

# Evaluation of Public Gardens in Terms of the Relationship Between Climate and Design

**Dr. Ayşe Karahan**

Department of Landscape Architecture, Graduate School of Natural and Applied Sciences, Atatürk University, 25240, Erzurum, Türkiye

## **Abstract:**

National gardens are an important element of green spaces in today's cities, meeting the needs of the community for recreation, sports and interaction. However, environmental and social challenges facing cities are leading to changes in the design and function of these gardens. The concept of resilient cities refers to the resilience of cities against natural disasters, climate change and other risks. National gardens can be designed as an important part of becoming resilient cities. Equipping these gardens with structures resistant to various natural disasters and adopting sustainable practices such as water management can increase the overall resilience of the city. Sustainable city and eco-city concepts are also important elements to consider in the design of community gardens. These concepts include principles such as environmental sustainability, energy efficiency and strengthening green infrastructure. National gardens can be equipped with sustainable practices such as rainwater recycling systems, the use of local plant species and waste management. National gardens designed in this way not only provide recreation and relaxation for city residents, but also contribute to the environmental and social sustainability of the city. In addition, these gardens encourage community cohesion and solidarity. As a result, community gardens are important elements of resilient, sustainable and ecologically balanced cities. Adopting the principles of resilient city, sustainable city and eco-city in the design and management of these gardens can help cities meet future challenges and improve their livability.

**Keywords:** National Gardens, Resilient City, Sustainable City, Ecocity

## **Introduction**

The National Gardens Guide for Turkey was prepared by the General Directorate of Spatial Planning of the Ministry of Environment and Urbanization under Article 4 of the Planned Areas Zoning Regulation and published in May 2020 (Uzun ve Şenol 2020; Şenik and Uzun 2021). The evaluations related to this guide are included in its content (1) by taking into account the increasing population, unplanned urbanization, urban environmental problems and approaches to their solution, and considering the expectations from today's urban parks without entering the stages of the design process of contemporary urban parks, (2) Climate and Design, (3) Bioclimatic Comfort, (4) Thermal Comfort, (5) Climate Change, (6) Global Warming, (7) Green Infrastructure, (8) Sustainable City, (9) Ecocity, (10) Resilient City, (11) Smart Cities and (12) Impact of Epidemics, and if so, the scope was briefly stated.

### **1. Climate:**

Climate is included in the analysis of natural resources as a part of the survey and on-site and off-site inventory studies carried out during the landscape design process. Climate is included in the guidebook

by stating that “Climate analysis should include the analysis of data such as wind (prevailing wind direction, etc.), fog, insolation (sun angles at different times, insolation status of the area, sun rise angles, etc.), precipitation, cloudiness, temperature, humidity”. This is considered as an important landscape planning and design process evaluation approach for Turkey, which has three different climate zones and seven geographical regions.

## 2. **Climate and Design:**

The Guide does not include a statement on the relationship between these two terms. Considering the concepts of climate change, global warming and arid landscapes, and with the knowledge that our country is water poor, there is a need for more evaluations and assessments beyond spatial water use recommendations. Nevertheless, rainwater harvesting, the use and management of water, the provision of free drinking water, the inclusion of water-feeding bowls for animals, and the recommendation to prefer plants that are suitable for the region and consume less water can be evaluated in the context of the relationship between climate and design. Water, which indirectly emerges as a result of climate, and the spatial use and design of this water show that the guidebook indirectly mentions the relationship between climate and design: “Water surfaces and water elements should be included in Millet Gardens; the construction of large ponds (exceeding 5% of the project area) should be avoided in order not to increase maintenance and construction costs, and the mobile use of water should be emphasized”.

## 3. **Bioclimatic Comfort:**

This concept is not directly mentioned. However, there are very general statements about the safety and comfort of National Gardens. Emphasizing bioclimatic comfort together with climate, climate and design, climate change, quality of life and satisfaction, and thermal comfort would have enriched the content of the guide.

## 4. **Thermal Comfort:**

This concept is expressed only in the form of obtaining data on “macro- and micro- thermal climate conditions” within the Geological and Topographical Structure in the natural structure analysis part of the design process. It would be appropriate to elaborate as stated in the previous article.

## 5. **Climate Change:**

In the Millet Gardens guide, this issue is proposed to use “rain gardens as one of the nature-based approach methods that can create a solution to climate change and the resulting drought, changes in precipitation regime and amount, and the resulting decrease in water resources”. However, the functions of national gardens are not defined in order to avoid the problems arising from urbanization, destruction of natural areas, increase in transportation and use of fossil fuels that cause climate change and the effects of climate change on the urban scale in solving these problems (Karahan and Karahan 2023a). This also applies to the concept of “Global Warming” in the next article.

## 6. **Global Warming:**

This issue is not included in the National Gardens Guide. The issues mentioned under the heading of climate change also apply to this article.

## 7. **Green Infrastructure:**

Ecological architecture and passive design, open-green spaces, environmentally friendly transportation, urban agriculture, urban biodiversity, energy, blue-green corridors, green roads and urban forests are important components of urban green infrastructure and are among the important indicators for improving the quality of urban life in the development of new urban models or urban transformations (Karahan and Sezen 2024). While the assessment of green spaces in the Guidelines states that at least 15,000 m<sup>2</sup> of

space should be provided for a National Garden, there is no indication of the amount of green space per capita or access distances to green space in cities.

On the other hand, in order to support green infrastructure, it is suggested that “energy and waste recovery in designs, use of local resources in design, use of renewable energy sources, energy efficient landscape design, wind control - wind screening and wind corridors, practices that will ensure carbon sequestration, minimize air, noise and light pollution, and conduct studies on rainwater management”. It is stated that practices related to Zero Waste policy and lighting fixtures should be compatible with renewable energy sources.

However, the guide provides information on the components of green infrastructure such as urban agriculture, urban forests, ecological architecture, blue-green corridors and green road systems. On the other hand, it would have been useful to explain how environmentally friendly transportation and recreational-sportive advantages such as bicycle paths, which are proposed only within the National Gardens, will be integrated into the city.

#### 8. Sustainable City:

It is seen that sustainability is taken as the “main principle of determining a feasible and sustainable operation and management model” in the guide. It is also understood that one of the main objectives of the National Gardens is “to provide our cities with open and green areas with aesthetic, ecological, sustainable and recreational value”. It can be said that sustainability is addressed in relation to “Smart Cities”, one of the new urban models, and is reflected in the content with targets related to ecological planning and design, sustainable landscapes, efficient use of water and energy, zero waste and urban quality of life (Karahana and Sezen 2019a; Karahana *et al.* 2021; Karahana and Dilek 2024). A table of current and targeted indicators for the sustainable city would have been useful for measurement and evaluation.

#### 9. Ecocity:

The concepts of ecocity or ecological city, as well as ecological design and ecological planning should have been included in this guide, considering the experience of Public Gardens such as Central Park and Hyde Park, which have a 150-year history. It may be possible to consider this as existing within the general sustainability and smart city approaches given in the content.

#### 10. Resilient City:

Beyond urban design and environmental sustainability, the concept of a resilient city, which includes the elimination of environmental problems, making cities resilient to natural disasters, and making them socio-economically strong and vibrant (Gupta *et al.* 2019; Karahana and İlke 2019; Boychev 2021; Özkur Karahana and Dilek 2023; Karahana and Sezen 2024) has not been included in the National Gardens Guide. However, the idea that National Gardens would be potential gathering areas for large cities at risk of earthquakes should have been included.

#### 11. Smart Cities:

At the beginning of the National Gardens Guide, it is stated that it is aimed to “utilize innovative, renewable energy and environmentally friendly solutions through smart applications”. If considered as a smart city approach, there are many definitions regarding the effective use of spatial water, environmentally friendly transportation, and the use of renewable energy sources. Considering that the smart city approach uses technology and digitalization infrastructures and systems, the guide strengthens this approach with smart security systems, smart lighting sensors, smart imaging system suggestions (Kumar *et al.* 2022; Javed *et al.* 2022). However, this issue could have been covered more comprehensively with the recommendations of geographic information systems, remote sensing,

digitization, measurement, evaluation and monitoring tools and models that perform continuous data analysis.

## 12. Impact of Pandemics:

Considering the Covid-19 pandemic process and its effects, the publication of the National Garden Guide published in May 2020 may be postponed for a few months; concepts such as social distance and social isolation in public spaces (Rahaman *et al.* 2020; Ugolini *et al.* 2020; Nugroho *et al.* 2021; Lekić Glavan *et al.* 2022; Karahan and Karahan 2023b).

## Conclusion

The following conclusions have been drawn from the resilient urban planning and landscape design aspects of the Turkey National Gardens Guidelines published in May 2020 by the General Directorate of Spatial Planning of the Ministry of Environment and Urbanization.

- The guide emphasizes the examination of climate data within the scope of analyzing natural resources in the landscape design process. Climate analysis should include elements such as wind, fog, insolation, precipitation, cloudiness, temperature and humidity in a more comprehensive and easy-to-understand-apply manner.
- There is no specific mention of the relationship between these two terms in the Guidance. However, design proposals should be developed by considering factors such as climate change and arid landscapes.
- This concept is not directly mentioned in the Guidelines. However, the provision of a comfortable and safe environment is generally emphasized.
- Thermal comfort is addressed by analyzing macro and micro thermal climate conditions in the design process.
- It is seen that rain gardens are suggested in the guide for impacts such as drought due to climate change, but there is no detailed evaluation of other problems caused by climate change.
- The guide emphasizes the importance of green infrastructure, but does not provide detailed recommendations. Criteria for the amount of green space in cities should be set and environmentally friendly transportation should be encouraged.
- In the guide, sustainability is primarily addressed as a viable business and management model. However, measurable indicators need to be identified and the concepts of ecological cities need to be examined in more detail.
- The guide does not specifically address the concept of eco-city. However, it is important to elaborate on this issue within the scope of sustainability and environmentally friendly design principles.
- The concept of resilient city is not included in the Guide. However, measures such as making cities resistant to natural disasters and creating gathering areas should be taken.
- Smart cities are targeted by using innovative and environmentally friendly solutions. However, more technological applications and digital infrastructure proposals should be presented.
- The guide does not include recommendations on the effects of pandemics such as the Covid-19 pandemic. However, suggestions on the relationship between concepts such as social distance and isolation with public spaces should be presented.

In conclusion, in order for the National Gardens Guide for Turkey to be more comprehensive and successfully implemented, issues such as climate change, sustainability, resilient cities and smart cities

should be addressed in more detail and recommendations should be determined (Memlük 2017; Karahan and Sezen 2019b; Uzun ve Şenol 2020; Şenik and Uzun 2021). In this context, the following suggestions can be made:

- Considering factors such as climate change and global warming in the design of nation gardens and encouraging environmentally friendly practices.
- Determining sustainability criteria and establishing measurable indicators.
- Examining the principles of eco-cities in detail and presenting applicable recommendations.
- Identifying gathering areas to make cities resilient against natural disasters and to be prepared for epidemics.
- Expansion of smart city applications and effective use of technology in urban management.

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