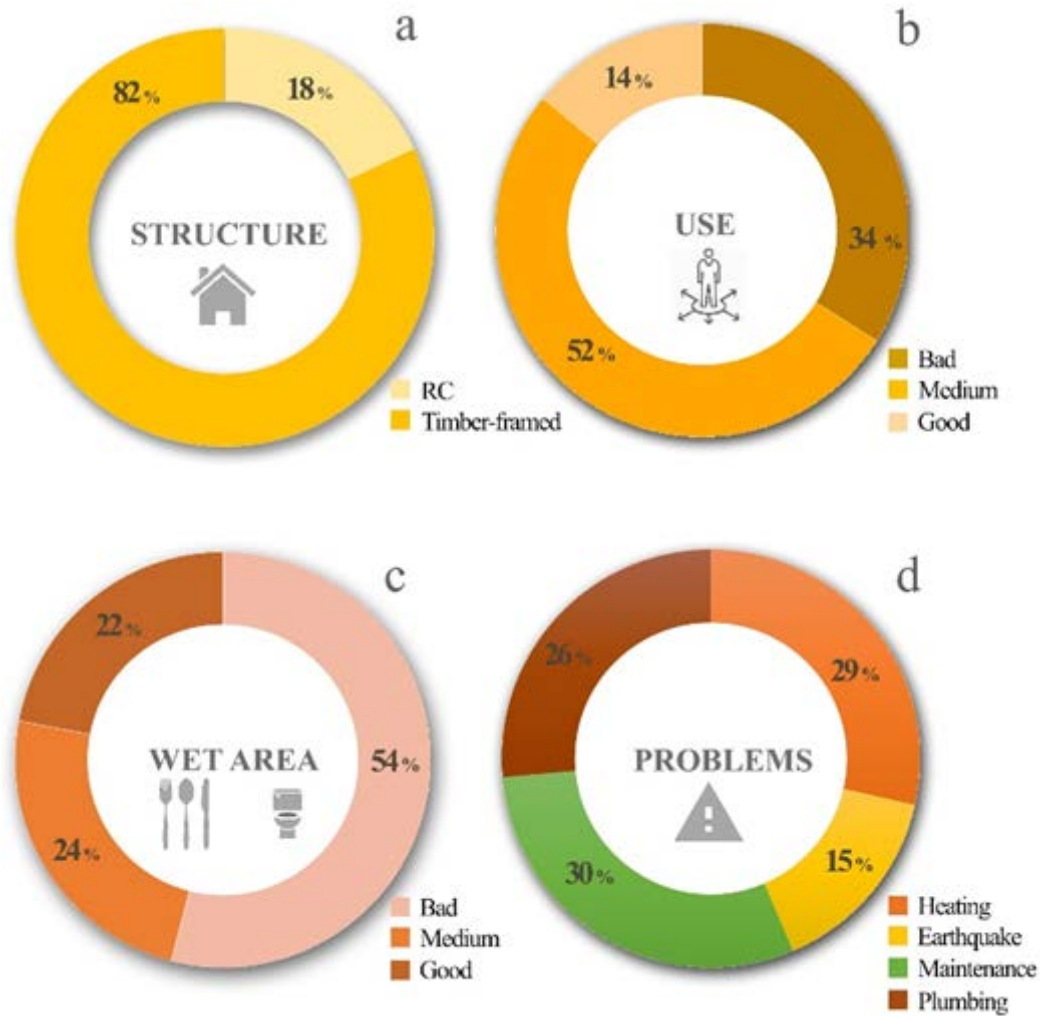


Figure 11: Survey results: Type of structure (a); the condition of use (b); the condition of wet areas (c) and the problems of the houses (d).

According to the survey, 82% of participants live in timber-framed structures and the rest reside in reinforced-concrete buildings. Only 14% of the users state that the condition of use is good and %22 find that the wet areas of the buildings are in good state. On the other hand, 54% of inhabitants describe the wet areas of housings as bad. When the main problems of the buildings were asked, they were listed as maintenance; heating and plumbing as 30%, %29 and %26 respectively. The possibility of being damaged in the next earthquake is the least important problem defined by the users (Fig. 11).

The respondents were asked whether the dwellings were damaged in 1999 and what would happen to the buildings, they are inhabiting currently, in the next possible devastating earthquake. The results indicate that 54% of people responded the structures were damaged in the 1999 earthquake. On the other hand, 62% of participants believe that current buildings most probably will be damaged if there occurs another devastating earthquake in the future. Finally, they were asked about the structural system of new housings that they might have in the neighborhoods. It is obvious that 64% of users prefer reinforced-concrete structure and leave the traditional material of wood.

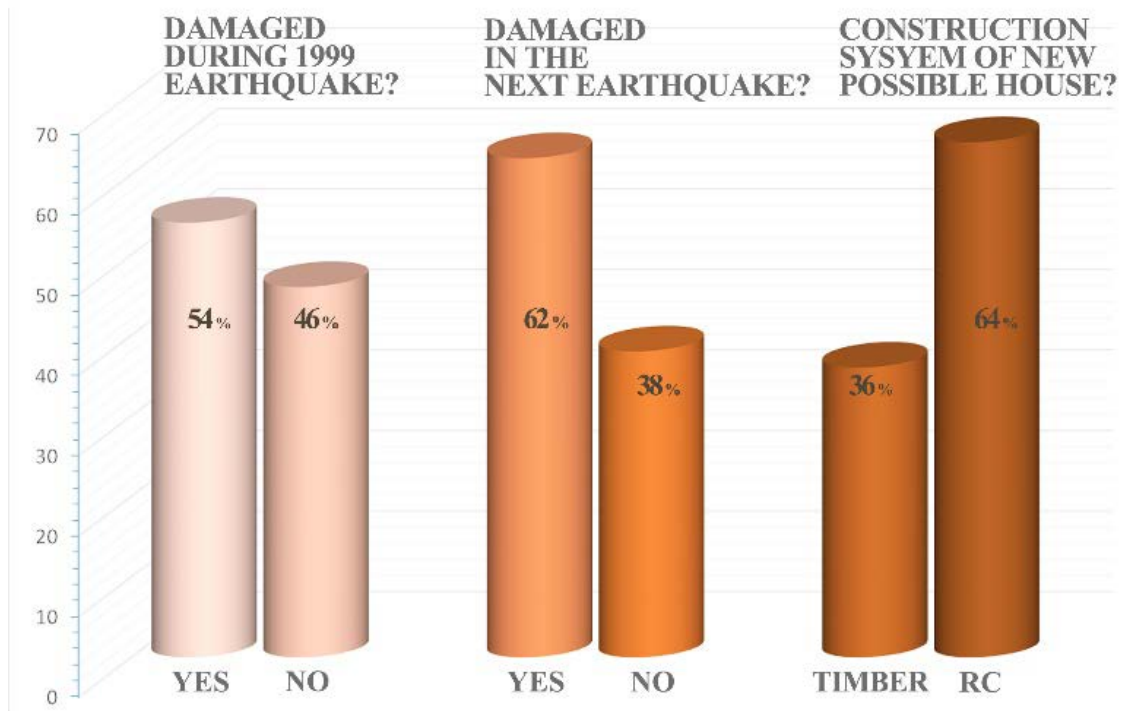


Figure 12: Survey results: The conditions of being damaged during the 1999 earthquake, in the possible earthquake and the construction system of new structures.

5. DISCUSSION

The comparison of the inventory executed in 2011 and revisit of 2019 in Saraylı and Örcün reveals interesting results. In two neighborhoods, the number of architectural heritage assets was decreased as newly constructed housings constitute a dense urban pattern inside and around the historical village. The number of traditional housing was diminishing, caused by the lack of maintenance, the lack of adapting heating and plumbing equipment and the vulnerability of seismic actions. These houses were not sustained in terms of use, economic value and socio-cultural terms; thus, some of them were disappeared and some were mainly conserved due to a few attempts by users. Moreover, being listed in the national inventory could create different situations; some inhabitants of those buildings suffer from the bureaucratic process and high budgets considering new restoration activities. As a result, inhabitants might leave the listed houses which leads to the collapse if they do not put under maintenance and restored properly. The reconstruction process or adaptive modern technology to the existing timber buildings become problematic to the architectural heritage. It is easily deduced that, after the 1999 earthquake, vernacular architecture did not play a participative effective role in the resilience of the area. The region witnessed urban spreading in the 1970s and 1999. This issue continued increasingly after post-earthquake which caused the construction of unqualified reinforced concrete buildings. The lack of sustaining vernacular systems resulted from not transferring them as knowledge to new generations and not using traditional materials for maintenance would lead to destroying current rural tissue. On the contrary, the agricultural area with traditional construction techniques provide the clues of resilient cities against the possible next earthquake. The timber-framed system is resilient and sustainable compared to reinforced concrete structures.

To clarify the reasons for neglecting the cultural heritage and its assets, questionnaires were held in the villages with the phenomenon of resilience. The participants live in the timber

building (%82) mainly graded that the current use conditions of the dwellings as medium (%52). Besides, the users are not satisfied in their living spaces. Especially the spaces like kitchen, bathroom, and WC are the unpleasant places (54%). It is obvious that heating and plumbing (%55) is the most important problem for the continuity of vernacular houses. The other problem is mentioned as the maintenance of the structures. The participants live in timber structures and this problem refers to the traditional housings. Craftsmanship on timber processing has been lost and the experts on multidisciplinary research of vernacular buildings are limited. In addition to these, the awareness of the sustaining CH for the resilience was diminished with the increasing urban population and new residential zonings. Therefore, the structures are in danger and resilience effort should be done via rejuvenating the traditional systems.

On the other hand, the number of participants suffered from the damage occurred in the 1999 earthquake is 27. The damage refers to various level from heavy to slightly-damaged. Thirty-one people also think that the possible earthquake would damage their current houses. This is probably caused by the lack of maintenance and the lack of knowledge about the structural behavior of timber structures against lateral loads. The users would like to live in new reinforced concrete buildings if they have a chance. This number indicates that vernacular housings do not meet their needs. Thus, acontextual and ubiquitous reinforced structures seem to be more favorable than the vernacular systems peculiar to the region.

6. CONCLUSION

The present work reported on the ongoing monitoring of architectural heritage after the 1999 earthquake on two historic villages of Gölcük, Kocaeli aiming at the realization of sustainable development. The resilience and CH are important subjects in order to have sustainable solutions in urbanized and disaster-prone areas. In the case of Örcün and Saraylı, the number of architectural assets together with agricultural areas has been constantly decreased. The process started in the 1970s but accelerated after the 1999 earthquake. Craftsmanship, architectural heritage, socio-economic variables of the area are in danger; thus, the resilience of region has not rooted in the traditional techniques. Reinforced-concrete and industrialization become the main actors leading to loss of traditional solutions. The traditions need to be analyzed and become a research subject for experts from different disciplinary. Not only architecture and urban planning should deal with the development of the area, but also social sciences such as sociology, psychology, anthropology, archeology, and education; engineering fields (civil, environmental, mechanical, geodesy, survey, electric engineering) especially in adapting new technologies to the vernacular fabric; economy, administration and public relations should involve in the planning of new visions of area. Finally, participative conservation act should be provided with the various stakeholders. The municipality, local authorities, NGOs, academics, experts, chambers and the inhabitants should be in the same team to develop the policies towards resilience and conservation of CH with the local, national and/or international funds.

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