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SUSTAINABLE ECOLOGICAL PARK DESIGN APPROACHES: AM EXAMPLE OF ZAGNOS VALLEY[1]

SÜRDÜRÜLEBİLİR EKOLOJİK PARK TASARIM YAKLAŞIMLARI: ZAĞNOS VADİSİ PARKI ÖRNEĞİ

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ABSTRACT

In recent years, the rapid depletion of natural resources due to intensive urbanization and technological developments has caused the ecological balance to deteriorate. Particularly urban spaces have become the most affected structures in this situation as the natural environment gradually decreases. Impacts of environmental conditions on the negative side necessitated more precise measures with natural processes in each area. As in other areas of work, spaces have been designed in urban green ecosystem designs in urban green planning based on ecological principles that are compatible with nature. Ecological planning approaches in landscaping designs have come into being with appropriate spatial compositions in line with natural processes, in line with area needs. The main objective of ecological planning approaches is; to create a balance between nature and man by ensuring ecological integrity by including sustainable planning, design and implementation phases of the people, cycles and processes that make up the landscape. For this reason, ecological parks, unlike urban parks, provide social and economic contributions to the city in accordance with certain criteria. Even though ecological planning approaches are not applied much in urban areas of Turkey yet, studies done in this way will be an example. In this study, ecological parks in open green areas from urban planning approaches are addressed in terms of landscape planning, design and method approaches (field suitability, aesthetics, sustainability, plant design, wildlife organization, management and maintenance, field mission). In this context, Trabzon city parks Zağnos Valley Park selected as the study area were evaluated with this approach. The results have been compared with other applied ecological parks and suggestions have been made for the implementation and implementation of similar studies.

Keywords: Landscape design, ecological design, Trabzon, ecological park

ÖZ

Özellikle son yıllarda yoğun kentleşme ve teknolojik gelişmelere bağlı olarak doğal kaynaklar hızla tükenerek ekolojik dengenin bozulmasına neden olmuştur. Bu anlamda kentsel alanlar, doğal ortamların kademeli olarak azalmasından en fazla etkilenen yapılardır. Çevresel koşulların yaşattığı olumsuz sonuçların etkileri her alanda önemli ve kesin tedbirlerin alınmasını gerekli kılmıştı. Bu nedenle her alanda olduğu gibi doğayla uyumlu olan kentsel yeşil alan planlama ekolojik ilkelere dayanan tasarım ilkelere gündeme gelmiştir. Peyzaj tasarımlarında ekolojik planlama yaklaşımları, alan ihtiyaçları doğrultusunda doğal süreçlerde uygun mekansal kompozisyonlarla ortaya çıkmıştır. Ekolojik planlama yaklaşımlarının temel amacı; sürdürülebilir planlama, insanların tasarım döngüleri ve süreçleri, peyzajı oluşturan süreçler dahil edilerek ekolojik bütünlüğü sağlayarak doğayla insanlar arasında bir denge kurmaktır.

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Bu nedenle, ekolojik parklar kent parklarının aksine, belirli kriterlere uygun olarak kente sosyal ve ekonomik katkılar sağlamaktadır. Ekolojik planlama yaklaşımları henüz kentsel alanlarda fazla uygulanmamasına rağmen, bu şekilde yapılan çalışmalar gelecekte bir örnek olacaktır. Bu çalışmada kent planlama yaklaşımlarından peyzaj planlama, tasarım ve metot yaklaşımları alana uygunluğu, estetik, sürdürülebilirlik, bitkisel tasarım, yaban hayatı organizasyonu, yönetim ve bakım, alan misyonu açısından açık yeşil alanlardaki ekolojik parklar ele alınmaktadır. Trabzon kent parkı niteliğinde çalışma alanı olarak seçilen Zağnos Vadisi Parkı bu yaklaşımla değerlendirilmiştir. Sonuçlar, uygulanan diğer ekolojik parklarla karşılaştırılarak ve benzer çalışmaların uygulanması için öneriler geliştirilmiştir.

Anahtar kelimeler: Peyzaj tasarımı, ekolojik tasarım, Trabzon, ekolojik park

1. INTRODUCTION

Cities are settlement areas consisting of small neighborhood units that constantly hold social developments and meet the needs of society such as settlement, work and rest (Keleş, 1998). In fact, urban areas are complex and dynamic systems. As the society changes and transforms depending on its physical, economic and ideological structure, it can cause many changes within itself (Akkar, 2006). However, in almost all cities of today's cities there are sections or places that enable the community to live, work, entertain and rest. It is possible to classify these places according to their functions as residential areas, trade and business areas, industrial areas, transportation areas, social facilities, recreational areas and natural areas (Gül & Küçük, 2001).

Increasing population growth and industrial developments in recent years have damaged the natural environment in which people live. On the other hand, protection of nature as an environmental consciousness, restoration and creation of new natural habitat environments are indispensable elements of people (Kesim, 1996; Akyol Şatıroğlu & Yeşil, 2016)). For this reason, it is obligatory to take new approaches and planning steps to provide natural living environments in cities today (Ertaş, 1994). The first priority was the 'urban ecology' movement in the 1970s, and the conscious movement towards the neighbourhood continued to evolve in the 1980s (Özgüner, 2003). For the first time in the World Commission on Environment and Development, the concept of sustainability has been described as "development that meets today's needs without compromising the ability of future generations to meet their needs" (Brundtland, 1987). Within the framework of the Environmental Development Conference held in Rio in 1992, the concept of 'sustainability' has come to the fore, and the development and protection of urban ecosystems has become increasingly important with the aim of sustainable cities and environmental balance (Erdoğan Onur, 2012). The starting point of the conception of the meeting was to prevent environmental problems that arise parallel to economic and technological developments (Kiper et al., 2017). Sustainability of cities necessitates continuity and ensures that social, economic or ecological system functions continue without deterioration and depletion. Sustainable cities make healthy decisions in the long run and ensure that the right steps are taken.

2. THEORETICAL BACKGROUND(S)

2.1. Ecological Planning for Urban Landscape Design

Ecological planning is the whole set of actions aimed at preventing environmental problems in sustainable cities. Planning action is seen at different levels in terms of quality and quantity, individual and social or private and legal. Ecological approaches in landscape design studies on small scales are aimed at bringing solutions that follow the natural processes by taking the model of the nature itself and harmonize the structural and functional features of the area with nature.

Especially in recent years, versatile ecological approaches have been developed in landscape planning. In this context, the ecology-economy balance is absolute and it becomes a necessity to make appropriate planning for the pressures on resources for the sparing of natural resources (Dramstad et al., 1996; Marsh, 1997). In addition to this, in the cities, which are used intensively, the aesthetic front panel is kept on the second plan of making natural processes and ecology. This has harmed the natural structure, causing a change from the nature to the structure over time due to aesthetic concerns in landscape designs (Bradley, 1982). In this sense, ecology is seen as the most effective tool for preserving nature and natural resources. Various approaches to ecological planning, ranging from past to present, have been put forward for conservation and sustainable use of natural resources (McHarg, 1992; Steiner, 2000, Ndubisi, 2002). According to McHarg (1969), for sustainable development, nature and natural processes must be included in planning and design work. However, it should be considered that the results of the study will emerge over time, depending on the dynamic process of nature. It should not be forgotten that especially in cities, the process of this process could be slowed down by the fact that the existence of natural areas is low. In this

context, nature and design approach are becoming increasingly important in areas where natural features are preserved in urban areas (Korkut et al., 2017). The most prominent study in this sense is the work that McHarg (1969) has developed by developing. The targets of this approach are;

- ✓ Preservation of existing landscape characters
- ✓ Design according to ecological conditions and climate
- ✓ Water impact landscape design and xeriscaping landscape editing studies
- ✓ Energy efficient landscape design
- ✓ Green roof and green wall applications
- ✓ Alternative urban green areas
- ✓ Sustainable agricultural areas (Korkut et al., 2017).

According to Erdoğan Onur (2012), ecological approaches in landscape design the differences between ecological and traditional approaches in the design and management of urban green spaces are predicted to be grouped under seven headings. These are listed as field suitability, aesthetics, sustainability, plant design, wildlife, management and maintenance, and field mission.

• **Field suitability**; it is necessary to design the historical and cultural values in the foreground in order to design an area with an ecological approach, to support the local ecological conditions, the compatibility of the aesthetic appearance with the natural structure of the area, the utilization of local plants and the ecological structure of social needs.

• **Aesthetics;** When taking design decisions in terms of aesthetics, the concept of landscape aesthetics, which is ecological values, should be introduced and new aesthetic and form concepts should be given in terms of adaptation of the natural environment to the structural environment.

•**Sustainability;** In terms of sustainability, ecological planning approach is important. In this context, the use of local and recycled materials should be ensured, plant species suitable for the material and the area structure of the region should be used, maintenance costs should be reduced, renewable energy sources should be used, and recycling applications should be included in area management and maintenance.

• **Plant design**; In plant design applications, it is necessary to use species appropriate to the local and existing ecological structure, the natural appearance of the region must be provided, selection of species suitable for wildlife and habitat, protection and restoration of existing habitats.

• **Wildlife organization**; arrangements should also be made for wildlife species diversity in landscape design. Increasing species diversity should provide new habitats such as wetlands, ensuring plant diversity should support new habitats, wildlife populations should be controlled.

• **Management and maintenance**; must be the minimum human intervention in the management and maintenance phase, the use of sustainable, ecological management policies must be ensured, the use of zoning studies to protect biological diversity in the field with an competent and conscious manager should be restricted. In this context, volunteer participation of local people can be provided in management and maintenance.

• **Field mission**; Preservation and support of urban ecosystems and wildlife, creation of educational and research environments, controlled recreational and sportive activities, and activities to enhance human nature interaction should be provided. It is aimed to develop ecological aesthetic concepts for creating environmental consciousness in society. Urban environmental problems should be addressed by bringing proposals for solutions.

2.2. Ecological urban parks contributing to sustainable cities

Today, environmental conditions are getting harder and the ecological cities and ecological park concepts that are the result of deterioration of ecological balance are the solution points of the cities, which are characterized as degraded. Efforts to remove this problem have gradually increased by reducing the problems in macro scales emerging in urban areas to urban parks in micro scale. In this respect, sustainable cities are reorganized with an ecological approach, contributing to urbanization from an environmental point of view, economically and socially. According to Tregay (1986) environmental ecological approaches are effective in solving many problems in urban green space systems.

- ✓ The use of rainwater in superficial flow in wetland designs within the area provides the natural hydrological cycle of water to be lost.

- ✓ With the natural environment to be created, it can contribute to raising the environmental air conditioning and air quality.
- ✓ Planting, which supports the natural building to do with local species, can be used as an effective tool in providing urban sound control.
- ✓ Since these areas are indicative of possible environmental changes and stresses, they can guide the prevention of larger environmental problems.

From an economic point of view, selection of natural plant species suitable for local growing conditions is cheap and advantageous. Adapting to these species is easier as the needs for care are less (Bayramoğlu, 2016). In addition, ecological parks implemented in the city increase the quality of life of the region, increase the demand for the environment and provide the mobilization of economic activities (Emery, 1986). On the social side, it increases the quality of life of city people. It gives the people of the city the chance to be in nature and to perform different recreational activities. In addition, it is possible to provide an educational environment, which is one of the main objectives of the ecological approach in landscape management. These areas will positively affect the individual development of young people and provide different play areas especially for children.

In this study, Zağnos Valley Park, which is located in the city centre of Trabzon and where the people of the city have the opportunity to perform many different activities within the scope of urban transformation, has been determined as a study area. The study area will be evaluated according to the criteria of ecological approach as indicated in the study of Erdoğan Onur (2012). In this context, on-site observations and inspections were carried out and evaluations were made for each criterion and conclusions and recommendations were developed.

3. MATERIAL and METHOD

As a research area; Trabzon is located in the Eastern Black Sea region of Turkey (40°33'N - 41°07'N, 37°07'E - 40°30'E). The third largest city in the region, Trabzon has a population of 779.379 and an area of 4.662 km2. Inland except for the coastal strip, there are generally mountains, hills and plains (Trabzon Province Environment Status Report, 2010). Trabzon province is generally located in macro climate climate types in Turkey which has both sea and mountain inspiration. According to this climate type, there is a high amount of rainfall in all seasons and the summers are hot and the winters are warm (Erinç, 1996). However, in recent years there have been sudden climate changes due to global warming and arid temperatures in July and August (Bayramoğlu, 2013). The temperate climatic type dominated by the sea in Trabzon province in general. The annual average is 14.6° C, with an annual total precipitation of 807.3 mm (Akkaş, 1990). It is a very mountainous region as it is in the Eastern Black Sea Region. 30% of the IU lands are mountainous, 60% are the southward increasing areas with 25-30% slope, and only 10% is composed of flat areas.

Zağnos Valley Park in the city center of Trabzon was taken as the study area. Zağnos Valley fulfilled the functions of ventilation and green space in the development of the city in the past history until the 1960s. It is said that this area is a tangerine garden from the Zağnos valley to the south in 1960 and north to the north of the bridge there are various wooden gardens and several traditional Trabzon houses located in these gardens (Bıjışkyan, 1998). To the south, the Zagnos valley is one of the rare green areas close to the city center with its beauty and fresh air. The Zağnos Valley is a park, which has parks, recreational areas, recreation areas, picnic areas, eating and drinking areas, scenic water lakes, pets living environments, pond-sitting areas, water games and night light displays and exhibition spaces (Figure 1). Zağnos Valley, the Zağnos Valley Urban Transformation Project, which was jointly conducted by the Municipality of Trabzon and the Housing Development Administration (TOKİ) in order to restore the ecological function of the city, to meet the need for the green area of the city and to implement the plan decisions, came into force in 2004. Within this scope, according to the protocol signed by TOKİ and Trabzon Municipality, it was declared as 'Urban Transformation Area' by decision of Trabzon Municipal Assembly dated 02.11.2005 and numbered 284. (Bülbül & Yilmaz, 2010).

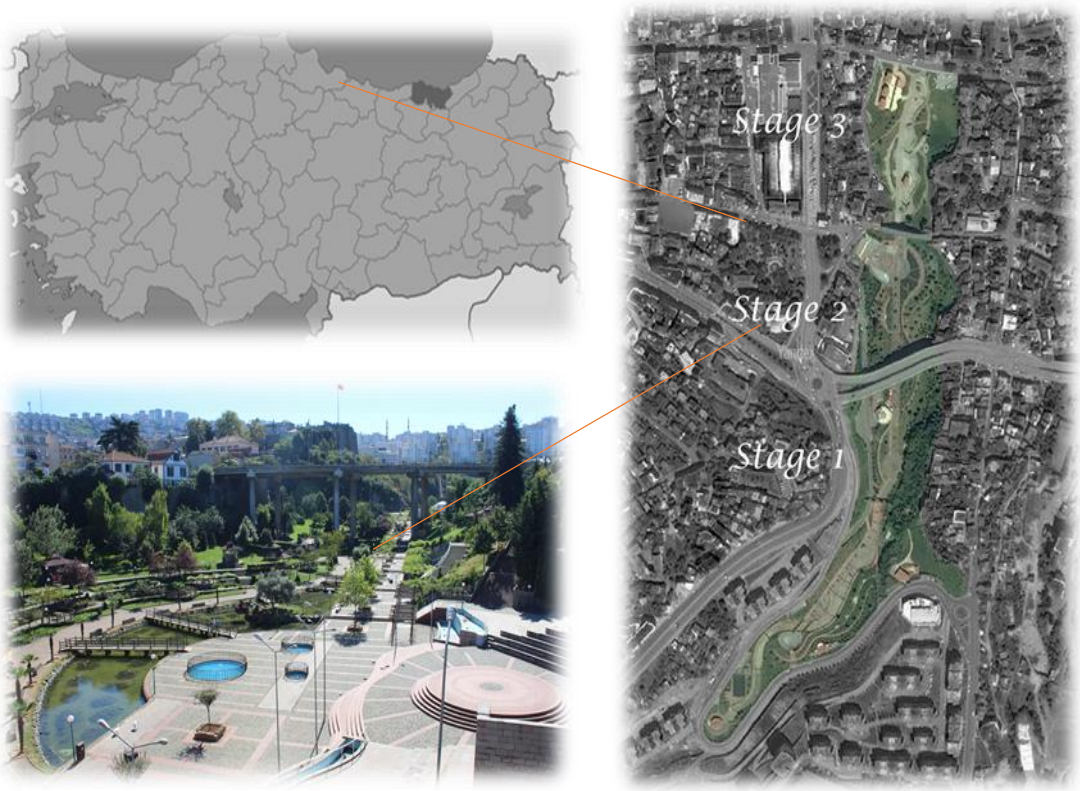

Figure 1. Study area

Trabzon Zağnos Valley The Urban Renewal and Transformation Area covers an area of approximately 96.000m2 with a width of approximately 100m to 150m, approximately 700m in length to the south, with Maras Street on the north of the Urban Renewal and Transformation Area (Bogenç, 2014). The main idea of the Zagnos Valley Urban Transformation Project (Anonymus 2007), the project was tendered by the Housing Development Administration for the implementation of the recreation project prepared for the valley in the direction of thinking of the city to use socio-cultural and recreational purposes. Construction of the Stage 1, project area as of 2009, the use of the completed area has been opened.

Figure 2. Zağnos Valley (Stage 1 and Stage 2)

Stage 1; The area between the bridges passing over the valley of the Tanjant road (Yavuz Selim Boulevard) and the bridge of Zağnos in the north. This area is bounded by Erdoğdu road going south from the main spine of the city to the west, which is integrated with Ortahisar to the east.

Figure 3. Zağnos Valley (Stage 2 and Stage 3)

Stage 2; The second part located to the west of the walls of Ortahisar to the south of the Yavuz Selim Bulvar. This part is the area where the construction is composed of very steep natural rocky slopes.

Stage 3; It lies to the north of Zağnos Bridge. This area is composed of the walls of Ortahisar to the east and the walls to the north of the west wall of the outer fortress to the west (Figure 3).

The study area of Zağnos Valley has been brought to the city as a socio-cultural and recreational area. The socio-cultural and recreational purpose function areas of the area include social activity areas, pond-based sitting units, water games and light show areas, seating and viewing areas, exhibition areas, picnic areas, local dining areas, recreation routes.

4. RESULTS and DISCUSSION

Zağnos Valley, which is determined as a study area and its immediate surroundings have been, evaluated according to ecological approach criteria as stated in the study of Erdoğan Onur (2012).

- **Field suitability;** an area of ecological approach to landscape design and management must be appropriate. Zağnos Valley is suitable for the topographic structure of the area. Since the study area is in a valley position, especially the 1st stage border date, it takes the walls of Trabzon and reflects the main identity of the city. For this purpose, the green texture is not reflected exactly. However, in terms of soil characteristics, transportation is not specific to the area where the soil is. There is no natural appearance in terms of aesthetics, which is compatible with the natural structure of the area. There is much intervention in the design of the area, too much hard ground and space. Activity areas have not been arranged to reflect the historical and cultural values of the area. It was made for recreational activities of daily city people. For plant species, locally and regionally specific species were not used.
- **Aesthetics;** in terms of aesthetics, there are no places in Zağnos Valley that are ecological values and which emphasize the aesthetics of the landscape. However, the natural environment is in harmony with the structural state. They aimed to reflect the same texture in the green spaces of the space by taking protection without harming the natural structure of the landscape at the boundary with the walls of the area. However, in terms of aesthetics and form, a sharp understanding of design is dominant in sharp lines.
- **Sustainability;** the adjacent equipment was not used from sustainable materials. Only wood that is compatible with the natural structure has been included. Erdoğan Onur (2012) study, however, stated that it is necessary to use materials compatible with the area where the city park is located. However, since the Trabzon region is generally widespread, the reinforcement elements are damaged in this sense. In addition, renewable energy sources are not included in the elements to reduce energy consumption. Also, recycling practices have not been considered in terms of area management. The area does not use very large hard floors, but the natural look and feel of maintenance and operation costs are quite high.
- **Plant design;** the plant species in the vicinity are used in accordance with the local and existing ecological structure. In this sense, it can be considered as a positive situation in terms of the existing

habitat and the continuity of the natural environment. In this respect, the plant species in the Zağnos Valley were able to grow naturally.

- **Wildlife organization;** the vegetative tissue in the vicinity may be a kind of diversity since it is the continuation of the natural species. However, the facts that the park is located in the city centre and the TOKI permanent residences, which are used extensively in the upper part, have negative effects on this situation. There are ducks and fish in the pond built on the ground by taking some precautions to correct this situation. There are also plant diversity and life possibilities for many bird species. Again there is a rabbit island in the middle of the pond and the possibility of living for pets is provided.
- **Management and maintenance;** in terms of ecological planning approach, minimum human intervention is required to provide low maintenance costs in terms of design criteria. However, since this area was evaluated within the scope of urban transformation, the formation was destroyed and a new formation was made. Maintenance costs are considerable and there is no limit to zone activities in terms of conservation of biological diversity in the field.
- **Field mission;** in this criterion, the area should be qualified as an appropriate identity for the structure of the society, and it is necessary to bring ecological and aesthetic beauty to the attention by making collective environmental awareness. However, the valley does not reflect the identity of the city. On the other hand, there are areas where recreational and sportive activities controlled by the field mission can be made, spaces that will create human and nature interaction.

5. CONCLUSION

The ecological balances, especially the natural degradation of natural areas, are now lost and the environmental consequences of artificial life in cities have emerged. For this reason, ecological-based planning and design approaches compatible with nature have recently been needed. In today's landscape architecture education, the application of the aesthetic concerns and visual disturbance to the forefront of the field design creates problems in terms of operation. Ecological design approaches, especially in urban green spaces are environmental economics and social sustainability. New approaches to urban planning and design have emerged as the macro scale approaches to the problems emerging in cities have been reduced to micro scale. Yet in Turkey, ecological planning and approaches have not yet been found in design studies. The reason for this is that local public institutions and organizations do not support and consider such landscape works. To solve this situation, local governments should add to their programs. And also they should add the concepts of ecological design and sustainability predominantly. These concepts should be assessed regardless of the size of the assimilations and professional practices.

In urban parks designed based on ecology; structural and vegetable materials are used which are suitable for the climate and topographical structure of that region, which overlap with the natural structure and which are sustainable in terms of maintenance and cost. In ecologically based designs, planning and design should be done in accordance with the natural plant cover and work should be done as an extension of the existing plant texture without deterioration. In this respect, more open and green spaces should be supported with vertical and roof gardens in the urban texture by increasing the designs. In addition, materials that pre-plan natural and cultural resources that characterize the city that supports local identity should be used in designs. In this sense, Zağnos Valley has been determined according to urban ecological approaches in terms of many criteria. The plant applications used in the field are close to the natural species and are consistent with the natural vegetation and topographic structure in the city's continuity. However, the lawn texture, which is included in sustainable landscape studies and which is considered as herbaceous application areas, has been used extensively. Instead, landfill species that can hold soil moist should be increased, seasonal flower parts should be used, and plants should be arranged taking into account different characteristics of each season.

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