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Prof. Dr. Bilge IŞIK
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Öğr. Gör. Dr. Aysel TARIM

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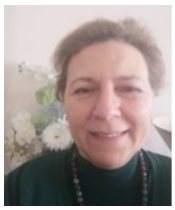
Architectural and Social Adaptation of Traditional Housing from Past to Present; The Sample of Karahüyük in Konya




A.Deniz Oktaç Beycan, Sinem Tuğçe Şahin
Konya Technical University
adobeycan@ktun.edu.tr
sinemt.duraksahin@hotmail.com

ABSTRACT

The rapid urbanization caused by Industrial Revolution has become a problem for all cities around the world. The transformation began with reinforced concrete structures and continued with the use of iron and steel has led to a new era in buildings. With the recent social and cultural changes, traditional materials and sustainable housing are no longer preferred. Therefore, people are abandoning their traditional homes and neighborhoods. The recent increase in apartment construction has narrowed the distance between people, but has also led to a lack of social interaction. In contrast, when distances are greater in traditional housing neighborhoods, human relationships become stronger, and traditional living spaces close to nature also create a comfortable social space. Therefore, restoration and reinforcement work, including addressing spatial and structural deficiencies, is necessary for traditional living areas to continue to be used. Konya is one of the cities where villages on the outskirts of the city are undergoing transformation and becoming central neighborhoods. One of these transformations is taking place in the Karahüyük neighborhood of Meram district in Konya. While the neighborhood continues to stand with original and traditional materials and techniques, it is caught in an intermediate section between rapid urbanization. In this study it is shown that a traditional residential structure can meet the needs of modern life and the requirements of a modern family while providing comfort. The condition of a building made with traditional materials and structure, such as adobe, in a traditional region is discussed, and the spatial happiness of a modern family living with a traditional perspective in the region is conveyed. In conclusion it is reached that social, ecological, and economic sustainability can be achieved without disrupting traditional pattern and construction.

Keywords: Adaptation, Adobe Houses, Konya-Karahüyük, Historical Housing Style

1. INTRODUCTION

In recent years, the increasing urbanization and population growth on a global scale have led to architectural and structural transformations in urban areas. These transformations cause a threat to traditional structures and habitats, and complicate the protection of the cultural and historical heritage. In this context, the preservation and sustainability of traditional buildings are of great importance.

Rural areas around the cities are also affected by rapid urbanization, causing them to lose their rural characteristics. It is observed that these areas come under the pressure of urbanization without adequate protection for their cultural, socioeconomic, and architectural aspects. As a result of this transformation, rural settlements in the vicinity of cities lose their traditional, rural, and historical features and transform into multi-story urban zones.

Konya is a city located in the central Anatolia region of Turkey. In recent years, its rapid growth has led to the transformation of villages in the outskirts of the city into central neighborhoods. One of these transformations is taking place in Karahüyük Neighborhood, which is part of the Meram district of Konya. While striving to preserve its original rural structure and traditional architectural style, Karahüyük Neighborhood has started to undergo changes through urban planning efforts influenced by rapid urbanization.

The aim of this study is to demonstrate to be able to maintain the urban life for people in the areas which don't lose their historical, rural, and natural significant properties. A house built with traditional adobe material in a rural area integrated into the city has been examined. In this study it is shown how the family living in this house can meet their modern comfort needs while still preserving the traditional style, thus demonstrating their integration into urban life.

Photography, observation, interviews, and survey techniques have been employed as methods. These methods have allowed for a detailed examination of the garden and surroundings of one of the traditional residential structures in the region. Additionally, interviews with residents in the area have provided insights into their living conditions and expectations.

In this study it is concluded that in order to continue the use of traditional, historical, and rural living spaces, urban planning in the region should adopt an approach that preserves the regional characteristics. By maintaining the traditional pattern and urbanization while ensuring compatibility with the city and modern life, social, ecological, and economic sustainability can be achieved.

2. CHARACTERISTICS OF TRADITIONAL SETTLEMENTS AND CONTEMPORARY CHANGES

Anatolia has been home to many civilizations [1]. The structures in the cities of Turkish period were shaped in accordance with their context and traditional culture [2,3]. The pattern and structural characteristics of settlements are derived from various aspects such as lifestyle, traditions, livelihoods, products obtained, product evaluations, and the reflection of small crafts in space [4].

The rapid urbanization occurred as a result of the Industrial Revolution and the rapid industrialization of our country after the 1950s have affected traditional residential areas [5]. Nowadays, traditional residential areas rapidly undergo transformation. In this process of transformation, traditional residential areas in rural areas within and around the city have been seen as structural areas of new neighborhoods consisting of high-rise buildings and have not been adequately preserved.

Especially many of the urbanized rural areas have turned into new neighborhoods consisting of apartment blocks built on residential, commercial, and agricultural lands. Very few traces of the old settlements remain, and they have been virtually engulfed by the city. Although many rural areas have lost their traditional characteristics, a small number of rural settlements have been fortunate enough to urbanize while preserving their settlement fabric, traditional courtyard houses with gardens, local structures such as mosques and municipal buildings, and their spaces.

2.1 A View to the Structures showing Rural-Traditional Dwellings from the framework of Living Conditions and Sustainability changed in our presentday.

With modernization, the societal mindset has also been influenced, and people's preferences, desires, and expectations have changed [6]. After a while, these changes began to have negative effects on cities, societies, and individuals [7]. One way to eliminate these negative effects is to ensure the sustainable lifestyle of the past in line with present-day conditions [8]. Nowadays, there is a growing importance placed on the concept of sustainability and buildings that are designed accordingly. Traditional textures and spaces are highly valuable examples where sustainability can be achieved

in terms of economy, social development, and environmental conservation [9]. These low-rise, nature-oriented, and traditional areas are ecologically and sustainably significant [10]. Therefore, evaluating traditional residential fabrics, integrating them into contemporary life, and preserving them will yield valuable gains in terms of cultural identity, urban memory, and the understanding of sustainability, which are highly valued today [11].

In the presentday, with the limitations imposed by the pandemic [12] and the destruction caused by earthquakes in multi-story reinforced concrete buildings [13] the value of low-rise, garden-based housing has increased for humanity. Traditional houses that possess these characteristics have been recognized as important not only for providing a healthy environment but also for preserving social distancing. Revitalizing and making traditional residential areas to a sustainable form is crucial for the health and quality of life of the community.

3. KONYA CITY AND ITS TRADITIONAL ARCHITECTURE

Konya is the largest province in Turkey in terms of area (Fig. 1, Fig. 2). Surrounded by the Taurus Mountains, the Konya Plain has a partially closed basin-like appearance. Konya, one of the oldest settlements in the Central Anatolia Region, was established on the alluvial cone of the Meram River. Throughout history, Konya has been one of the world's most significant ancient cities. It has been a site of important civilizations from the Neolithic period to the present, including the renowned Çatalhöyük settlement located near the city center [14].

Figure 1. Turkey in the world map[15].

Figure 2. Konya in the map of Turkey. [16].

After being conquered by the Anatolian Seljuk State and established as its capital, the physical structure of Konya had changed [17]. Today, there are many historical structures survived from this period. Until the 1950s, Konya largely preserved its historical and traditional architecture [18]. The houses on both sides of the city's streets were built with adobe materials, featuring large courtyards and one or two stories [19, 20, 21].

In recent years, there has been significant migration from rural areas to urban centers, from east to west, from earthquake-prone zones to safer areas, and due to the settlement of refugees throughout the country. Konya, being in the midst of this rapid urbanization process, has also experienced the effects of these migrations and has had to urbanize quickly. In this rapid urbanization process, the city of Konya has expanded beyond its center, undergone renewal with high-rise buildings, and has been unable to preserve traditional housing structures, particularly [22]. In recent times, the city has transformed into a structure that engulfs the historical, traditional, and naturally significant rural neighborhoods on its periphery [23]. The surrounding rural neighborhoods have completely transformed into a high-rise urban appearance (Figure 3). Only a few settlements, such as Karahüyük, which is the subject of this study, have been able to preserve their own structure to a lesser extent, withstanding urbanization pressures.

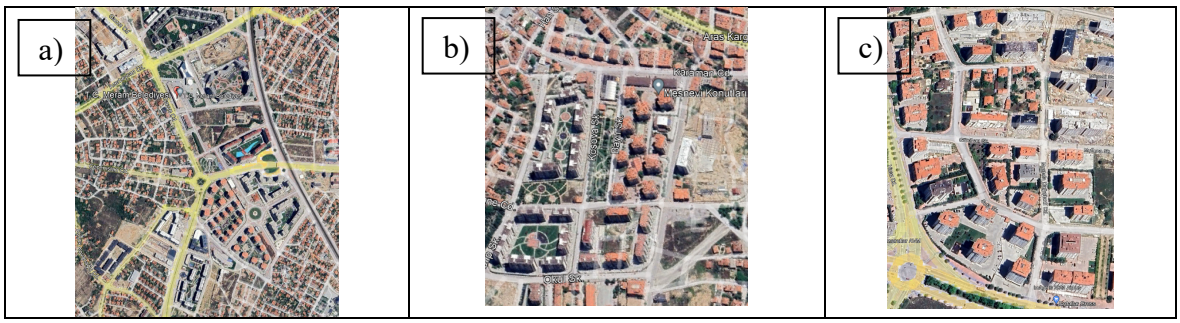


Figure 3. Examples of 10-12 story apartment buildings observed in the outskirts of Konya in rural and vineyard areas are as follows: **3-a)** Kovanağzı vineyard area [24], **3-b)** Kumköprü vineyard area [24], **3-c)** Hocacihan village [24].

3.1. Field Study: Evaluation through Karahüyük Neighborhood and Ahmet Şahin House

Karahüyük Neighborhood:
Karahüyük is a historical, traditional, and naturally significant rural settlement located in the south Konya. Like all rural areas around Konya, it has been affected by the rapid growth of the city. However, it stands out as a settlement that tries to resist change. Despite the urbanization pressures, the region has managed to continue its development without significant disruption, thanks to its planned growth and the local community's resistance to high-rise construction. As a result, there are still Konya families living in old adobe houses with courtyards, nestled within the natural environment and traditional architecture.

Karahüyük is a neighborhood belonging to the central district of Meram, located 15 km southeast of Konya. Excavations initiated in the region in 1953 under the leadership of Archaeologist Sedat Alp are still ongoing, and research has shed light on the settlement layers of Karahüyük dating back to around 3000 and 2000 BC (Fig. 4-a) [25].

Karahüyük is a rural area consisting of traditional courtyard houses. Its residents rely on agriculture, with wheat and grape production being particularly common [26]. Unfortunately, none of the four village chambers, one inn, or six water wells in the neighborhood have survived to the present day. The sources of livelihood have also shifted away from agriculture.

Karahüyük Neighborhood is undergoing architectural changes through various urban planning modifications in recent times. As a result of these modifications, new roads are being opened, the garden and plot areas of houses are being waned, and new buildings are being added to the pattern. Despite the decrease in garden and cultivation areas, the neighborhood still retains traces of being a rural settlement. Karahüyük Neighborhood strives to preserve its traditional architectural elements as much as possible in the present day (Fig. 4). Within the scope of this study, the changes experienced in a courtyard-style traditional house of a family transitioning from rural to urban life in Karahüyük Neighborhood will be examined to provide insights into the transformation of the region.

Figure 4. The location of Karahöyük: **4-a)** Its position on the map [27], **4-b)** Aerial photograph of Karahüyük Neighborhood in 2023 [28], **4-c)** Aerial photograph of Karahöyük Mound in 2023 [28].

Ahmet Şahin House

Karahüyük Neighborhood, Pirhasan Street, parcel number 12 of plot number 37403, located in the Meram district of Konya province, is where the structure was built between 1980 and 1985 (Fig. 8). The late Ahmet Şahin, who passed away recently, was the current owner of the building. The structure is currently occupied by his spouse, Nadire Şahin, and their children [29]. In the initial intervention to the building, an external reinforced concrete staircase was added, dividing the structure into a ground floor and an upper floor. As a result, the building is used by two separate families. In 2019, there were further changes made to the courtyard as a result of urban planning regulations.

Figure 5. The 2023 satellite image of the project area [30].

During its initial construction, the entrance to the house was through the courtyard gate opening onto Pirhasan Street in the northeast direction. The house was built adjacent to the northeast wall of the courtyard. The courtyard included elements such as an outdoor kitchen, a tandoor-oven area, a woodshed, and a toilet (Fig. 6-a, 6-b). However, due to the 2019 urban planning parcel regulations, the courtyard was reduced in size (Fig. 6-c, 6-d). The outbuildings that were originally present in the garden were demolished under municipal control. A road was constructed in the demolished area, resulting in a smaller garden. Currently, the house remains on a corner plot at the intersection of three streets (Fig. 6-c, 6-d). Today, the courtyard is accessed through Pirhasan Street in the northeast direction, just as it was in the past. The entrance to the building is from the northeast, opening into the courtyard. In the remaining part of the courtyard, new kitchen, storage, and toilet facilities have been built to meet the needs of the present day (Fig. 6-c).

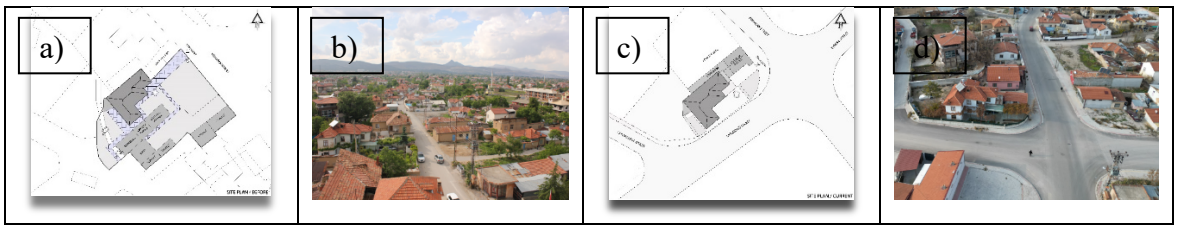


Figure 6.a) Site Plan in 2017 [31], **6.b)** Street Texture of the Year 2017 [28], **6.c)** Current Site Plan [31], **6.d)** Street Texture of the Year 2022 [28].

Şahin House was built using the traditional construction material of adobe and the technique of rammed earth. The building has two floors, with a central hall (sofa) and three rooms opening onto the hall on each floor. The lower floor walls were constructed with two layers of main adobe and one layer of small adobe, with a thickness of 60 cm. The upper floor walls were built with one layer of main adobe and one layer of small adobe, with a thickness of 30 cm.

The building has a sawtooth-shaped floor plan. The entrance to the rooms is through the central hall (sofa). The central hall serves as a space that connects the rooms and the staircase, and it is accessed from the courtyard on the ground floor (Fig. 7-a). Both floors consist of three rooms and one central hall (Fig. 7-a, 7-b). Due to the sawtooth-shaped floor plan, the external facade of the building has a dynamic appearance. The ground floor windows open to the northeast, southeast, and southwest directions (Fig. 7-c, 7-d).

Figure 7.a) Ground Floor Plan [31], **7.b)** First Floor Plan [31], **7.c)** Rear (Southeast) Elevation and Garden of the House [28], **7.d)** The House's Courtyard After Renovation and Its New Kitchen [28]

Alterations:
After the initial renovation, the lower and upper floors are used by two separate families. Access to the upper floor is provided through an external staircase. Today, this staircase has been removed, and both floors are used by the owner as originally intended (Fig. 7). The current user of the building has renovated the storage areas and the windows of the lower floor when they purchased the house (Fig. 8). Due to the maintenance difficulties of the grid wooden system, the ceilings have been covered with wooden paneling. Additionally, a wooden staircase has been added later on. In the central hall (sofa), there is a wooden staircase that connects to the upper floor (Fig. 8-b). The heating system of the building was provided by a stove until 2016. With the introduction of a natural gas pipeline to the neighborhood, heating is now done using a natural gas central heating system (Fig. 8-a).

On the ground floor of the building, there are two rooms, and the same rooms on the upper floor have niches and storage areas. The storage areas include wet areas to meet the bathroom needs (Fig. 8-d). The kitchen requirement of the building is designed in one of the rooms on the ground floor, specifically for kitchen use (Fig. 8-c).

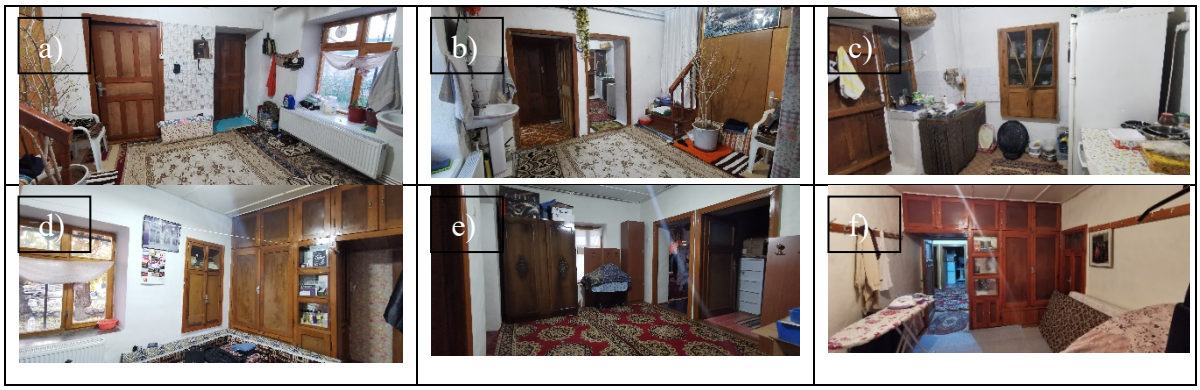


Figure 8.a) Ground Floor Reception Room and House Entrance [28], 8.b) Ground Floor Reception Room [28], 8.c) Kitchen [28], 8.d) Niche and Cupboard in the Living Room [28], 8.e) First Floor Reception Room [28], 8.f) Niche and Cupboard in the Living Room on the Upper Floor [28].

The exterior facade of the building was initially finished with a layer of clay over the adobe plaster, followed by a lime wash (Fig. 9-a). In the exterior facade renovation carried out in 2018, a cement-based plaster was applied to the entire facade. The roof covering was repaired, and the eaves were covered with wooden material (Fig. 9-b).

Figure 9.a) Building Photo Before Facade Renovation in 2011 [28], 9.b) Building Photo After Facade Renovation in 2022 [28]

The owner of the house, who is a professional architect and engineer, currently lives in this building with their grandchildren. The building is located in a neighborhood that is close to the city yet still preserves its traditional rural characteristics. In terms of the number of floors and size, along with its garden and courtyard, the building meets the needs of the residents. The construction system of the building provides easy heating during the winters and creates a cool space during the hot summers of Konya's climate. The spacious garden brings joy and provides a relaxing environment for the family, especially during the pandemic period when the garden has become an even more valuable space for soothing the family [29].

4. RESULTS

Traditional buildings are important elements that reflect the culture and history of a region. However, in today's urbanization process, many traditional textures and structures have been destroyed or deteriorated. Konya is an important center in Turkey in terms of history, culture, and art, and it is home to many traditional buildings. However, in recent years, urbanization has also spread to the surrounding rural areas. This situation has been changing the socio-cultural, economic, and architectural structure of these rural areas. The study was conducted on Karahüyük Neighborhood as an example of a rural area that has undergone the least architectural changes among urbanizing rural areas.

Karahüyük Neighborhood is a historical and rural area located in the center of Konya. The traditional buildings in this area are still actively used by the local community. However, planned urban development projects in Karahüyük Neighborhood have led to the destruction and deterioration of these traditional structures. Preserving the architectural characteristics of the traditional buildings in the neighborhood and adapting them to meet modern needs is crucial for sustainability. The building has been designed as a traditional Konya house. Despite undergoing changes and transformations in 2019, it continues to maintain its original structure. During the renovation process of the building, which was constructed using adobe materials, emphasis was placed on preserving its original form and utilizing local materials for restoration. In line with this approach, the building has been reorganized to accommodate the requirements of modern living while ensuring its sustainability. This study demonstrates that social, ecological, and economic sustainability can be achieved without compromising the integrity of traditional architecture and urban fabric.

In conclusion, the utilization of this building in Karahüyük is important for preserving traditional architectural elements and ensuring the sustainability of the natural environment. Karahüyük Neighborhood (Village) serves as an example of a rural area that has undergone urbanization while preserving its architectural character and avoiding high-rise construction, which reflects the desires of the local community. The traditional residential structures in the area are being reorganized to meet the requirements of modern living, transforming them into healthy, comfortable, and sustainable living spaces. As a result, the residents of the neighborhood are able to enjoy a convenient and happy life, being close to the city while surrounded by a natural environment.

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