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Evaluation of Urban Renewal Practices in Traditional Settlement Structures in the Context of Sustainability: The Case of Alipaşa-Lalebey Neighborhood [1]

Geleneksel Yerleşim Dokularındaki Kentsel Yenileme Uygulamalarının Sürdürülebilirlik Bağlamında Değerlendirilmesi: Alipaşa-Lalebey Mahallesi Örneği

Sevilay AKALP[2] İdil AYÇAM[3]

Öz

İklim değişikliği, kuraklık, sel gibi doğal afetler 21.yy'da kentlerin sık olarak karşılaştığı problemler arasında gösterilmektedir. Kentsel sürdürülebilirlik konusu günümüzde sürdürülebilir kalkınma hedeflerine ulaşmak için önemli bir kaynak olarak gösterilmektedir. Bu bağlamda dünya üzerindeki birçok ülke çevresel felaketlere ve tehlikelere karşı koymak amacıyla kentsel sürdürülebilirlik göstergeleri çerçevesinde önlem almaya başlamıştır. Geniş perpektifte sosyal, çevresel ve ekonomik ölçekte kentlerin afetlere karşı kırılgan özellikleri belirlenmiş ve problemlere çözümler getirilmesi hedeflenmiştir. Bu bağlamda çalışma kapsamıda Diyarbakır Tarihi Suriçi kent dokusunda yer alan Alipaşa-Lalebey Mahallesinde uygulanmış olan kentsel yenileme projeleri eski kent dokusuyla karşılaştırılarak çevresel, ekonomik ve sosyal sürdürülebilirlik göstergeleri çerçevesinde değerlendirilmiştir. Çalışmada literatür taraması, GIS (Coğrafi Bilgi Sistemi), alan çalışması ve derinlemesine görüşmeler yöntem olarak kullanılmıştır. Eski-yeni yerleşim dokusuna ait Koruma Amaçlı İmar Planı ile Kentsel Yenileme Projeleri ArcMap programı kullanılarak haritalandırılmış daha sonra da sosyal, çevresel ve ekonomik sürdürülebilirlik göstergeleri çerçevesinde değerlendirilmiştir. Çalışma sonucunda Alipaşa-Lalebey Mahallesinde uygulanan kentsel yenileme projesinde yeni konut dokusunun geleneksel dokuya kapsamlı şekilde referans vermediği sonucuna varılmıştır. Sokak dokusunun değiştirilmesi, yapı adası, parsel-yapı tipolojilerindeki mekânsal değişimler, geleneksel yapım teknikleri ve malzemenin kullanılmaması kültürel mirasın ve toplumsal hafızanın korunmasının önüne geçen çevresel ve sosyal sonuçlar olarak karşımızda çıkmaktadır. Yerel kaynakların etkin şekilde kullanılmaması ve geleneksel meslek kollarına olan ihtiyacın azalması ekonomik sürdürülebilirlik göstergelerinin uygulanmamasına yol açmıştır. Literatürde geleneksel tarihi bir dokuda gerçekleşen kentsel yenileme proje uygulamalarını sosyal, ekonomik ve çevresel sürdürülebilirlik göstergeleri bağlamında ele alan kaynakların bulunmaması çalışmanın özgün değerini ortaya koymaktadır. Bu çalışma, gelecekte sıcak-kuru iklim bölgelerinde tarihi dokuda planlanacak olan kentsel yenileme projelerinde, sosyal, çevresel ve ekonomik kentsel sürdürülebilirlik prensiplerini bütüncül şekilde alarak daha etkili sürdürülebilir kentlerin oluşmasına rehberlik etmeyi hedeflemektedir.

Anahtar Kelimeler: Kentsel Sürdürülebilirlik, Geleneksel Doku, Sürdürülebilirlik Göstergeleri, Suriçi, Kentsel Yenileme Projesi

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ABSTRACT

Climate change, drought, floods, and other natural disasters are frequently encountered problems for cities in the 21st century. Today, urban sustainability is an essential resource for achieving sustainable development goals. In this context, many countries worldwide have started taking measures through of urban sustainability indicators to withstand environmental disasters and hazards. From a broad perspective, the vulnerability of cities to disasters has been identified in social, environmental, and economic dimensions, and solutions have been aimed at addressing these issues. In this context, within the scope of the study, urban renewal projects implemented in the Alipaşa-Lalebey Neighborhood, located in the historic Walled City of Diyarbakır, were compared with the old city fabric and evaluated by means of environmental, economic, and social sustainability indicators. Literature review, GIS (Geographic Information System), field study, and in-depth interviews were used as methods in the study. The Conservation Development Plan and Urban Renewal Projects of the old-new settlement pattern were mapped using the ArcMap program and then evaluated within the framework of social, environmental, and economic sustainability indicators. As a result of the study, it was concluded that the new housing texture in the urban renewal project implemented in the Alipaşa-Lalebey Neighborhood does not make comprehensive reference to the traditional texture. Changing the street texture, spatial changes in building blocks, parcel-building typologies, and non-use of traditional construction techniques and materials are environmental and social consequences that prevent the preservation of cultural heritage and social memory. The ineffective use of local resources and the decreased need for traditional professions have led to the failure to implement economic sustainability indicators. The absence of resources in the literature that discuss urban renewal project applications in a traditional historical context in the context of social, economic, and environmental sustainability indicators reveals the unique value of the study. This research aims to guide future urban renewal projects in historical contexts in hot-arid climate regions by comprehensively considering social, environmental, and economic urban sustainability principles to contribute to the creation of more effective and sustainable cities.

Keywords: Urban Sustainability, Traditional Urban Texture, Sustainability Indicators, Suriçi, Urban Renewal Project

INTRODUCTION:

The acceleration of the urbanization process has caused several problems such as depletion of natural resources, environmental degradation, poverty, and social inequality in recent years (Bibri, 2019a; Bibri and Krogstie, 2017a). In order to reduce this negative impact, new strategies and practices have begun to be developed through sustainable development (Martos et al., 2016; Bibri et al., 2020). Sustainable development has set many goals to create a livable environment for today and future generations. In theoretical terms, sustainable development is a multidimensional approach to the integrated management of economic prosperity, environmental quality, institutional capacity, and social welfare (Alyami and Rezgui, 2012; Gilmour and Blackwood, 2011; Michelina, 2021). The Sustainable Development Goals (S.D.G.s) aim to address sustainability's environmental, social, and economic dimensions equally (Saracaga et al., 2018; Lindkvist et al., 2018). In order to achieve sustainable development goals and provide livable futures, social, economic, and environmental parameters must be included in both urban and architectural design processes. However, while environmental problems and solutions are prominent in today's Sustainable Development iscourses (Gibson, 2006; Raslanas et al., 2013; Shari fi and Murayama, 2013; Park et al., 2017), the social context is ignored. Sustainability assessment tools that developed to measure the success of SD goals are also primarily characterized by environmental aspects of sustainability (Shari fi and Murayama, 2014; Shari fi and Murayama, 2013; Komeily and Srinivasan, 2015). In other words, both sustainable development goals and sustainable assessment tools put the environmental context and improvements ahead of the social context. Different evaluation methods are required to measure the success of sustainable development goals and ensure national or international standardization. To this end, this situation necessitates the need to create comprehensive sustainability assessment methodologies to measure economic, environmental, and social changes, which are components of development activities (Gasparatos and Scolobig, 2012; Sharifi, 2021). The evaluation methodology has brought about the need to determine the urban or regional limitations. In this context, cities, shown as the junction of the built environment and social interaction, play an essential role in promoting sustainable development strategies (Arto et al., 2016). Recently, many studies have been published addressing theoretical and methodological aspects regarding the creation and use of indicators in sustainability assessment (Tanguay et al., 2010; Huang et al., 2015; Ameen, 2015; Cohen, 2017; Bell and Morse, 2018; Huovila et al., 2019); In this context, among the sustainable evaluation indicators, the design

strategies of traditional settlement patterns are widely accepted as an effective model for sustainable development. These settlements are integrated into new or existing settlements in learning to ensure sustainable social, ecological, and environmental development goals. It is considered a vital guide (Dipasquale et al., 2014; Correia et al., 2014; Karahan et al., 2023).

Understanding traditional architecture forms the foundation for sustainable education, climate-sensitive architectural design principles, and energy-efficient design elements. The knowledge and experience from the past will contribute to new techniques and methods for future interventions in the construction sector. Using passive solar techniques and methods derived from traditional architecture can potentially reduce dependence on fossil fuel-based energy (Chavan and Chandar, 2022). Vernacular architecture possesses crucial features aligning with many of today's sustainable development goals. Its local and original nature ensures the transfer of experience and cultural codes to future generations while developing renewable energy-oriented solutions through passive design strategies contributing to environmental sustainability. Simultaneously, using local materials throughout the building life cycle supports economic sustainability by reducing waste and pollution and fostering activities that strengthen the local economy. Therefore, traditional architecture is a significant reference in sustainable design and building practices.

There is no study in the literature that evaluates the reconstruction process in a historical context in terms of sustainability indicators, particularly social, environmental, and cultural aspects. Currently, the Diyarbakır Suriçi region, which has completed an urban renewal project in its historical fabric, has been selected as the study area due to its inclusion in the UNESCO Cultural Heritage List and its cosmopolitan character throughout history. The study area was determined as the Alipaşa-Lalebey District, where the Urban Renewal Project was completed in this region. In order to preserve the traces of the original texture in new housing structures, the Conservation Development Plan was revised in 2016, and the urban renewal project commenced in 2018. In this context, the Alipaşa-Lalebey District, where the urban renewal project has been completed, was compared with the old city texture using sustainable evaluation indicators. Literature review, GIS (Geographic et al.), field study, and in-depth interviews were chosen as the methods for the study. The ArcMap program was used to map the old-new settlement pattern, Preservation Development Plan, and Urban Renewal projects. Environmental sustainability indicators were compared on maps, while fieldwork and in-depth interviews supported social and economic indicators. The new urban texture was then compared with the old settlement pattern within the framework of urban sustainability. As a result of the study, it was concluded that the features of the new housing texture in the urban renewal project implemented in the Alipaşa-Lalebey District did not comprehensively reflect the traditional texture. Socially, the decline in the use of traditional construction techniques and materials in new housing structures hinders the transmission of cultural heritage to future generations and jeopardizes the preservation of social memory. The neglect of local resources limits recycling opportunities, thereby increasing the carbon footprint. Moreover, the diminishing presence of traditional businesses and vocations has reduced the influence on the local economy. From an environmental standpoint, the modification of street layouts and the disruption of building block-parcel-courtyard configurations in the traditional urban fabric as a result of urban renewal initiatives have resulted in the disregard of local climate-sensitive architectural design principles The changes, such as increasing street widths, reducing courtyard surfaces, and adhering not to occupancy-vacancy relations by local architectural principles, indicate that passive design strategies should be employed appropriately. This oversight may lead to reduced use of renewable energy resources and a lack of indoor climatic comfort. In summary, when evaluating the Alipaşa-Lalebey District urban renewal project within the framework of urban sustainability indicators, it was concluded that the urban planning applied to the new housing texture lacked alignment with sustainability principles on economic, social, and environmental scales. This study

serves as a valuable resource, addressing urban renewal projects in historical contexts with comprehensive consideration of social, environmental, and economic indicators, offering a multidimensional perspective on urban sustainability. Its objective is to guide the development of more effective and sustainable cities in future urban renewal projects planned in historical contexts, especially in hot-arid climate regions, by holistically incorporating social, environmental, and economic urban sustainability principles.

1. Literature Review

1.1. Urban Sustainability Concept and Indicators

In today's world, 55% of the global population resides in urban areas, and the number and percentage of urban dwellers continue to rise. Due to urbanization and global population growth, it is projected that by 2050, 68% of the population will live in urban areas (UN, 2018). Cities are already grappling with numerous environmental and socio-economic challenges such as climate change, land use, air pollution, depletion of ecological resources, waste generation, and access to clean water (Bibri, 2019a). All these issues indicate that even the basic needs of urban residents may not be met in the future. Consequently, the vulnerability of cities, viewed as living organisms, has become a crucial agenda for countries worldwide. Agenda 21, published in 1992, is considered the first document focusing on sustainability at the local level. This document emphasizes the necessity and awareness of the concept of sustainable cities as a significant political focus (Khatibi, et al., 2023).

A pivotal representation of the concept of sustainable cities is found in the United Nations' Sustainable Development Goals, specifically Goal 11, "Sustainable Cities and Communities," introduced in 2016 (UN, 2016). In this context, the fragile nature of cities and their hosting of large populations necessitate regional and international measures to be taken. "Urban sustainability" has various interpretations and definitions. Urban sustainability is seen as a practice expressing itself in social, economic, and environmental dimensions (Finco and Nijkamp, 2001; Jenks and Jones, 2009; Pallathadka et al., 2023). In simple terms, urban sustainability is acknowledged to encompass ideas related to economic development, social progress, environmental protection, and more recently, social justice. Another definition related to urban sustainability focuses on its multifaceted impact on the economy, culture, and climate (Verma and Raghubanshi, 2018). The concept is often seen as a balancing act between economic progress, quality of life, and environmental sustainability, recognized as a frequently contradictory notion (Eastaway and Støa, 2004; James, 2014). Despite diverse perspectives and definitions surrounding the concept, the common thread is a notion that aims to integrate social, economic, and environmental factors, considering the needs for future generations.

To assess sustainability programs, various indicators have been identified with different methods and contents. Indicators have become a fundamental and robust tool for evaluating the implementation of the sustainable development concept since 1990 (Reed et al., 2006; Hák et al., 2016). Indicators provide an effective and measurable tool for creating sustainable cities; these cities not only promote environmental friendliness but also support the long-term economic productivity, health, and quality of life of their residents (Ahvenniemi et al., 2017). The accurate application of sustainability assessment indicators is crucial for achieving urban sustainability goals (Michalina et al., 2021). The use and creation of sustainability assessment indicators have been approached with various theoretical and methodological insight (Reed et al., 2006; Tanguay et al., 2010; Hak et al., 2012; Bell and Morse, 2018). Among indicator-based system methodologies, the oldest method involves systems created using the vulnerability and driving forces of the city, encompassing human-induced environmental pressures and natural disasters (Huang et al., 2015). In other words, it covers the driving forces of environmental changes and can occur at local, regional, and global levels. Indicators to inform sustainability are organized into themes and dimensions such as environment, economy, society, technology, and

institutions, focusing on topics like clean water and air access, renewable energy use, green space utilization, waste management, green transportation, ecological footprint, climate change, and mixed land use (Clune and Zehnder, 2020). Other indicator systems consist of local, government, or municipality-focused policies, using a single compound indicator such as Ecological Footprint (EF), Environmental Performance Index (EPI), or Human Development Index (HDI) (Pallathadka et al., 2023). Success is possible when the chosen indicator systems for cities are accurately determined, emphasizing the vulnerability and driving forces of the city to highlight environmental, economic, or social issues at the local level (Kaur and Garg, 2019). When considering urban sustainability components within an environmental context, it is possible to list fundamental principles and associated strategies. Parameters such as access to clean air and water, promotion of renewable energy use, waste management, green spaces, and transportation usage, as well as ecological footprint, can be outlined as general principles of environmental sustainability. At the design scale, urban sustainability strategies can be implemented through strategies such as compact urban form, orientation, utilization of local materials, and ensuring thermal comfort (Table 1).

Table 1. Principles and Strategies of Urban Sustainability at the Environmental Scale (Svarstad et al., 2010; Checker, 2011; Lynch et al., 2011; Morelli, 2011; Haapio; 2011; James, 2014; Correia et al., 2014; Dean et al, 2014; Fidan, 2016; Chuang et al., 2017; Pandit et al., 2017; Bibri, 2018; Maurya et al., 2020; Allen et al., 2020; Kong et al., 2020; Reisi et al., 2020; Abu-Rayash and Dinçer, 2021; Michalina et al., 2021; Zhang et al., 2022; Pallathadka et al., 2023)

Urban Sustainability Indicators	**Principles**
Enviromental Scale	Freshwater availability Fresh air availability Renewable energy Green space Waste management Community forestry Recycling of waste Green Space Green transport Ecological footprint Mixed land use Climate Change
	Strategies
	• Compact urban form • Selection of land suitable for environmental characteristics • Building orientation according to climatic characteristics

	• Using the natural slope of the land, preventing excavation and excavation • Use of renewable energies such as sun and wind • Use of Local Material • Selection of recyclable materials • Ensuring thermal comfort • Consuming existing energy resources • Increasing indoor temperature and humidity levels • Ensuring adequate natural ventilation • Ensuring adequate natural lighting and solar radiation • Developing natural and passive heating systems • Avoiding toxic materials • Providing practical guidance to anticipate and reduce risks • Developing strong and flexible construction systems • Consider the special characteristics of local risks • Developing post-disaster recovery strategies

Urban sustainability assessment primarily comprises environmental, economic, and social dimensions, with each dimension focusing on various indicators representing the situation of a specific area. Urban sustainability indicators are fundamentally based on three components. Environmental sustainability is a crucial parameter among the significant parameters of the sustainability concept. The fundamental starting point of this concept is the preservation and transmission of ecological systems to future generations (Huang and Wang, 2020). To reduce the vulnerability of urban areas, environmental sustainability needs to be integrated into urban management properly. Different principles and strategies have been developed to reduce or prevent negative effects on the environment, whether natural or human-made. Environmental principles of urban sustainability at a broad level include access to clean water and air, the use of renewable energy sources, green space utilization, waste management, green transportation, ecological footprint, climate change, and mixed land use. These principles consist of more detailed explanations and implementation strategies for each parameter. Environmental strategies include appropriate land selection, building orientation, the use of local materials, encouraging renewable energy in construction techniques, selecting recyclable materials, ensuring indoor thermal comfort, using non-toxic materials, improving disaster and risk resilience, and utilizing natural and passive systems (Table 1).

Table 2. Principles and Strategies of Urban Sustainability at the Economic Scale (Haapio,2012; Correia et al., 2014; Pan et al., 2016; Kuloğlu Yüksel and Karagüler, 2017; Verma and Raghubanshi, 2018; Anejionu et al., 2019; Bibri, 2020; Kong et al., 2020; Allen et al., 2020; Russo and Cirella, 2020; Michalina et al., 2021; Pallathadka et al., 2023)

Urban Sustainability Indicators	**Principles**
Economic Scale	• Supporting the local economy • Extending the lifespan of structures • Optimizing material usage • Preserving resources • Maximizing the building's life cycle • Developing green development strategies • Elevating the well-being level • Providing job opportunities • Tax Policies
	Strategies
	Utilization of Local and Accessible Materials and Resources • Encouraging the use of local materials and resources • Promoting indigenous craftsmanship production methods • Stimulating local production • Optimization of materials • Ensuring the appropriateness of building scale • Encouraging the use of low-recycled materials • Anticipating regular replacement of building components • Planning building maintenance • Constructing strong and durable structures • Utilizing recyclable materials • Promoting building density and compactness • Ensuring the supply of renewable energy • Developing construction systems suitable for local conditions • Enhancing natural ventilation, heating, and lighting systems

The economic scope is generally considered the most significant part of the sustainable domain, with financial values being accepted as fundamental indicators (Correia et al., 2014). It encompasses resource planning, conservation, management, and transmission to future generations. At the urban scale, planning for the optimal use, renewal, and long-term preservation of essential resources are included in future projections (Anejionu et al., 2019). The principles and strategies of economic-scale urban sustainability indicators are shown in Table 2. Fundamental principles at the economic scale can be listed as resource conservation and management, supporting the local economy, material usage, and providing job opportunities to the local population. Strategies are formulated using a wheel that includes structural, urban, and citizen involvement. Strategies are developed based on sustainable material usage, natural heating-lighting, recyclable material use, and preference for local materials and construction techniques (Table 2).

Table 3. Principles and Strategies of Urban Sustainability at the Social Scale **(**Lynch et al., 2011; Correia et al., 2014; Schwegler, 2015; Pan et al., 2015; Ahvenniemi et al., 2017; Ilieva& McPhearson, 2018; Zhang& He, 2020; Huang& Wang, 2020; Bibri, 2020; Michalina et al., 2021; Pallathadka et al., 2023)

Urban Sustainability Indicators	**Principles**
Social Scale	• Transmission of Cultural Codes to Future Generations • Preservation of Cultural Landscape • Enhancement of Well-being and Human Health • Transmission of Traditional Building Techniques to Future Generations • Preservation of Social Integrity • Establishment of Social Infrastructure • Ensuring Security • Social Security • Stakeholder Participation • Utilization of Green Spaces
	Strategies
	•Understanding the "Genius Loci" and Its transmission to future generations • Optimizing soil characteristics and microclimates through sustainable agriculture and land management •Public Access to Green Spaces •Facilitating the accumulation of experimental knowledge by allowing practical hands-on experiences • Recognizing the value of expertise and constructive memory • Involving younger generations in constructive processes • Acknowledging the value of roles and knowledge in traditional activities • Engaging all stakeholders in local governance and decision-making • Promoting diversity in building system solutions • Ensuring the transmission of building techniques developed through experiential knowledge gained in trial-and-error processes to future generations Transmitting Cultural Values and History • Creating community character and a sense of place • Recognizing local symbolic expressions • Enhancing building and production processes as cultural values • Attributing value to the development of collective well-being

Researchers studying sustainability in the built environment over the past ten years have found that current standards and approaches mostly prioritize the environmental aspect of sustainability. (Cole, 2005; Diaz-Lopez et al., 2019).). In other words, the developed sustainable approaches have overlooked mainly social and economic contexts. When examining the existing standards in the built environment, it has been observed that buildings lack indicators related to their environmental, social,

cultural, and economic aspects (Doan et al., 2017; Bernardi et al., 2017; Cucuzzella, 2011; Brandon and Lombardi, 2010). In this context, social sustainability holds a significant place within the framework of urban sustainability. Social sustainability indicators aim to bring together tangible and cultural positive impacts observable in local solutions (Oliver, 2006). Social sustainability indicators are complex data that emerge in the long term and are challenging to measure and finalize. At its core, preserving the soul of space and place and passing it on to future generations is considered among the social sustainability indicators. Urban memory involves the urbanite conveying the "spirit of the place" by experiencing the emotions awakened by the space. In addition, parameters such as social infrastructure, level of well-being, and security emerge as fundamental principles of urban social sustainability indicators. Urban social sustainability strategies can be listed as a series of components aiming to support stakeholder participation, include all stakeholders in local government decisions, and pass on cultural values and traditional construction methods to future generations (Table 3).

2. Material and Methods

2.1. General Characteristics of the Traditional Urban Fabric of Suriçi

Diyarbakır is located in the southeastern region of Turkey, on a vast plateau between Mount Karacadağ and the Tigris River. The traditional settlement pattern of Diyarbakır is located in the central part of Southeast Anatolia, on the eastern slope of Mount Karacadağ and the Tigris River (38° 51' N, 40° 21' E) (Darçın, 2020). Although precise information about the city's history is lacking, it is believed to date back to the Hittite and Hurrian periods (around 3500 BC) (Beysanoğlu, 2003). Diyarbakır has hosted various civilizations throughout its history and gained significance due to its strategic location in Upper Mesopotamia. The Historical Suriçi District of Diyarbakır is surrounded by walls that are 5 km in length and 6-8 meters in height (Demir, 2021; Yıldırım and Kiasif, 2023). The Suriçi District comprises 15 neighborhoods, and the settlement patterns are generally aligned through of north-south (Figure 1)

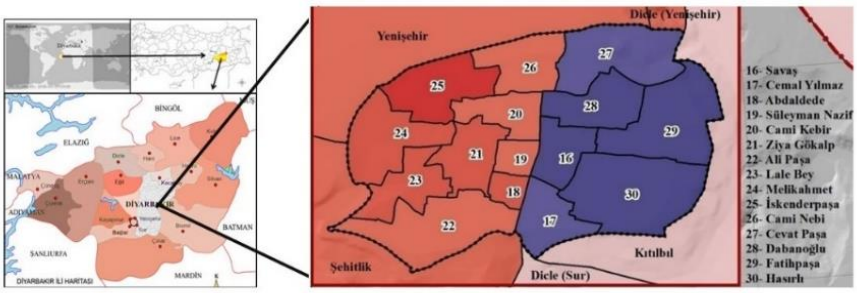


Figure 1. Location of Suriçi Urban Area and Neighborhood Representations (Yakut and Ceylan, 2019)

According to the Köppen climate classification, the city of Diyarbakır experiences a hot and arid Mediterranean climate with dry summers (Csa), and rainy winters (Yılmaz and Çiçek, 2018). Based on long-term data from the weather observation station located in the city center, the annual average temperature is determined to be 15.9 °C, with the highest and lowest temperatures recorded at 46.2 (July) and -24.2 (January), respectively. The annual average sunshine duration is 7.9 hours, and the average number of rainy days is 85.4. The prevailing wind direction is northwest during the winter season and west-northwest during the summer season (Table 4).

Table 4. Meteorological Data for the City of Diyarbakır (MGM, 2023)

Climate Period (1991-2020)													
	January	February	March	April	May	June	July	August	September	October	November	December	Anuel
Average Temperature (OC)	1.8	3.8	8.3	13.8	19.3	26.1	31.0	30.5	25.1	17.6	9.7	4.1	15.9
Average Highest Temperature (^{O}C)	6.7	9.2	14.5	20.5	26.6	33.6	38.4	38.3	33.4	25.4	16.3	9.2	22.7
Average Lowest Temperature (^{O}C)	-2.2	-1.0	2.5	7.0	11.3	16.6	21.7	21.1	16.0	10.1	4.2	-0.2	8.9
Average Sunshine Duration (hour)	3.9	4.9	5.6	7.2	9.6	12.2	12.4	11.7	10.0	7.5	5.5	3.9	7.9
Ortalama Yağışlı Gün sayısı	12.33	11.34	11.83	11.22	8.74	2.66	0.47	0.32	1.07	5.71	8.17	11.50	85.4
Average Rainy Days	70.3	67.2	66.7	68.4	44.8	8.7	1.3	1.0	5.4	32.6	55.4	71.5	493.3
Measuring Period (1929-2020)													
The highest temperature (^{O}C)	16.9	21.8	28.3	35.3	39.8	42.0	46.2	45.9	42.2	35.7	28.4	22.5	46.2
The lowest temperature (OC)	-24.2	-21.0	-14.0	-6.1	0.8	1.8	9.9	11.4	0.0	-1.8	-12.9	-23.4	-24.2

2.2. Case Study: Alipaşa-Lalebey Neighborhood

In 2008, an urban design project was prepared within the scope of the "Diyarbakır Alipaşa and Lalebey Neighborhood Urban Renewal (Transformation of slum) Project" to end informal settlements. However, most of the neighborhood residents rejected the transformation, so the demolition process was halted. In discussions that resumed in 2009, it was stated that adherence to the Conservation Development Plan would be maintained within urban renewal, and a conditional protocol was signed accordingly (Korkma, 2016). In 2010, a protocol was signed with the Mass Housing Administration as part of the İçkale Urban Transformation project, and the transformation process partially began. However, due to the residents of Alipaşa-Lalebey Neighborhood refusing to leave their homes, urban renewal efforts were suspended. In 2015, based on the Urgent Expropriation Decision and the Urban Renewal project for Suriçi initiated in 2012, following the Disaster Risk Area Decision made in 2012, the process of expropriation and urban renewal in Alipaşa-Lalebey Neighborhood commenced (Yakut and Ceylan, 2019).

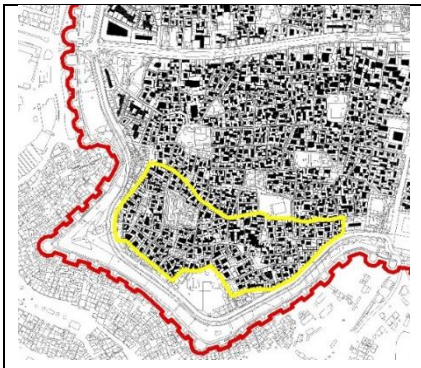
Figure 2. Diyarbakır Alipaşa and Lalebey Neighborhood Urban Renewal Project

Alipaşa-Lalebey Neighborhood is the first settlement unit where the urban renewal project commenced. Aerial photographs depicting the urban transformation and the pre-transformation era in Alipaşa-Lalebey Neighborhood are shown (Figure 5). Changes in the original fabric are chronologically indicated in the aerial photographs. The reconstruction phase started in the southwest part of the region (İpek, 2020).

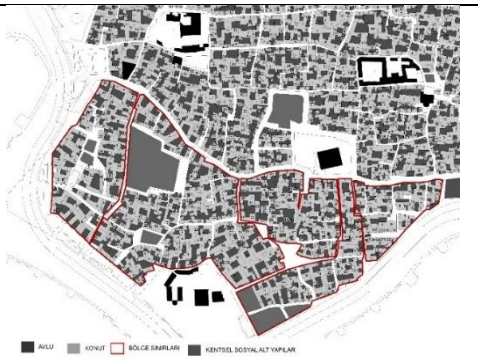
		
2013	2016	2018
		
2019	2020	2022

Figure 3. Change of Alipaşa-Lalebey Neighborhoods Over the Years (Aerial View/Google Earth)

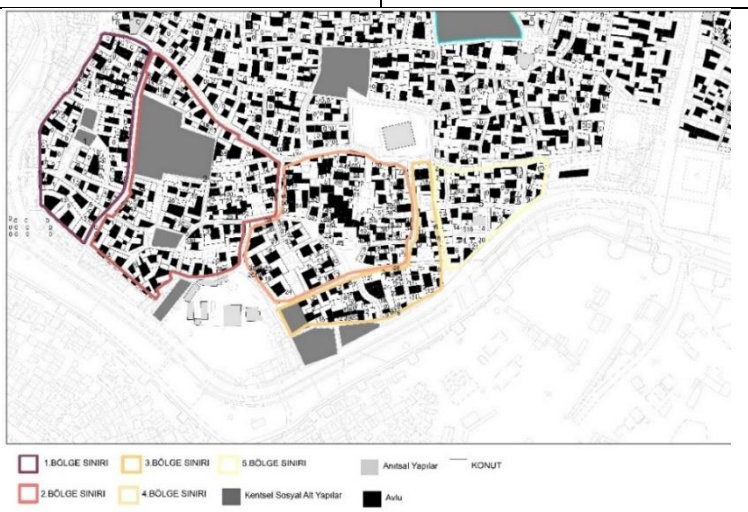
The Alipaşa-Lalebey Neighborhood Urban Renewal Project was initiated by the Ministry of Environment and Urbanization. Housing production activities in Alipaşa and Lalebey neighborhoods were divided into 5 regions undertaken by 5 different contracting companies (Aslan and Dündar, 2022).



Diyarbakır Alipaşa and Lalebey Neighborhood Urban Renewal (Transformation of Slum)



Project 2016 Conservation-Development Plan Revision



Zoning of Alipaşa-Lalebey Neighborhood Urban Renewal Project

Figure 4. Comparison of Diyarbakır Alipaşa and Lalebey Neighborhood Urban Renewal (Transformation of Slum) Project and Conservation Development Plan

2.3. Methodology of the Study

Within the scope of the study, the Conservation-Oriented Zoning Plan for 2016 and the Urban Renewal Project prepared in 2018 for Alipaşa and Lalebey Neighborhoods were mapped using the Geographic Information Systems (GIS)-based ArcMap program. ArcMap was preferred due to its user-friendly interface and support for resource and land management, urban design, transportation, risk analysis, and other spatial features (Chen, 2021; Haydarovich, 2023). Thematic maps of KAİP and Urban Renewal Projects created through the ArcMap program were analyzed within the framework of environmental sustainability indicators. Changes in street patterns, block-plot relationships, courtyard typologies, and density-void relationships were compared at the environmental scale in the context of urban sustainability principles (Figure 3).

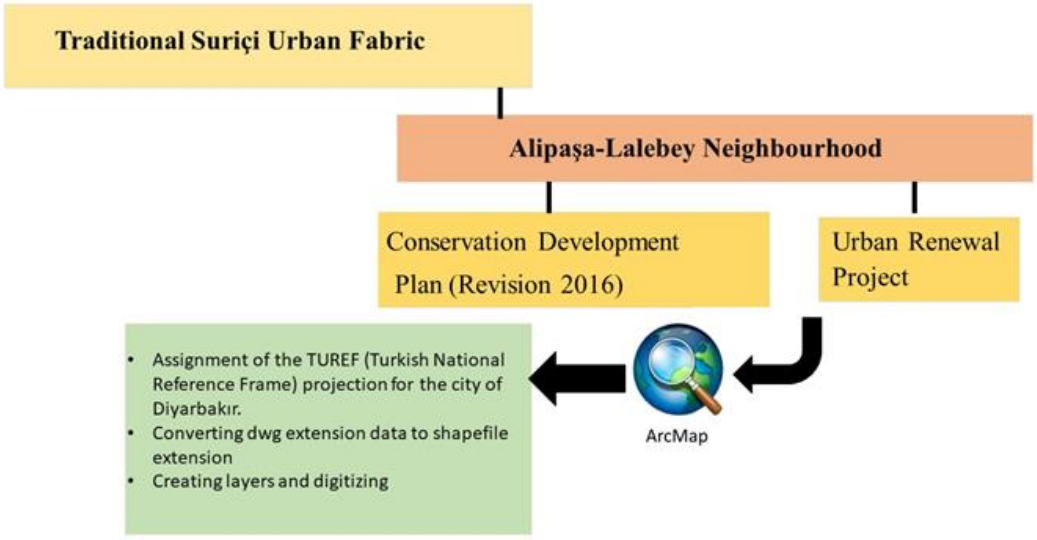


Figure 5. Methodology of the Study (Environmental Scale Assessment)

In the next step of the study, fieldwork and in-depth interviews were conducted to understand the spirit of the historical fabric comprehensively. Comparisons and evaluations were made through of social and economic indicators. Indicators related to social sustainability principles, such as traditional construction techniques, accessibility, urban identity, stakeholder participation, and urban memory, were obtained through fieldwork and in-depth interviews. These data were used to make meaningful comparisons for evaluating the new settlement unit. In the Alipaşa-Lalebey Neighborhood, economic sustainability was assessed by implementing key strategies such as the economic use of local resources, encouraging local craftsmanship productions, optimizing resource use and materials, and using renewable energy. Additionally, elements such as developing construction systems suitable for local conditions and extending the building's life cycle were examined within the framework of economic indicators (Figure 5 and 6).

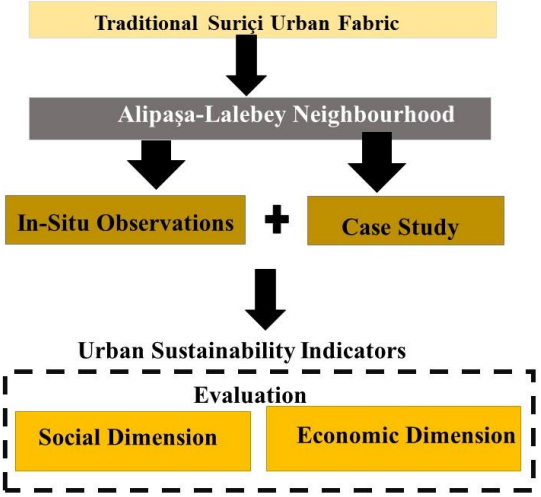


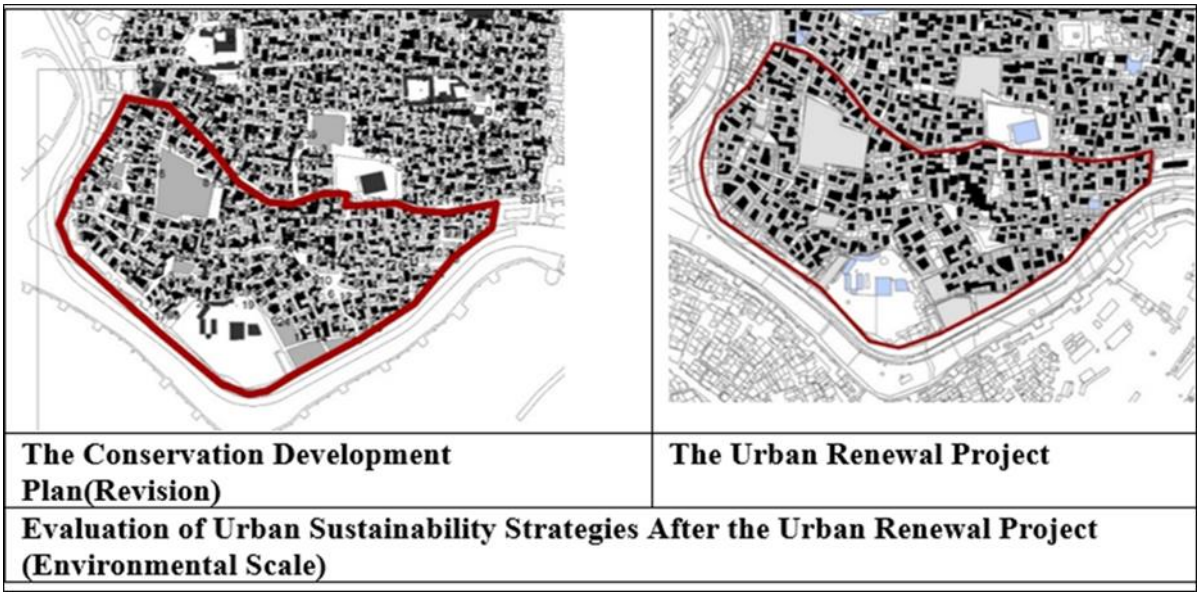
Figure 6. Methodology of the Study (Social and Economic Scale Assessment)

3. Data Analysis: Evaluation of Alipaşa-Lalebey Neighborhood Urban Renewal Project in the Context of Urban Sustainability

3.1. Evaluation of Environmental Sustainability Indicators

The Alipaşa-Lalebey Neighborhood urban renewal project, evaluated within the framework of environmental sustainability indicators, was compared with the Conservation Development Plan in terms of urban form, green area usage, accessibility-transportation, and connectivity scale. As a result of the comparisons, it was observed that the design continued to follow a compact urban form after implementing the urban renewal project. Similarly, recreational areas previously used as parks and green spaces were preserved after the urban renewal project. The narrow streets ranging from 2 to 4 meters in the traditional Sur inner-city fabric, serving only pedestrian traffic, were also considered essential traditional passive cooling strategies due to their shading effect. As a result of the urban renewal project, street widths expanded for vehicle safety and emergency reasons were designed at an accessible scale (Table 5).

Table 5. Comparison of Environmental Sustainability Indicators at the Urban Scale



Evaluation of Urban Sustainability Strategies After the Urban Renewal Project (Environmental Scale)		
Strategies	**The Traditional Urban Texture (Suriçi)**	**Urban Renewal Project in Alipaşa-Lalebey Neighborhood**
Compact Urban Form and Mixed Land Use (Burgess, 2000; Jabareen, 2006; OECD, 2012b; Kotharkar et al., 2014; Correia et al., 2014; Ghonimi, 2017a, Bibri et al., 2020; Khatibi et al., 2023)	The Traditional Suriçi urban texture is an example of a compact urban form and mixed land use (Erdemir, 2014; Özdemir, 2016).	There has not been a radical change in the compact urban form as a result of the urban renewal project. Access to significant commercial arteries of the city, as well as transportation to various functions such as health and education, has been designed in accordance with

		the Conservation Development Plan.
Green Space Utilization (Jabareen, 2006; Correia et al., 2014; Abu-Rayash&Dinçer, 2021; Meerow& Newell, 2019; Kong et al., 2020; Khatibi et al., 2023)	The urban fabric of the historical city consists of various street arrangements and courtyard plan typologies. Today, active green spaces are mainly located in the courtyards of existing buildings in this area (Tuncer, 1999; Akın & Koca, 2017).	The Conservation Development Plan has designed public park areas in the urban renewal project. However, upon examining the courtyards of residential structures, it has been determined that the usage of landscape elements such as trees and water features has decreased, reducing the proportion of hard surfaces.
Connectivity , Permeability, accessibility and proximity (Dempsey &Jenks, 2010; Correia et al., 2014; Ghonimi, 2017a; ; Kong et al., 2020; Farouk et al, 2024)	The characteristics of the hot-arid climate region have led to the design of passive solar protection strategies in the historical texture. In other words, narrow streets ranging from 2 to 4 meters wide, designed exclusively for pedestrian access and closed to vehicular traffic, are considered significant characteristic features of the historical fabric (Tuncer, 1999; Dağtekin et al., 2018).	In order to ensure emergency access for security, ambulance, and fire services, street widths have been designed to be at least 5 meters wide, allowing vehicular passage. Within this framework, all streets have been redesigned to be accessible for pedestrian and vehicular use.

At the scale of street layout, environmental principles of urban sustainability such as street access, energy-efficient design, passive design strategies, natural ventilation and lighting, building layout, and form, and the use of local materials were compared with the old settlement. In regions 2 and 3, building blocks have been separated and expanded by roads to ensure the continuity of transportation. This situation has ensured the continuity of both vehicular and pedestrian traffic. However, in terms of passive design strategies and energy-efficient design principles, the decrease in shadow effect has reduced the impact on indoor and outdoor comfort.

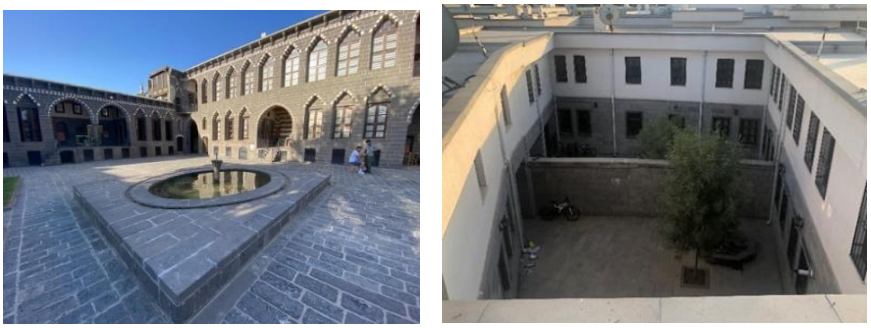
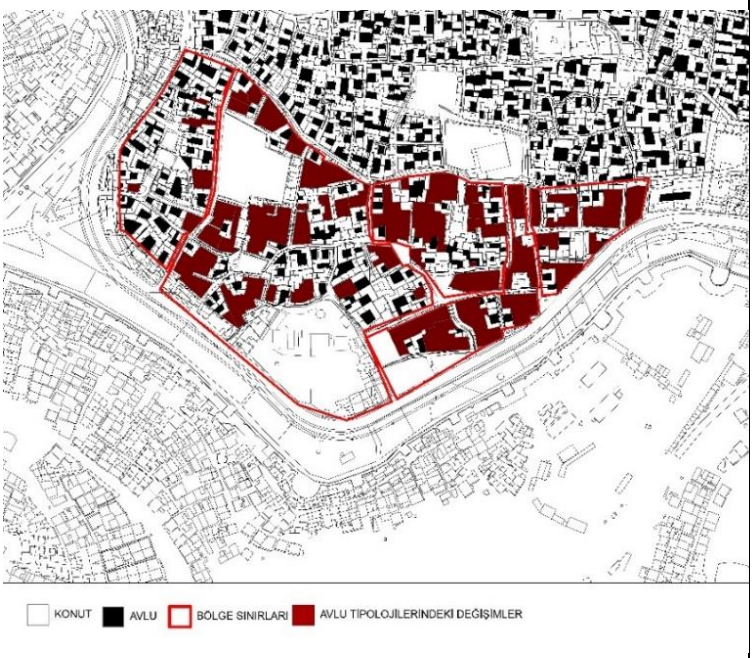


Figure 7. Examples of Courtyards in the Old and New Residential Structures

The changes in courtyard typologies are shown in Table 6. Evidently, there have been changes in the majority of courtyard typologies in all regions, and they are not designed per the Conservation Purpose Zoning Plan. Altering street patterns, courtyard-parcel relationships, and the orientation of buildings not designed to be climate-appropriate, as well as opening transparent surfaces to street facades, will increase solar radiation, leading to increased annual cooling loads. Building systems did not use traditional building construction techniques such as shell, roof, and flooring. Reinforced concrete structures and thin-cut stone cladding surfaces were used on the facades. Roofs featured parapet, terrazzo cladding, and insulation, which were not used in traditional Diyarbakır houses. Detailed comparisons at the environmental scale are presented in Table 6.

Table 6. Comparison of Environmental Sustainability Indicators at the Scale of Urban Block-Parcel-Building Relationship

The Scale of Neighborhood Unit	Courtyard typologies changing according to the Conservation Development Plan
The Urban Renewal Project	
 	
The Conservation Development Plan (2016 Revision)	

Strategies	The Traditional Urban Texture (Suriçi)	Urban Renewal Project in Alipaşa-Lalebey Neighborhood
Adequate space for streets and accesebility (Song and Knapp, 2004;; Dempsey et al., 2010; UN-Habitat, 2015; Bibri et al., 2020)	The original texture of the urban fabric is shaped by walkable streets and roads that restrict private vehicle access (Akın and Koca, 2017; Kara, 2019).	The organic narrow street structure has been opened to private vehicle use and designed to accommodate the parking needs of each household to adapt to contemporary housing production forms. In the third region, the 3-meter-wide streets have been expanded to 5 meters with the 2016 Protection-Oriented Zoning Plan revision. This revision aimed to increase the width of the streets from 2-3 meters to up to 5 meters.
Energy Efficiency Design (Jabareen, 2006; Bibri, 2018; Abu-Rayash and Dinçer, 2021; Pallathadka et al., 2023; Du et al., 2024)	The narrow streets, which protect from the harsh summer heat, have emerged in the inner-city urban texture due to the positioning of building blocks and parcels, creating organic street forms and dimensions (Tuncer, 1999).	The street patterns and widths, building-plot relationships, changes in courtyard typologies, and the use of reinforced concrete in building shells have negatively impacted the annual cooling load by increasing solar radiation.
Passive Solar Design (Thomas, 2003; Jabareen, 2006; Kotharkar et al., 2014; Bibri, 2018; Bibri, 2020a; Bibri, 2020b; Bibri and Krogstie, 2020a)	Narrow streets, vault gates, and street elements like oriels and courtyard housing typologies are considered significant traditional passive cooling strategies in the traditional inner-city urban texture (Ayçam et al., 2020; Bekleyen, 2019; Akın and Koca, 2017; Ergin et al., 2020).	The widening of the streets in the urban renewal project has reduced shading, leading to the heating of surfaces, which, in turn, has adversely affected passive cooling systems. Elements such as bays and dead-end streets, dependent on shading effects, can prevent solar-induced heating of surfaces, optimizing thermal comfort indoors during the summer.

Natural Ventilation and Lighting (James, 2014; Ghonimi, 2017a; Melikoğlu and Bekleyen, 2021; Khatibi et al., 2023)	In the Traditional Suriçi street pattern, the orientation of facades toward courtyards is influenced by climatic and privacy reasons. The street silhouette comprises blind facades and bay window passages (Direk, 2006; Ergin et al., 2020). Street widths vary between 1.90 and 2.50 meters, but it is observed that they increase up to 3.00-4.00 meters (Dağtekin et al., 2018).	While narrow streets incorporate a design approach that accelerates wind effects and allows for cross ventilation, widening the streets has reduced wind speed. This has resulted in a decrease in the cooling effect provided by water elements on courtyard surfaces. Additionally, in the new settlement structure, windows have been opened to surfaces facing the street layout, leading to issues with privacy, visual comfort, and the ineffective use of cross-ventilation techniques.
Building Layout, Form and Typology (Thomas, 2003; Song and Knapp, 2004; Jabareen, 2006; Dempsey et al., 2010; (Ghonimi, 2017a; Mangan et al., 2020; Shareef and Altan, 2021;	In the Traditional Suriçi structure of Diyarbakır, the dominance of a hot-arid climate has led to houses being oriented towards spacious courtyards, creating an inward-focused construction (Tuncer, 1999; Oruç, 2017). Preserving traditional houses' courtyard and parcel layout, maintaining the ratio of built and open spaces, controlling density, preserving unique courtyard walls, and distinctive street paving are accepted principles (Soyukaya, 2015)	As a result of the urban renewal project, courtyard-building relationships have been altered, leading to disruptions in street patterns and reduced shading effects. Courtyard typologies and building orientations have also been changed, introducing orientations unsuitable for hot-arid climate regions.
Local Construction and Material (Tanguay, 2010; Correia et al., 2014; Juaidi; 2019; Ergöz Karahan et al., 2023; Khatibi, et all, 2023)	The Traditional Suriçi courtyard houses in Diyarbakır use region-specific basalt stones. Wall thickness varies based on structural or dividing functions, with load-bearing walls using non-porous basalt stones in the 0.5-0.8 cm (Oruç, 2017; Oğuz and Halifeoğlu, 2017). Roofs of Traditional Diyarbakır houses	Following the urban renewal project, the new residences have been constructed with reinforced concrete structures and basalt cladding. Terrazzo covering, using various insulation materials on top of reinforced concrete, has been employed as a roofing

	are constructed by covering wooden beams with thatch, chipboard, and stones and then plastering them with mud or black soil (Oğuz and Halifeoğlu, 2017).	material for the new houses.

3.2. Evaluation of Social Sustainability

Social sustainability is directly related to the quality of life and the level of well-being. It aims to provide equal access to essential services such as health and education for every social group, regardless of gender and economic status (Eizenberg and Jabareen, 2017; Mohamed et al., 2020). As discussed in the Habitat Agenda, social sustainability covers critical issues such as health, safety, housing, productive life, free will, and the quality of the built environment. In this context, steps for the future need to be taken at the social and economic levels to achieve sustainable development goals. The historical urban fabric of Diyarbakır's Sur district, with its cosmopolitan structure, continues to be a living open-air museum with multicultural characteristics. In this context, the physical changes in the urban fabric have led to differences in architectural or urban design approaches and directly impacted the needs and social lives of the people experiencing the area. In this context, social sustainability indicators at the social level include principles such as equality, quality of life, well-being, cultural diversity and identity, health, safety, accessibility, demographic status, transmitting traditional construction techniques to the future, and preserving cultural landscapes (Sachs, 1999; Ding, 2005; Colantonio, 2009; Dempsey et al., 2011; Landorf, 2011; Correia et al., 2014; Weingaertner and Moberg, 2014; Ahvenniemi, 2017; Da Costa, 2017; Ahmad and Thaheem, 2017; Korkmaz et al., 2019; Mohamed et al., 2020; Zhang and He, 2020; Bibri, 2020; Fatourehchi and Zarghami, 2020; Sharifi, 2021; Michalina et al., 2021; Ergöz Karahan et al., 2023). Cultural diversity and identity are highlighted as critical vital themes in social sustainability. Urban identity is shaped by physical, cultural, socio-economic, and historical processes. The urban form changes dynamically according to the city's identity and the lifestyles of its residents. The formation of urban identity consists of various variables such as historical texture, cultural level, traditions, customs, and geographical context, covering an extended period (Tekeli, 1991; Kaypak, 2010; Boussaa, 2017). Urban culture can be defined as the abstract and tangible values that the community has accumulated cumulatively over decades by narrating the ways of life of the people living in the city. Urban culture directly impacts the emergence of urban identity (Güler et al., 2016; Binnur and Dönmez, 2021).

Figure 8. Street Pattern Examples of Old-New Urban Texture

In this context, the Alipaşa-Lalebey Neighborhood urban renewal project has been compared to the traditional fabric regarding urban identity and culture. It has been identified that the characteristic features of traditional urban fabric, such as the use It has been identified that the characteristic features of the traditional urban fabric, such as the use of basalt material, narrow streets, blind facades facing the street, and wings of structures that vary according to seasons, were not designed in a way that corresponds to the authentic texture in new settlements. In addition, changing the patterns of block-parcel-street fabric and the ratio of built to open spaces will prevent the local people experiencing the city from conveying various design codes to future generations and hinder the sustainability of cultural values. In other words, bringing contemporary interpretations to traditional fabric in terms of materials and design scale will disrupt social memory and prevent the transfer of cultural heritage to the next generation. Another principle that defines urban sustainability on a social scale is accessibility and universal design. In other words, when evaluating an area or settlement in the context of social sustainability, there should be accessible areas that people of all ages and scales can equally benefit from and use. In this context, the street pattern, which previously allowed only pedestrian access, has been opened to vehicle use for security and emergency reasons after urban transformation and expanded to a scale that will meet the parking needs of each residence. In this context, accessible areas have been designed at every scale. Transmitting traditional construction techniques to future generations is an essential criterion for social memory and the sustainability of traditional urban fabric. The formation process of courtyard houses that make up Diyarbakır's Sur district was created through vernacular design principles, also known as "architects without architects," based on experience, knowledge, and accumulation. In this context, the new housing fabric after the urban renewal project was compared to the traditional fabric in the roof, wall cladding, and construction technique scale. As a result of the comparisons, it was determined that the walls of houses, which were previously made of solid basalt stones, consist of reinforced concrete material in the new housing area. Previously called roofs, they were walkable units open to everyday life uses of the local people; in the new houses, roofs are designed as roofs that cannot be walked on with parapet walls. In this context, traditional techniques and material usage were not encountered in the new housing fabric. This situation has hindered the transmission of traditional methods to future generations, preventing social sustainability.

3.3. Evaluation of Economic Sustainability

Urban sustainability aims to improve city life and create a sustainable environment for future generations by addressing economic, environmental, and social contexts in an integrated manner (EEA, 2023). One of the most critical parameters that addresses sustainability's quantitative scale is the economic sustainability principle (Correia et al., 2014). Ensuring the efficient use of resources and transferring them to future generations are among economic sustainability goals. In this context, resource use and conservation policies are evaluated in urban economic sustainability to ensure reproduction and recycling (Anejionu et al., 2019; Zeng et al., 2023). Urban economic sustainability involves critical strategies through the use of local resources, the promotion of local craftsmanship productions, the optimization of resource use and materials, the utilization of renewable energy, the development of construction systems suitable for local conditions, and the extension of the life cycle of structures (Haapio, 2012; Correia et al., 2014; Pan et al., 2016; Verma and Raghubanshi, 2018; Anejionu et al., 2019; Bibri, 2020; Kong et al., 2020; Allen et al., 2020; Russo and Cirella, 2020; Michalina et al., 2021; Pallathadka et al., 2023) that can be listed to ensure urban sustainability on an economic scale.

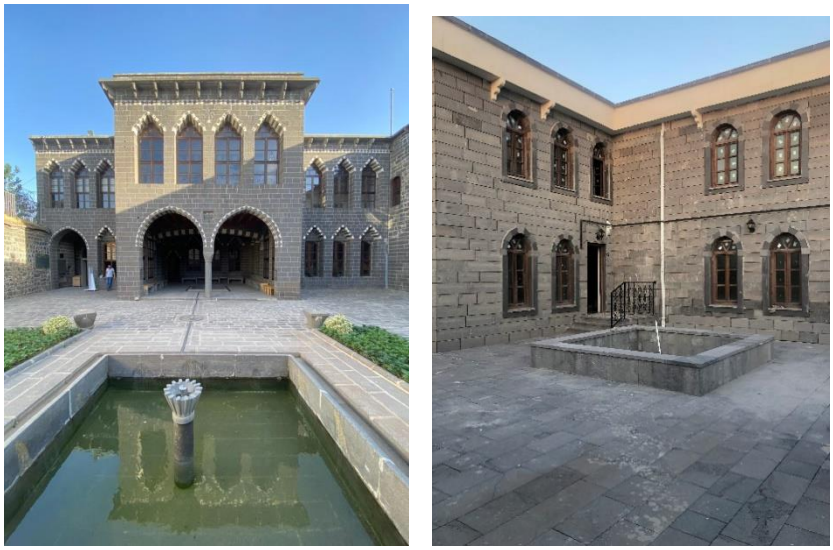


Figure 9. Examples of Facade-Courtyard in Old-New Urban Fabric

When assessing the Alipaşa-Lalebey Neighborhood urban renewal project within the framework of the economic sustainability principle, it is observed that local economic materials and resources are not obtained from region-specific materials. In other words, it is determined that facades, roof decking materials, and coatings are obtained from contemporary reinforced concrete systems. When considering the recycling of materials and resources, it is found that the used reinforced concrete materials, with a life span of 50-60 years, will produce a significant carbon footprint both during the construction phase and the demolition process, and their reuse is not feasible. Crafts such as-coppersmithing, goldsmithing, leatherworking, engraving, and stonemasonry have been preserved from the past to the present as important professions and industries in the historical fabric of Suriçi. However, with the Industrial Revolution, global developments have led to the decline of labor-intensive production methods on a global scale (Zümrüt, 2021). In this context, the essential aesthetic values of Traditional Diyarbakır houses include metal elements (door knockers, railings, balustrades, etc.), stone features (sliced, circular star arches), and wooden decorations (sills, chestnut, seat railings) (Haspolat, 2014). In this context, after the urban renewal project implemented in the Alipaşa-Lalebey Neighborhood, craftsmanship and decorations on doors and windows were not encountered in the new housing fabric. This situation will lead to the forgetting of tangible cultural heritage values preserved from the past to the present and prevent the transmission of these craft teachings and experiences to future generations. In other words, the failure to transfer local-specific production and handicraft forms to the next generation contradicts economic and social sustainability principles.

4. CONCLUSION:

Issues such as climate change, land use, air pollution, and the depletion of renewable resources are highlighted as significant environmental problems that cities face. The Agenda 21 report, published in 1992, is considered among the important sources emphasizing the necessity of sustainable cities (Khatibi et al., 2023). This document is recognized as an important political focus highlighting the necessity and awareness of the concept of sustainable cities. In this context, the planning of cities within the framework of sustainability indicators covering social, economic, and environmental scales is shown to be an essential resource for preventing environmental crises such as climate change in the future. Therefore, indicators covering social, economic, and environmental scales related to urban sustainability parameters need to be integrated into urban planning with the development of correct policies and strategies. Traditional urban fabrics should be showcased as exemplary models of sustainable cities. In this context, referencing the traditional fabric in local-specific urban design plans

contributes to building more sustainable futures. Within the scope of this study, the Traditional Urban Settlement Pattern, including the Diyarbakır walls listed on the UNESCO World Heritage List, and the Historical Suriçi, where the Urban Renewal Project was initiated in 2015, were discussed, with the Alipaşa-Lalebey Neighborhood identified as the study area. The completed Urban Renewal project in the Alipaşa-Lalebey Neighborhood was compared with the old urban fabric regarding sustainable evaluation indicators. The study method was determined as literature review, GIS, and case study. The new urban fabric was compared with the old settlement pattern within the social, environmental, and economic urban sustainability indicators. Using the ArcMap program, the old-new settlement patterns, Conservation-Purpose Zoning Plan, and Urban Renewal projects were mapped and evaluated in line with environmental sustainability principles. The evaluation of environmental scale sustainable indicators revealed that characteristics such as street pattern, building block, parcel, and building typologies' changes, local-specific material usage, and other features did not provide broad references to the traditional fabric. This situation resulted in the non-application of traditional passive design strategies in new housing fabrics. The reduction of courtyard occupancy-empty ratios, the increase in street width, and the evacuation of building blocks will increase energy loads by reducing shadow effects and hindering internal-external space comfort. When evaluated within the framework of social sustainability, it was determined that the characteristic features of the traditional urban fabric, such as the use of basalt material, narrow streets, blind facades facing the street, and wings of structures that vary according to seasons, were not designed in a way that corresponds to the authentic texture in new settlements. In addition, changing the patterns of block-parcel-street fabric and the ratio of built to open spaces will prevent the local people experiencing the city from conveying various design codes to future generations and hinder the sustainability of cultural values. In other words, bringing contemporary interpretations to traditional fabric in terms of materials and design scale will disrupt social memory and prevent the transfer of cultural heritage to the next generation. The change in street widths contradicts the principle of social sustainability in ensuring accessibility and universality while being important for urban identity, and the widening of narrow streets contradicts the communal memory. Finally, when the urban renewal project is evaluated within the economic sustainability framework, it is observed that local resource usage is not preferred, limiting recycling opportunities and increasing the carbon footprint both in the construction stage and the demolition process. In addition, the decrease in traditional jobs and professions has reduced the impact on the local economy. It is recommended that local and public authorities incorporate economic, social, and environmental sustainability indicators when developing urban planning policies. Furthermore, it is advised that urban renewal projects prioritize the preservation of cultural heritage and ensure the participation of local communities. The preservation of traditional urban fabrics should be emphasized, recognizing them as exemplary models of sustainable cities. Local-specific urbanization plans should maintain the characteristic features of traditional fabric by referencing them, thereby promoting sustainable urban development. Additionally, within urban renewal projects, active preservation of cultural heritage should be a focal point, encompassing not only the physical aspects of historical structures but also the social, cultural, economic, and communal memories associated with these areas. When the Alipaşa-Lalebey Neighborhood urban renewal project is evaluated within the framework of urban sustainability indicators, it is concluded that sustainability principles in economic, social, and environmental scales do not design the urban planning applied in the new housing fabric. In this context, it is concluded that urban renewal should not consider the historical fabric only as a physical space. These spaces are "living spaces," and planning should consider the local people's social, cultural, economic, and communal memories. The importance of developing plans considering these factors is demonstrated by this study. This study aims to guide future urban renewal projects in historical areas in hot-~~dry~~ arid climate regions by comprehensively considering social, environmental, and economic urban sustainability principles to create more effective sustainable cities.

Compliance with Ethical Standard

Conflict of Interest: *The author(s) declare that they do not have a conflict of interest with themselves and/or other third parties and institutions, or if so, how this conflict of interest arose and will be resolved, and author contribution declaration forms are added to the article process files with wet signatures.*

Ethics Committee Approval: *Ethics committee approval is not required for this article, and a wet-signed ethics committee decision form stating that it is not required has been added to the article process files on the system.*

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