

INVESTIGATING THE IMPACT OF EVOLVING PLANNING THEORY
THROUGH THE CONCEPT OF NATURE-BASED SOLUTIONS

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THROUGH THE CONCEPT OF NATURE-BASED SOLUTIONS**

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ABSTRACT

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Since the beginning of industrialization in the early 1800s, spatial and urban development policies and trends have changed significantly. With the rapid urban population growth in the 20th century, policies based on economic growth have irreversibly and negatively affected most urban ecosystems globally. Climate change has begun to occur due to fossil carbon-intensive technologies that have evolved together with urban systems and lifestyles. While previously a more top-down planning approach with very general studies and projects was dominant, today it is accepted that the place-dependent approaches are also essential elements in the solution. For example, the importance given to basic climate change concepts such as mitigation and adaptation in the latest IPCC reports reveals this. The fact that a single type of mitigation or adaptation policy cannot be applied to all cities increases the importance of local dynamics in policies and practices that will enable cities to develop in many areas.

The study aims to understand the evolving planning theory and its impact on urban practices through the concept of Nature-based Solutions. For this purpose, the changes in the planning theory stages were first revealed. The basic values defining nature-based solutions were investigated through literature studies. As a result of examining successful project examples of nature-based solutions, the Izmir - Urban GreenUp project selected from Türkiye was analyzed using comparison methods. Thus, as a reflection of the changing planning theory, the effects of nature-based solutions, which are handled with varying approaches in practice, on Izmir urban planning were examined.

Keywords: Planning Theory, Sustainable Development, Climate Change, Nature Based Solutions, Urban GreenUp Project

ÖZ

GELİŞEN PLANLAMA TEORİSİNİN ETKİSİNİN DOĞA TABANLI ÇÖZÜMLER KAVRAMI ARACILIĞIYLA ARAŞTIRILMASI

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Sanayileşmenin başladığı 1800'lü yılların başlarından bu yana mekânsal ve kentsel gelişim politikaları ve eğilimleri büyük ölçüde değişti. 20. yüzyılda hızlı kentsel nüfus artışıyla birlikte ekonomik büyümeyi temel alan politikalar, küresel anlamda çoğu kentsel ekosistemi geri dönülemez ve olumsuz yönde etkiledi. İklim değişikliği, kentsel sistemlerin ve yaşam tarzlarının birlikte evrimleştiği fosil karbon yoğun teknolojiler nedeniyle meydana geldi. Önceleri çok genel çalışma ve projelerle daha yukarıdan aşağıya doğru bir planlama yaklaşımı hakimken, günümüzde kentsel sorunların çözümünde yer-bağımlı çözümlerin de oldukça önemli olduğu kabulü hakimdir. Örneğin son IPCC raporlarında, azaltım ve uyum gibi temel iklim değişikliği kavramlarına verilen önem de bunu ortaya koymaktadır. Tek tip bir azaltım veya uyum politikasının tüm şehirlere uygulanamaması, yerel dinamiklerin kentlerin birçok konuda gelişmelerini sağlayacak politika ve uygulamalardaki önemini artırmaktadır.

Bu çalışmanın amacı gelişen planlama teorisi ve bunun kentsel uygulamalara olan etkisini Doğa Temelli Çözümler konsepti üzerinden anlamaktır. Bu sebeple

planlama teorisinin zaman içerisindeki deęişimi ele alınmıştır. Doęa temelli çözümleri tanımlayan temel deęerler literatür çalıřmaları ile ortaya konulmuřtur. Doęa temelli çözümlerinin uygulandıęı iyi dünya örneklerinin incelenmesi ve karşılařtırma yöntemleri ile Türkiye’de çalıřma alanı olarak seçilen İzmir - Urban GreenUp projesi analiz edilmiştir. Böylelikle gelişen teorisinin bir yansıması olarak uygulamada farklı yaklaşımlarla ele alınan doğa temelli çözümlerin İzmir kent planlamasına olan etkileri incelenmiştir.

Anahtar Kelimeler: Planlama Teorisi, Sürdürülebilir Kalkınma, İklim Deęişikliği, Doęa Temelli Çözümler, Urban GreenUp Projesi

To the daisies...

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TABLE OF CONTENTS

ABSTRACT.....	v
ÖZ	vii
ACKNOWLEDGMENTS	x
TABLE OF CONTENTS.....	xi
LIST OF TABLES	xiii
LIST OF FIGURES	xv
CHAPTERS	
1 INTRODUCTION	1
1.1 Aim and the Scope of the Research	1
1.2 Method and Structure of the Research.....	6
2 THEORETICAL FRAMEWORK AND UNDERSTANDING THE IMPACT OF CLIMATE CHANGE ON THE CITIES	11
2.1 Theoretical Framework	11
2.1.1 Planning Approach in Türkiye	28
2.1.2 Development of the Sustainable Development Concept	44
2.2 Climate Change and Its Impact on Cities	52
2.2.1 European Green Deal	54
2.2.1.1 Nudging Theory	60
2.2.2 Sustainability Studies in Türkiye	64
3 NATURE-BASED SOLUTIONS.....	69
3.1 Introduction of Nature-Based Solutions	69
3.2 Analyzing Nature-Based Solutions as an Approach	75

4	EXAMINATION OF THE GREEN CITY CONCEPT AND URBAN IMPLEMENTATION EXAMPLES OF NATURE-BASED SOLUTIONS	91
4.1	Cities with Green City Vision	91
4.1.1	Copenhagen, Denmark	92
4.1.2	Reykjavik, Iceland	93
4.1.3	Essen, Germany	94
4.1.4	Izmir, Türkiye	96
4.2	Nature-Based Solutions Projects Examples	111
4.2.1	Yamuna Biodiversity Park, Delhi, India	112
4.2.2	Integrated Development of the Hatirjheel Area, Including the Begun Bari Canal, Dhaka, Bangladesh	116
4.2.3	Spoorpark, Tilburg, Holland	122
4.2.4	EcoCity Augustenborg, Malmö, Sweden	124
4.2.5	Pocket Parks the Greening of Degraded Public Spaces, Lalitpur, Nepal	127
4.2.6	Urban GreenUp, Izmir, Türkiye	131
4.2.6.1	Urban GreenUp Implementations	139
4.3	Comparison of the Projects	146
4.4	Findings and Discussion	155
5	CONCLUSION	163
5.1	The Summary of the Research	163
5.2	Limitations of the Study	166
5.3	Further Studies	167
	REFERENCES	169

LIST OF TABLES

TABLES

Table 2.1. Criteria for Describing and Evaluating Planning Traditions (Hudson et al., 1979)	14
Table 2.2. Relative Emphasis of SITAR Theories Based on Selected Criteria (Hudson et al., 1979).....	14
Table 2.3. Planning Means for Different Authors (Hirt, 2005)	19
Table 2.4. Three Big Shifts in Planning Theory According to Friedmann (Friedmann, 2008).....	23
Table 2.5. Words that Summarize the Current Planning Approach.....	28
Table 2.6. Plan Types, Legal Basis, Authorized Institutions and Scales in Türkiye (Yalçinkaya & Say, 2018).....	29
Table 2.7. Five Different Planning Periods of Türkiye (Övgün, n.d.).....	31
Table 2.8. Modernist, Postmodernist, and Ecological Worldviews (Wheeler, 2016)	47
Table 2.9. Words that Summarize the Sustainable Urban Development.....	52
Table 2.10. Two Cognitive Systems (Kahneman & Frederick, 2002).....	61
Table 2.11. Sustainable Development Goals for Türkiye (Sürdürülebilir Kalkınma Amaçları Değerlendirme Raporu, 2019).....	65
Table 2.12. Important Plans for Türkiye (Gökçin Özuyar et al., 2021).....	66
Table 3.1. Nature-based Solutions Approaches (Climate and Development Knowledge Network, 2022).....	84
Table 3.2. Nature-based Solutions Principles (IUCN, 2012).....	87
Table 3.3. Nature-based Solutions Principles (IUCN, 2020).....	88
Table 3.4. Keywords that Identify Nature-based Solutions	89
Table 4.1. Cities with Green City Vision.....	91
Table 4.2. 5 Local Sub-Goals and 5 Indicators for İzmir (İzmir Gönüllü Yerel Değerlendirme Raporu, 2021).....	101

Table 4.3. Innovative Projects Based on Living in Harmony with Nature (Izmir Metropolitan Municipality, 2021)	106
Table 4.4. Sustainable Development Goal 13 – Outstanding Practices in the Izmir (İzmir Gönüllü Yerel Değerlendirme Raporu, 2021)	108
Table 4.5. Nature-based Solutions Topics for Izmir - Urban GreenUp	133
Table 4.6. Project Implementation of Urban GreenUp in Izmir (Izmir Metropolitan Municipality, 2020)	139
Table 4.7. Comparison of Different Nature-based Solutions Related Projects	146
Table 4.8. Common Features of the Selected Projects with Izmir Urban GreenUp	153

LIST OF FIGURES

FIGURES

Figure 1.1. Relational Framework of the Study.....	9
Figure 2.1. Radiant City by Le Corbusier (Urban Design Lab, 2024).....	20
Figure 2.2. Sustainability as a Transition from the Modernist Paradigm Grounded in Economics toward Ecological Thought (Wheeler, 2016).....	47
Figure 2.3. Green Nudging Typology (Evans & Geene, 2017).....	63
Figure 3.1. Conceptual Representation of Nature-based Solutions (Barreira et al., 2020).....	72
Figure 3.2. Word Cloud from 142 Selected Articles Organized by Field (Barreira et al., 2020).....	74
Figure 4.1. Krupp Park (Horn et al., 2017).....	94
Figure 4.2. Timeline for some of the Plans of Izmir.....	96
Figure 4.3. The Development of the Principles of a Nature-based Lifestyle (Izmir Metropolitan Municipality, 2021).....	105
Figure 4.4. Locations of Nature-based Solutions Projects.....	111
Figure 4.5. View of the Site of Yamuna Biodiversity Park before Restoration (Climate and Development Knowledge Network, 2022).....	113
Figure 4.6. View of Yamuna Biodiversity Park after Restoration (Climate and Development Knowledge Network, 2022).....	114
Figure 4.7. Overview of the Lake prior to the Project (Architecture Prize, 2024)	120
Figure 4.8. The Lake after Restoration (Architecture Prize, 2024).....	120
Figure 4.9. Spoorpark (Spoorpark Tilburg, 2019).....	123
Figure 4.10. Green Roofs in EcoCity Augustenborg (Persson & Mansson, 2021).	125
Figure 4.11. The Site before the Intervention (Vriksha Foundation, 2024).....	128
Figure 4.12. The Site post the Intervention (Vriksha Foundation, 2024).....	129
Figure 4.13. Pilot Areas (Velibeyoğlu, 2024).....	140
Figure 4.14. İztam, Sasalı BioLab (Mertuslu, 2021).....	141

Figure 4.15. Mavişehir Restoration Project Area (Urban GreenUp, n.d.).....	143
Figure 4.16. Pocket Parks in Girne Street (Urban GreenUp, n.d.)	145
Figure 5.1. Summary of Study Through Core Keywords	166

CHAPTER 1

INTRODUCTION

1.1 Aim and the Scope of the Research

This study aims to explore the evolving planning theory and its impacts on practices through the concept of Nature-based Solutions. To achieve this, the study first identifies the changes in the planning process. The core values associated with nature-based solutions were identified by reviewing existing literature. The Izmir Urban GreenUp project from Türkiye was analyzed using comparative research methods by examining successful project examples of nature-based solutions. In doing so, the study examines how the effects of nature-based solutions, which are applied with varying approaches in practice, reflect the shifts in planning theory and impact urban planning in Izmir.

Through these studies, it is aimed to examine how successful a theoretical concept with an analytical language and purpose will be in the implementation phase. The aim is to find the answer to the question of whether it will remain as independent and fragmented studies at different points of the city or it can be transformed into a model that the whole city can benefit from by creating innovative way of solutions.

As time went by, space changed. Accordingly, cities had to adapt to this change according to the needs of all living. There are a number of alternative planning schools, each has its institutional framework for implementing ideas and its epistemology for confirming knowledge (Hudson et al., 1979). Numerous significant problems about the current and future roles of planning in urban policy-making are brought up by the diversity within the planning profession. Many different planning definitions and approaches have given rise to this variance (Galloway et al., 1977). Six principal discourses encompass approximately 90% of the relevant literature:

applied rationality, societal guidance, behavioral approaches, communicative practice, social learning, and radical planning or emancipatory practice (Friedmann, 1998).

As cities grew, they became more complex, and this caused the problems and solutions related to the city to become more complex. As a function of scale, complexity, and time, what can be safely known determines the absolute boundaries of planning. In theory, urban scales are unlimited, but spatial planning is always limited by territory. Planners' professional knowledge is inevitably grounded in a very limited understanding of urban complexity (Friedmann, 2008). Research on urban issues requires a better understanding of territorial dynamics as well as experimental initiatives and activities in the city. Accordingly, the existence of urban planning is equally due to ideas developed from the practice of urban planning as well as the academic creation of data that may be successfully and intentionally positioned within this field (Pinson, 2004).

The urban planning process is currently undergoing a revival, driven by two key theoretical and practical breakthroughs. The first is the concept of the "urban project," a distinctive approach that redefines the role of urban planning, traditionally focused on master planning, regulations, or large-scale architectural structures. The second innovation, linked to the rise of democracy, is the idea of "governance." This shift focuses on analyzing the relationships between power and decision-making concerning spatial development, thereby changing the conditions under which urban planning processes are formulated (Pinson, 2004). In contemporary urbanization practices, the primary goal is to thrive in a competitive environment by creating a rapidly appealing space that supports this success, while also adapting to the changing dynamics driven by urban renewal (Yılmaz Bakır, 2013). According to Tekeli, urban projects are those that significantly affect the dynamics of the city's development, require large amounts of investment, take a long time to implement, alter the city's rental prices, and are significant enough to affect the lives of those who live nearby positively or negatively (1992).

Today, the challenges posed by Climate Change in cities have become a top priority. The first international recognition of environmental issues caused by human activities dates back to the 1970s. In 1972, the Human Environment Conference was held in Stockholm, where discussions focused on settlement and environmental problems. Under the “World Conservation Strategy,” it was emphasized that conservation and development must be tackled together to achieve a sustainable society (Partigöç & Baş, 2022). Understanding climate change in a local context can highlight opportunities to maximize the local benefits of mitigation and adaptation action. Politically, this will also make the climate change issue more manageable (Corfee-Morlot et al., 2010). IPCC’s definition of adaptation to the urban climate is the process by which human systems adapt to the actual or expected climate and its impacts to minimize harm or take advantage of opportunities (Jiang et al., 2014).

The European New Green Deal is the European Union’s new growth strategy that “aims to transform the European Union (EU) into a fair and prosperous society with a competitive economy”. It is also an important part of the EU’s plan to achieve the 2030 Agenda for Sustainable Development (Fetting et al., 2020). Sustainability can be seen as requiring shifts in cognitive paradigm that are transformational, and radical (Wheeler, 2016). As a basic component of all policy decisions and the actions that follow, the European New Green Deal strategy's primary goal is to center economic policy around sustainability and human well-being.

In a world where there are many environmental, social, and economic issues, it is critical to create more ecologically friendly methods to address these issues or be ready for them. The ideas of adaptation and mitigation are especially stressed in this regard. It is crucial to disclose how the built environment and the nature-based solutions under discussion relate to one another. Cities and urban areas are faced with higher warming levels, flood disasters and many risks related to these (Gallardo et al., 2022). There is increasing evidence that nature based solutions can contribute to climate adaptation and mitigation, and provide co-benefits for human health, well-

being, and local biodiversity at household, neighborhood, municipal, and regional scales (Adelekan et al., 2022).

Nature-based solutions have emerged as a practical alternative for infrastructure development and improvements in cities that are exploring new approaches and reconsidering the long-term sustainability and costs of maintaining traditional infrastructure. These solutions are defined as living systems supported by natural processes and structures, designed to address various environmental challenges while providing multiple benefits to the economy, society, and ecosystems (European Commission, 2016). Nature-based solutions have largely evolved from previous ecosystem-based concepts and principles, but also pay attention to the social and economic benefits of resource-efficient and universal solutions that combine technical, business, financial, governance, regulatory, and social considerations (Barreira et al., 2020).

The well-being of humans is at a significant risk both now and in the future, highlighting the need for a shift in economic growth from fossil fuel dependence to a more regenerative, environmentally conscious model based on biological resources. Nature-based solutions (NbS) are central to this paradigm shift and are increasingly recognized as a key element in biodiversity and climate action. NbS is already being supplied, visible, and credible. One approach to advancing this shift is through the support and policy framework provided by the European Green Deal (European Commission, 2022).

Nature-based solutions have established standards that help ensure successful implementation. By using the Standard, specific on-the-ground activities provide measurable additional value. First, when presenting the intervention to donors, investors, and other stakeholders, the results can enhance its credibility. Second, the application of the standards helps identify areas for improvement and potential solutions by offering targeted recommendations for specific interventions. Third, the standards can encourage cross-sector participation and communication, fostering

new dialogues and providing a common vocabulary and framework to discuss trade-offs (IUCN, 2020).

Regarding policy, legislation, institutional structure, and project stock, Türkiye has achieved notable strides in climate action. A certain level of maturity has also been attained in the incorporation of climate change-related actions into national policies, strategies, and plans. Within the scope of Sustainable Development Goal 13, combating climate change and enhancing the ability of all institutions and groups, particularly those that are most vulnerable, to adapt to its negative effects, particularly those related to disasters, are included (Sürdürülebilir Kalkınma Amaçları Değerlendirme Raporu, 2019).

Urban GreenUp is a project funded under the European Union's Horizon 2020 program. Its objective is the development, application, and replication of Renaturing Urban Plans in a number of European and non-European partner cities with the aim to mitigate the effects of climate change, improve air quality and water management, as well as to increase the sustainability of our cities through innovative nature-based solutions (Urban GreenUp, n.d.).

Cities have sometimes become the target point of change and sometimes the change itself is in line with society's economic, social, and environmental needs. Different scenarios need to be developed to cope with social, ecological, and economic problems that have reached much worse levels than before. The main problem of today's planning studies is related to how successful and effective the studies are when moving from theory to practice. The problem statement of the study is the weakness in the success of theoretical studies on the solution of urban problems in practice. Different solution concepts have been produced throughout the historical process of solving urban problems. Today, cities are facing many more issues and need these solutions. The nature-based solutions approach has been on the agenda of the parties involved in the subject for a while. Examining the situation itself in the implementation phase of this concept, which has a chance to be applied in Izmir in

Türkiye, has the potential to be an example of new methods that can be developed for cities.

By addressing the paradigm shift in planning theory, the current widespread planning understanding was revealed. Then, the role of NbS in theory and implementation stages was examined thanks to the key concepts and standards obtained from the literature. The Izmir - Urban GreenUp project, which is an example of NbS, was addressed. In addition, examples from different parts of the world were investigated. Thus, it was possible to compare the Urban GreenUp project together with other projects. The location and effects of the project within the city of Izmir were examined. The research questions regarding the aim of the study are;

- What are the fundamental concepts of planning theory that are widespread and accepted today?
- What kind of changes has climate change caused in urban planning, what is the development process of the concept of Sustainable Development?
- What is the Nature-based Solutions concept, and what kind of an approach does it present for cities?
- What are the implementation examples of Nature-based Solutions in different parts of the world?
- What is the place of Urban GreenUp among Nature-based Solutions and its effects on Izmir?

1.2 Method and Structure of the Research

This research is conducted with an exploratory research method since it makes inferences by examining urban implementation examples of a theoretical concept. The theoretical framework begins by addressing the development of planning theory,

and then the current and relevant issues of the study will be addressed. The concept of nature-based solutions will be examined in detail with implemented examples from different parts of the world and Türkiye, Izmir. Therefore, a comprehensive literature review will be the main methodology to determine the specified research questions. In this context, a comparative and interpretative qualitative research approach was used to conduct the study.

Structure of the research is organized into five chapters. The first chapter provides an introductory section in which the aim of the study and some background information are introduced. In addition, it is the section where the problem statement and research questions are defined.

The second chapter emphasizes the fundamental change points in planning theory. In the process, the concepts accepted today are compiled. Conceptual changes in Türkiye are explained. Then, the development of the concept of sustainable development and its relationship with cities are presented. Climate change and its effects on cities are described. In this direction, the accepted European Green Deal is mentioned. The importance of the concept of nudging and green nudging and their effects on the subject is explained. Finally, sustainability studies in Türkiye are mentioned in this section.

In the third chapter, nature-based studies are discussed in detail. Nature-based solutions are explained conceptually. Basic concepts that define nature-based solutions are compiled. The basic features of nature-based solutions projects and the criteria they have are discussed.

In the fourth chapter, some examples from the world with a Green City vision have been examined. By examining these, the similarities in the goals of cities with a Green City vision have been revealed. This is important for understanding the Izmir example. Later, studies that were addressed in line with nature-based solutions have been examined. These are examples from different parts of the world. The Urban GreenUp project implemented in Izmir, Türkiye, has been analyzed. These projects

have been compared in terms of different values. Finally, the findings and discussion section of the study are discussed.

In conclusion, in the fifth chapter, the study is briefly summarized. The points reached by the study are discussed. All findings are critically assessed, and the study's limitations are outlined.

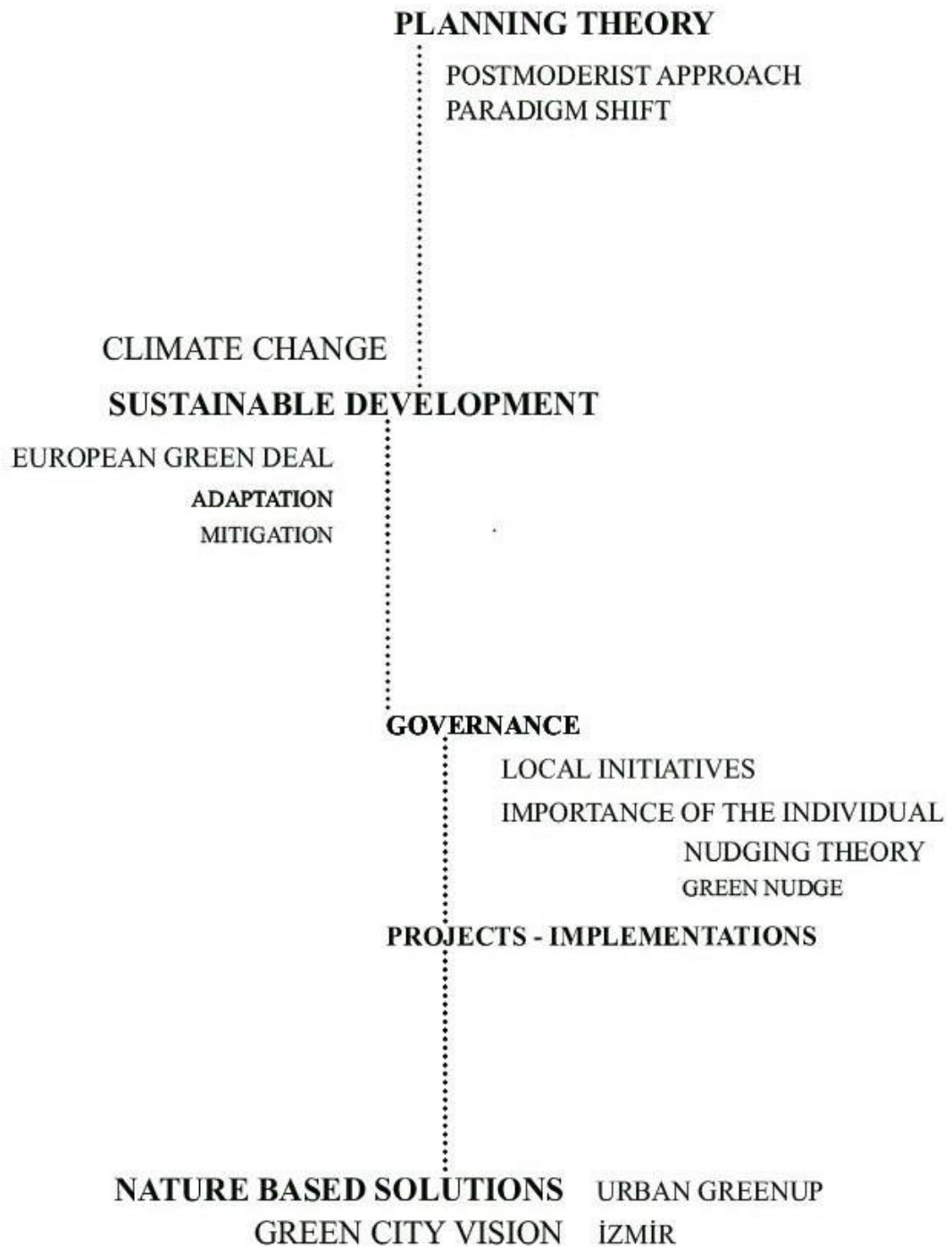


Figure 1.1. Relational Framework of the Study

CHAPTER 2

THEORETICAL FRAMEWORK AND UNDERSTANDING THE IMPACT OF CLIMATE CHANGE ON THE CITIES

2.1 Theoretical Framework

There are a number of alternative planning schools, most of which start from the synoptic approach's limitations. Among these other traditions, advocacy planning, radical planning, incremental planning, and transactive planning are the most significant. Each of the five traditions under consideration has a network of procedures, data needs, professional abilities, and working styles that are internally consistent and reinforce one another. Each has its institutional framework for implementing ideas and its epistemology for confirming knowledge. Each has a different perspective on the public interest, which reflects their unique understanding of human nature and the acceptable scope of social, economic, and political process interventions. According to Friedmann (1998), it could be stated that six principal discourses encompass approximately 90% of the relevant literature: applied rationality, societal guidance, behavioral approaches, communicative practice, social learning, and radical planning or emancipatory practice.

The journal editors invited comments from a number of distinguished academics, only to discover that no two of us could agree on the nature of the beast we wanted to theorize. None of those who wrote comments wanted to be 'fenced in' by any definition of planning discourse, however loose and encompassing. Definitions were somehow perceived as limiting their freedom to call theory whatever they wished it to mean. We did minimally agree that planning theory could serve as a code word among us, but the consensus

stopped there. We were riding off on different horses, each galloping into the sunset in a different direction (Friedmann, 1998, p. 246).

The majority of other planning approaches, which either represent adaptations of synoptic rationality or responses to it, originate from the dominant tradition of synoptic planning, also known as the rational comprehensive approach. Setting goals, identifying policy alternatives, evaluating means against ends, and putting decisions into action are the four basic components of synoptic planning (Hudson et al., 1979). A chief spokesperson for the incremental planning approach is Charles Lindblom, who describes it as partisan mutual adjustment or disjointed incrementalism, emphasizes that policy decisions are better understood and reached in terms of the push and tug of established institutions that are skilled at achieving goals through decentralized bargaining processes best suited to a free market and a democratic political economy, criticizing the synoptic approach as unrealistic (Hudson et al., 1979). The argument for incremental planning stems from a number of critiques of synoptic rationality, including its reductionist epistemology, insensitivity to institutional performance capabilities, and failure to recognize the cognitive limitations of decision-makers who are only able to "satisfice" choices by successive approximations rather than "optimize" (Hudson et al., 1979).

Transactive planning aims to close the knowledge gap between the technical expertise of the planner and the local expertise of the community. The foundation of this strategy is communication, which guides regional planning policies to align with planning expertise. The social intervention that regional deliberative planning provides as an appropriate tool for bottom-up development planning is the reason the policy briefing is conducted. Transactive planning has democratic value and is a strategy that aims to reconcile the diverse interests within the community as well as the planners and the community by establishing a middle ground (Taufiq et al., 2021). Through involvement in coalitions, planners and participants can exchange knowledge, fostering social learning. This, in turn, opens up possibilities for social

change. As a result, transactive planning necessitates that the planner be skilled in managing interpersonal and social relationships effectively (De Graaf, 2005, p.61).

Davidoff saw advocacy as a means of empowering all social groups, and he highlighted the significance of "organizations representing low-income families" (Checkoway, 1994). The 1960s political unrest and social protest had an impact on the development of advocacy planning. Advocacy planning is more widespread today than it was in the 1960s; it has brought up some of the same unresolved issues that existed in the past; and it pushes current planners to improve advocacy planning for the future (Checkoway, 1994). The advocacy planning model is based on the idea of pluralism in planning. Each option presents distinct benefits and drawbacks for the various groups involved in the decision-making process (Feld & Pollak, 2010). Therefore, there is no single "correct" plan that would work for everyone. A key element of this approach is the incorporation of both values and facts when making planning decisions, with the understanding that the process is not neutral. The decisions are influenced more by political and social factors than by technical ones (Feld & Pollak, 2010).

Radical planning has two schools of thought that sometimes overlap in the ambiguous legacy. One version is associated with spontaneous activism, driven by a practical yet idealistic vision of independence and solidarity (Hudson et al., 1979). It emphasizes the value of individual development, teamwork, and independence from unseen factors, much like transactive planning. However, more than other planning techniques, its starting point is composed of particular, substantial concepts regarding group activities that can produce tangible outcomes in the near future.

Table 2.1. Criteria for Describing and Evaluating Planning Traditions (Hudson et al., 1979)

Criteria	Characteristics and applications
Public interest	Explicit <i>theory of the public interest</i> , along with methods to articulate significant social problems, and pluralist interests in outcomes. May include principles of distributive justice, and procedures for dealing with conflict.
Human dimension	Attention to the <i>personal and spiritual domains</i> of policy impacts, including intangible outcomes beyond functional-instrumental objectives—for example, psycho-social development, enhancement of dignity, and capacity for self-help.
Feasibility	<i>Ease of learning and applying</i> the theory. Implies the theory is practical to translate into policy implications, and adaptable to varying types of problems, scales of action and social settings.
Action potential	Provision for carrying ideas into practice, building on experience underway and identifying new lines of effective solutions to problems.
Substantive theory	<i>Descriptive and normative theory</i> of social problems and processes of social change. Predictive capacity based on informal judgments, not just trend extrapolation; ability to trace long range and indirect policy consequences; historical perspectives on opportunities and constraints on action.
Self-reflective	Capacity for laying analytical assumptions open to criticism and counter-proposals; provision for learning from those being planned for; capacity for depicting concrete experience in everyday language, as well as conceptual models using aggregate data.

Table 2.2. Relative Emphasis of SITAR Theories Based on Selected Criteria (Hudson et al., 1979)

Major criteria, or descriptive characteristics of planning theory	The SITAR traditions				
	Synoptic planning	Incremental planning	Transactive planning	Advocacy planning	Radical planning
Public interest	○	○	○	●	●
Human dimension			●		○
Feasibility	●	●			
Action potential	○	○	○	○	○
Substantive theory		○	○		○
Self-reflective			○	○	○

Explanation of Table:
 Characteristics are taken from Table 1
 ● indicates major strength or area of concern
 ○ indicates partial or one-sided treatment
 blank cells indicate characteristic weaknesses

Table 2.2. evaluates the five SITAR traditions based on the criteria outlined in Table 2.1. This comparison aims to highlight similarities and differences among the various planning approaches and identify the relative strengths and weaknesses within each theory, revealing an overall pattern of emphasis and neglect in the planning field. The SITAR theories vary in their intentions and historical effectiveness in achieving their goals. For each theory, the table points out at least one area where it claims to excel, other areas where it provides a partial or limited perspective and specific shortcomings that can be identified.

The definition of public interest presents a key challenge in planning. Radical and advocacy planning emphasize conflict, while transactive and incremental approaches focus on dialogue among diverse stakeholders, while without addressing power dynamics. Synoptic planning tends to overlook conflict by adopting a singular view of public interest. Transactive planning fosters growth and learning between planners and communities, while radical planning highlights human agency and ideological unity. Both raise doubts about the sufficiency of social science alone for understanding social issues (Hudson et al., 1979). In terms of feasibility, planning methods must simplify complexity without confusing models with reality; synoptic planning is straightforward, while incremental and advocacy approaches align closely with the practices of skilled social actors (Hudson et al., 1979).

The impossibility of long-term predictions of how **complex** phenomena such as cities will develop has become clear through studies in the field of chaos theory. When the failure of elitist planning brought about new planning searches, planning also turned to participatory planning practices, just as democracy searches in the world turned to participatory practices (Tekeli, 2007). According to Fainstein, there are three approaches previously referred to under the headings of (a) the communicative model, (b) new urbanism, and (c) the just city (2000). Although the rational model and the physical master plan were the dominant forms of planning practice worldwide in the late twentieth century, they have not escaped strong criticism. The progressives of the previous period spent much of their energy condemning traditional planning for authoritarianism, sexism, the stifling of diversity, and class bias (Fainstein, 2000). Recent theory has progressed from merely criticizing to presenting a more enticing future scenario. For new urbanists, this is an urban form that encourages neighborliness, community involvement, subjective experiences of integration with one's surroundings, and aesthetic fulfillment. For communicative planners, this includes methods that let people influence the places where they live. In contrast to the state-centered model of the bureaucratic welfare state, just-city theorists focus on the creation of an urban vision that incorporates

material well-being but is based on a more decentralized, cooperative, and pluralistic approach to welfare provision.

The communicative model is based on two philosophical schools: Jürgen Habermas' theory of communicative rationality and American pragmatism as it was articulated in the works of John Dewey and Richard Rorty (Fainstein, 2000). Habermas's initial method is traced back to Hegelian idealism and Marxist critical analysis, and later to Wittgenstein's examination of language, while Dewey's work is rooted in British philosophical realism and empiricism (Fainstein, 2000). The term new urbanism describes a planned urban development strategy that is focused on design. It was mostly created by journalists and architects, and it may be more ideology than theory. Its message is spread not only by academics but also by planning professionals and a popular movement. In practice, it has stimulated the creation of several new towns and neighborhoods. The promise of a higher standard of living has sparked a social movement, which is the most intriguing feature of modern urbanism from the perspective of planning theory. Its utopianism contrasts with communicative planning, which offers only a better process. Therefore, there is a model of planning practice that is founded on the messianic promise of the advocate who believes in a cause and avoids neutrality, rather than the image of the sensitive planner who listens and speaks in an ideal manner. The goal of the Just City's vision is to inspire the populace rather than dictate a course of action to those in authority. A compelling vision of the just city must include an entrepreneurial state that creates more money in addition to providing welfare; additionally, it must depict a middle-class society in the future rather than merely empowering the poor and disenfranchised (Fainstein, 2000). Modern political economists often view society as being made up of the rich and the poor, ignoring the interests and aspirations of the large middle class and the working class's aspirations for upward mobility. In contrast, Marx scorned the lumpenproletariat and placed his hopes on the working class. Because benevolent authoritarianism is rare and because public participation in decision-making is a good objective in and of itself, it is part of the ideal of a just city. At the same time,

democracy poses a number of difficult issues that can only be handled in particular contexts and have never been theoretically solved.

Numerous significant problems about the current and future roles of planning in urban policy-making are brought up by the diversity within the planning profession (Galloway et al., 1977). Many different planning definitions and approaches have given rise to this variance. Sorting out the planning process and the area to which it pertains is becoming more and more challenging for policymakers who are in charge of making judgments about the role of planning in their companies. Kuhn's rejection of the conventional view of science, which depicts a cumulative and linear accrual of knowledge fostered by a homogenous chain of scientific revolutions, is generally the main cause of the controversies surrounding the propositions themselves in the process of paradigm change (Galloway et al., 1977). Kuhn claims that scientific revolutions occur at random and that scientific textbooks, which are frequently altered to imply a cumulative and nonrandom development of scientific thought, mask this random pattern. In particular, he proposes that significant shifts in scientific thinking occur on a regular basis when preexisting ideas (paradigms) are acknowledged to be insufficient in explaining the anomalies that appear at random during routine scientific research. He suggests that anomalies lead to major scientific breakthroughs.

Kuhn indicates that scientific communities pass through phases which can be summarized as follows:

1. The pre-paradigm period of a scientific community, in which there is no consensus within the community on a central paradigm and, therefore, the field consists largely of competing schools of thought
2. The period of paradigm development, in which the paradigm is “sufficiently unprecedented to attract an enduring group of adherents within the community away from the competing modes of scientific activity;” this paradigm being “sufficiently

open-ended to leave all sorts of problems for the redefined group of practitioners to resolve”

3. The period of paradigm articulation in which the parameters of research and problem-solving are determined by the paradigm itself

4. The extension of the post-paradigm period, in which anomaly occurs and is reflected in “nature’s violation of the paradigm;” the scientific community attempts to modify the paradigm to explain or “make law-like” the anomaly or anomalies.

5. The period of crises, which is generated when the existing paradigm cannot accommodate the anomaly, the paradigm is intensely scrutinized, and the parameters of research are broadened, leading eventually to paradigm substitution (Kuhn 1962).

According to Tekeli, there are significant differences and even disagreements between the approaches of the three thinkers, whose works are frequently referred to in discussions of postmodernism, to knowledge. There are significant differences and even disagreements between Feyerabend's pluralistic approach to science, which accepts that many traditions can coexist, Lyotard's approach, which claims that only local determinations based on language games are possible and that science will develop through paralogies, and finally Derrida's approach, which accepts that the interpretation of texts is constantly changing and that undecidability in texts "disseminates" (2017, p. 18). Based on each of these, different scenarios can be established for the development of knowledge. However, postmodernism neither foresees progress in the direction of one of these scenarios nor establishes the internal connection of these different approaches or explains the transitions from one to the other. However, postmodernism attempts to be defined with a generalization that encompasses the common features of all of them. Approaching the definition in this way causes the common features of different thought forms, such as fragmentation, transience, and indeterminacy, to come to the fore. This inevitably causes definitions of postmodernism to remain very descriptive and superficial (Tekeli, 2017, p. 18).

With special consequences for planning theory, postmodernism can be roughly described as a change in sensibilities that surfaced in the 1960s and 1970s. It functions as an "umbrella" phrase that covers a range of planning-related ideological shifts and their effects on policy (Hirt, 2005). These changes include a shift in emphasis from functionalism and efficiency to human-scale, urban, and unique designs; a move from expert-driven methods to participatory approaches; and a move from emphasizing new "modern" forms to appreciating historical structures (Hirt, 2005). A wave of prominent antimodernist planning theorists arose in opposition to the homogeneity produced by the "Fordist" approach to planning, which included "international-style" towers in city centers and urban neighborhoods divided by roads, as well as vast suburban developments. Their viewpoints are in line with many of the major planning movements of today, such as new urbanism and community regeneration. Table 2.3. shows some statements summarizing the postmodern approach according to the idea owners.

Table 2.3. Planning Means for Different Authors (Hirt, 2005)

Authors	Definition
(Jacobs 1961)	advocated urban complexity and diversity
(Lynch 1981)	good city form
(Boyer 1983)	city of collective memory
(e.g., Lynch 1960; Alexander 1977)	image," its patterns, its legibility, and its sense of place
(e.g., Calthorpe 1993)	human

The premodern, more comprehensive approach to understanding was significantly disrupted by the separation of knowledge into discrete disciplines. Modernist planners aimed to establish an ordered division of these elements into different zones, whereas medieval cities were typified by the chaotic coexistence of diverse uses and people (Hirt, 2005). Strict zoning and the resulting mechanical separation of urban areas have since been blamed for several problems, such as class

dominance, ecological pollution, and social isolation. The idea that humans have "dominated nature to produce a wealth of commodities" is a fundamental component of modernist ideology. Modernists believed that nature was a plentiful resource that existed mainly for human use. On the other hand, contemporary planning theory concentrates on debates about reducing land use with the goals of preventing sprawl, protecting open spaces, and reviving urban life (Hirt, 2005).

Pervasive changes beginning in the 1960s have been wreaking havoc upon ways of behaving and thinking as well as upon the shape of the landscape, leading to what has been described as a "paradigm shift" (Kuhn) along with a "legitimacy crisis" (Habermas). Like similar moments in our history, this one has witnessed a search for meaning featuring a fascination with the past as well as calls for multidisciplinary, multiculturalism, multivalence, and multilogue. During the paradigm shift, the notions of "city" and "culture" have been undergoing revision, as have academic disciplines and professions devoted to them (Ellin, 1996, p. 241).

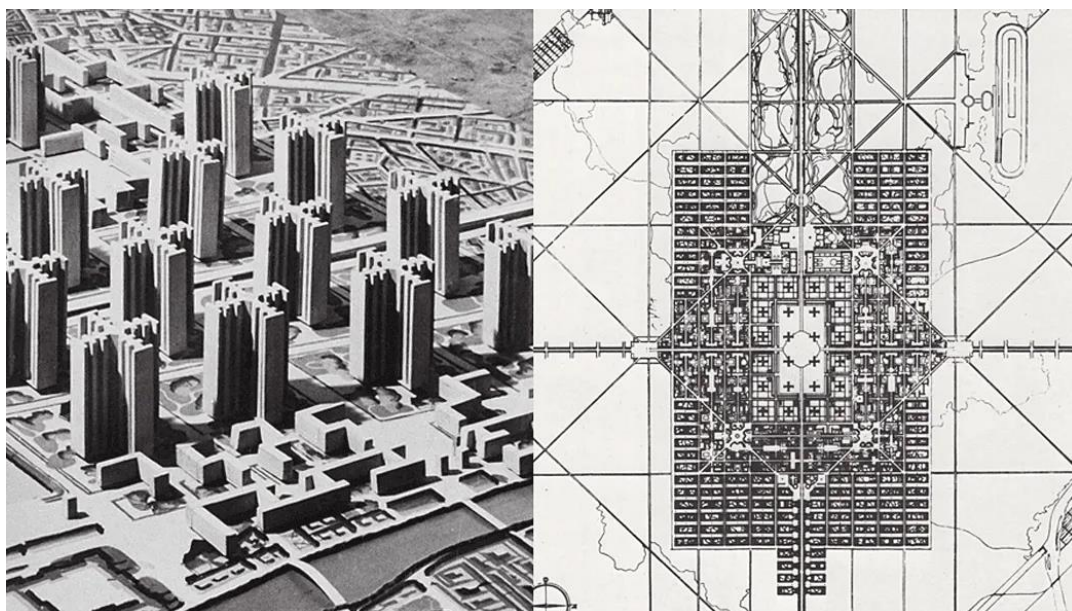


Figure 2.1. Radiant City by Le Corbusier (Urban Design Lab, 2024)

Modernism emerged as an enlightenment project and has survived to the present day with some changes over time. Like all planning approaches, urban planning is also a modernist project (Tekeli, 2017, p. 19). The modernist urban planning approach has developed under the assumption that the city is a whole. Modernists try to make large-scale plans that cover the entire metropolitan area and prioritize efficiency within the understanding of technical rationality. Planning approaches are rational and comprehensive. In this case, space is seen as something to be shaped by social purposes. These concerns have also brought about the single-function zoning approach. Postmodernism assumes that space is autonomous and independent, shaped by aesthetic purposes and principles, and that this formation is not related to social purposes (Tekeli, 2017, p. 19). When the city is abandoned from being seen as a whole and from setting goals related to this whole, the city; is perceived as a formation that is fragmented, where different forms of the past overlap, a collage of different uses, and many of its elements are temporary. If the city is perceived in this way, a planning approach consisting of different projects and urban design projects comes to the fore instead of the rational-comprehensive planning approach (Tekeli, 2017, p. 19).

“Postmodernism is seen as a legitimate reaction to the monotony of universal modernism's vision of the world. Generally perceived as positivistic, technocentric, and rationalistic, universal modernism has been identified with the belief in linear progress, absolute truths, the rational planning of ideal social orders, and the standardization of knowledge and production. Postmodernism, by way of contrast, privileges heterogeneity and difference as liberative forces in the redefinition of cultural discourse” (Harvey, 1989, p. 9).

Although the term "postmodernism" is broad and frequently confusing, at its core, it refers to a response to modernism's **homogeneity**, **functionalism**, and **rationalism** (Urban Design Lab, 2024). Postmodernism embraces eclecticism, irony, and the

blending of styles, whereas modernism aims to establish a universal language of architecture and urban planning founded on the ideas of efficiency, purity, and order. Postmodernism has had a significant impact on urban development, affecting both the general planning of cities and the design of individual buildings. Postmodern urban development places a strong emphasis on the significance of context, both cultural and physical, in contrast to modernist urban planning, which frequently uses a uniform, universal approach to city design. The large-scale, top-down planning techniques of the modernist era, which were occasionally viewed as unduly strict and disengaged from the demands of local populations, are frequently criticized in postmodern urban development. Postmodern planning, on the other hand, frequently favors **gradual**, **smaller-scale**, and **participatory** methods that provide greater flexibility and responsiveness (Urban Design Lab, 2024).

The significance of **localization** is particularly emphasized by postmodernism, which promotes the modification of these global influences to fit local circumstances. This method creates settings that respect the stories and customs that make each place unique while also satisfying contemporary demands. Postmodernism has added to the complexity and depth of contemporary urban environments by embracing contextualism, richness, and the blending of styles. But as cities keep changing postmodernist concepts and methods will need to be reassessed in light of new challenges and opportunities (Urban Design Lab, 2024).

Here, five related aspects of postmodern urbanism are reviewed in the context of the broader postmodern shift (Ellin, 1999):

- A growing interest in participatory planning
- A search for urbanity, urban identity, and cultural uniqueness
- An appreciation of historic spaces; a return to traditional urban forms
- A mixing of land uses and flexible zoning
- The pursuit of human-scale, pedestrian-friendly, higher-density, urbane, and compact forms

Friedmann approaches certain aspects differently today compared to when the manuscript for *Planning in the Public Domain* was written in the early 1980s. Three themes that have recently resurfaced will be discussed: the production of the urban habitat, the rise of civil society, and the inevitable question of power (Friedmann, 1998). According to Friedmann, *it doesn't seem so very long ago that planning was perceived to be a value-free activity guided by professional if not scientific standards. Planners, it was argued, are guardians of the public interest. And yet, as planners, we don't have a well-thought-out philosophical position beyond the usual platitudes of participation* (2008). As a function of **scale**, **complexity**, and **time**, what can be safely known determines the absolute boundaries of planning. In theory, urban scales are unlimited, but in practice, spatial planning is always limited by territory, and both the urban scales and the power to influence them range from the global to the minuscule areas of a neighborhood and city block (Friedmann, 2008). Planners' professional knowledge is necessarily based on a very limited reading of the urban complex. They are required to create **comprehensive** or **strategic** plans for a city or region, yet they are faced with the nearly impossible challenge of depicting the city or region in two dimensions at a size that is easily envisioned. Every map is a model, and every model is a radical simplification, an abstraction, of reality (Friedmann, 2008). What planners choose to show then decide to display a variety of variables, each of which is susceptible to change over time, although at different rates and in different directions.

Table 2.4. Three Big Shifts in Planning Theory According to Friedmann (Friedmann, 2008)

Authors	Definition
(e.g., Healey 2007, 280-82)	making planning more of a whole-society process rather than primarily a technical one
(Flyvbjerg 1998b)	planning increasingly into a political art, with planners needing to be acutely aware of power and the difference that power makes

Table 2.4. (cont'd)

(Pressman and Wildavsky 1984; Friedmann 1993b; Albrechts and Lievois 2004)	engagement of planners with the art of getting things done and so with planning in “real-time”
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There are three big shifts have occurred shown in Table 2.4. Friedmann (2008) identifies three central tasks for planning theory: creating a humanist philosophy to guide planners, modifying planning procedures to reflect the dynamic nature of human affairs, and converting ideas and knowledge from other disciplines into the language of planning. Today’s planners are no longer merely analysts advising politicians; they have become political actors in their own right. Planning theory, much like planning practice, is an eclectic, or more elegantly, **interdisciplinary** and even **transdisciplinary** field. The work of planners primarily involves urban and sometimes regional issues, which cannot be fully understood without integrating insights from multiple disciplines (Friedmann, 2008).

There is an alternative interpretation of multidisciplinary that does not rule out specialization (Pinson, 2004). Being receptive to the knowledge and expertise of other disciplines is exactly what transdisciplinarity is all about. Specialized knowledge can be reworked using transdisciplinary techniques to solve urban concerns in a relevant manner. Every urban planner is essentially an economist, engineer, sociologist, architect, or lawyer who makes an effective and pertinent contribution to a shared inventory of urban planning theory. **Uncertainty** became the regime of the new sciences and, within this context, urban planning was considered without these suspicions which disqualified it from the positive science point of view.

Urban planning can be viewed in terms of three characteristics that determine the existence of a discipline, contributing to the creation of a particular body of knowledge accessible to other fields. These criteria are first, a specific set of

knowledge and know-how; second, a training system that allows this knowledge and know-how to be transmitted; and third, a professional organization that participates in applying this knowledge and in ensuring its recognition (Pinson, 2004). A deeper comprehension of territorial dynamics, as well as experimental projects and actions in the city, is necessary for research on urban concerns. In this way, theories derived from the practice of urban planning as well as the scholarly development of information that can be purposefully and successfully positioned within this subject are equally responsible for the existence of urban planning (Pinson, 2004). Urban planners often took on the role of hyperactive professionals who assisted academics and other experts from various fields. Due to a significant shift in the city's standing in both international agreements and national regional planning, the role of urban planners began to change.

Urban planning practice requires an understanding of urban agglomerations. This information focuses on "urbanization," particularly how urban development is organized spatially. Geography is also interested in this topic. But beyond sharing this "object" of knowledge with geography, urban planning is also described as a discipline that has an unquestionable relationship with architecture and civil engineering, as well as a professional activity (praxis-action vs. poiēsis-production) that aims to master urban development by putting the built environment's transformation processes into configurations that will benefit society more (Pinson, 2004).

The urban planning process is being revitalized by two theoretical and practical breakthroughs today. The first is the "urban project," which is unique to and takes the role of urban planning, which has historically been devoted to master planning, regulation, or architectural megastructures. By dissecting the relationships between power and decision-making in connection to spatial development, "governance," the second innovation that comes with the rise of democracy, alters the circumstances for the formulation of urban planning processes (Pinson, 2004, p. 7).

The Chicago School carried the sociology studies that had slowed down in Europe to the other side of the ocean. The main feature of the studies conducted within this school was that they defined the city as a living organism, also under the influence of ecology. *Lefebvre criticized the Chicago School for its definition of the city that oversimplified the space it developed and for its overly reductionist positivist approach that based social phenomena on ecology. According to Lefebvre, when establishing a relationship between urban sociology and animal sociology, not only urban life but also life in the animal world was overly simplified* (Serter, 2013, p.74). Due to the tension between socioeconomic progress and the natural environment, concepts like sustainable development, circular economy, and smart growth have become central to today's environmental concerns. Green infrastructure, recognized as a practical approach to balancing environmental, social, and economic development, has emerged as a key strategy for achieving sustainable development (Ying et al., 2022).

The ideas of “protecting nature” and “respecting nature” were previously acknowledged by the public, though nature was seen as more passive in this approach. In contrast, “green infrastructure” emphasizes the importance of balancing nature conservation with human development and man-made structures. Additionally, it promotes the active maintenance, restoration, creation, and even reconstruction of green networks (Ying et al., 2022). The concept of green infrastructure is a key element in exploring the "harmonious coexistence between humans and nature," with its development involving an extensive process of conceptual preparation and accumulation (Benedict & McMahon, 2002). From a social and cultural perspective, green infrastructure enhances the built environment, offering people opportunities to connect with nature, improve the aesthetic quality of landscapes, and promote social equity, all of which contribute to better social well-being and human health (Ying et al., 2022).

Green Infrastructure (GI) in the United States (US) and other regions presents a paradox. While its origins are grounded in a landscape-oriented approach to research

and planning, GI is often primarily focused on stormwater management. While stormwater management is part of the broader landscape concept, limiting GI to this function can overlook the importance of landscape ecosystem structure and function. In response, a more integrated approach to GI is emerging, one that incorporates engineered infrastructures within the context of ecological networks (Grabowski et al., 2022).

Over the past decade, Green Infrastructure has significantly evolved, transforming from an intriguing expansion of existing green space planning into a well-defined and adaptable approach to landscape planning. In the UK, planning policies vary in their support for GI, while in the USA, the focus remains predominantly water-related. Additionally, in regions just beginning to explore GI, such as India, Bangladesh, China, and South Africa, there is a small but growing body of research on socio-ecological connectivity, which could potentially shape a standard approach to urban planning in the future (Mell, 2017). Geographical diversity has allowed Green Infrastructure to evolve into a flexible and dynamic approach to landscape planning. This trend is evident in the range of discussions featured in this special issue. It also underscores the complexity seen in many cities and regions across Europe, the USA, and more recently in African and Asian countries, where the adoption and form of GI have varied. Another key aspect of GI that is vital to understanding its role is that, regardless of the investment type, it must always be considered context-specific (Mell, 2017). Except for China, there are few studies in Africa, Asia, and South America, which may limit the universality of the green infrastructure findings. Therefore, it is necessary to study these developing regions. They are currently experiencing a rapid urbanization process, which is related to the severe ecological environment crisis in developing countries (Ying et al., 2022).

As a result, it becomes evident that planning theory has evolved, adapting within the economic framework to meet the changing needs and demands of cities and their residents. This evolution reflects not only shifts in societal priorities but also the dynamic nature of urban development, where economic, social, and environmental

factors play a significant role in shaping planning practices. When taking all of these elements into account, the concepts outlined in Table 2.5 serve as key descriptive values that characterize the current state of planning theory.

Table 2.5. Words that Summarize the Current Planning Approach

The pursuit of human-scale, humanist philosophy
Whole-society process
Participatory planning, Locality
Urban identity, Cultural uniqueness, City of collective memory
Urban diversity, Integration
A mixing of land uses, Compactness
Interdisciplinary, Even transdisciplinary

It is seen that there are different values and approaches throughout the development process of planning theory. Different approaches are also being tried in practice today. The basic values that planning theory has today are in the form of words and phrases that appear in Table 2.5. When the words and phrases are examined, it is seen that an approach that puts people at the center values society and values participation processes, urban identity, diversity, and cultural differences is dominant. Instead of urban dispersion and separation, urban mixed-use and togetherness are adopted. In urban development processes, producing urban knowledge and sharing this production are considered important. Interdisciplinary and transdisciplinary approaches are adopted in the production stages of this knowledge.

2.1.1 Planning Approach in Türkiye

The planning process in Türkiye, as in every country, has evolved into its current form under the influence of external and internal dynamics of change. It has undergone some changes and developments in line with the various dynamics of different periods. In Türkiye, various institutional reorganizations of urban

governance, influenced by neoliberal policies, have been implemented through the introduction of different legal instruments. The key features of governance reflect unique and distinctive administrative characteristics. The traditional central government-based administrative system has shaped all forms of governance in Türkiye (Kayasü & Yetişkul Şenbil, 2014). In Türkiye, village administrations are the oldest administrative units within the local government system. Another local government unit, the Provincial Special Administration, began to develop in the second half of the 19th century. Municipal administrations are another branch of local government. Metropolitan municipalities started to be established in 1984. Law No. 6360, enacted in 2012, brought about significant changes in the structure of the metropolitan municipality (Olgun Susta & Eren, 2019). According to the new definition, the metropolitan borders were aligned with the provincial borders, and the provincial municipalities of provinces with a total population of more than 750,000 were transformed into metropolitan municipalities. In all metropolitan cities, the legal entities of villages and town municipalities were terminated and the relevant administrative units were transformed into neighborhoods.

Table 2.6. Plan Types, Legal Basis, Authorized Institutions and Scales in Türkiye (Yalçınkaya & Say, 2018)

Plan Type	Legal Basis	Authorized Institution	Scale
Development Plan	1982 Constitution Article 166/Decree Law No. 641	Ministry of Development	Report
Regional Plan	Zoning Law No. 3194	Ministry of Development	Report 1/250 000- 1/100 000
Spatial Strategy Plan	Spatial Plans Preparation Regulation dated 14.06.2014	Ministry of Environment and Urbanization, General Directorate of Spatial Planning	1/250 000- 1/500 000

Table 2.6. (cont'd)

Environmental Plan (Çevre Düzeni Planı)	Spatial Plans Preparation Regulation dated 14.06.2014	Ministry of Environment and Urbanization, General Directorate of Spatial Planning	1/50 000- 1/100 000
Zoning Plan (Nazım İmar Planı)	Spatial Plans Preparation Regulation dated 14.06.2014	Municipalities within the adjacent area, Governorship- Special Provincial Administrations outside	1/5 000- 1/25 000
Implementation Zoning Plan (Uygulama İmar Planı)	Spatial Plans Preparation Regulation dated 14.06.2014	Municipalities within the adjacent area, Governorship- Special Provincial Administrations outside	1/1 000

Table 2.6 indicates the spatial plan types in Türkiye, their legal basis, authorized institutions, and scales within the scope of the Spatial Plans Construction Regulation and the Zoning Law No. 3194. The basic plans prepared in Türkiye are the development plan, regional plan, spatial strategy plan, environmental plan, zoning plan, and implementation zoning plan. Each of these plans has different but complementary content. They are prepared by different or the same institution on different scales and subjects.

According to Kayasü & Eldeniz (2013), three main periods can be clarified to explain the current regional policy efforts in Türkiye.

- Pre-planned period: Before the planned era, up until the 1960s, the main focus was on physical settlement planning as a public tool, rather than on regional development planning. The priority was primarily given to national development. Until the 1960s, no institutions were directly responsible for regional development in Türkiye, and development at the societal and national levels was emphasized over regional growth.

- Planned period with the establishment of SPO: With the start of the planned era following the establishment of the State Planning Organization (SPO), the first institution directly responsible for national and regional planning, an integrated planning approach was introduced. From the 1960s to the 1990s, the primary objectives of the SPO in formulating regional development plans were to address regional development imbalances and increase welfare levels. In line with this goal, various regional development plans were prepared, considering the integration of spatial dimensions and sectoral priorities.
- Ongoing planned progress, followed by EU membership efforts: Although regional planning has been part of Türkiye's political agenda since 1960, regional initiatives have not been effective in practice. The Europeanization process had a significant impact on Türkiye's regional policy framework, particularly in terms of aligning with EU requirements. Since the “regional level” is crucial for the EU's regional policy, it became an essential institutional unit in policy-making.

Table 2.7. Five Different Planning Periods of Türkiye (Övgün, n.d.)

Sectoral Industrialization Goal: 1930s
Agriculture-Based Development Goal: 1940s and 1950s
Planned Development Period: 1960s
Marketization of Planning: 1980s
Strategy Period in Planning: 2000s

The planning adventure in Türkiye can be divided into five separate periods given in Table 2.7. The general feature of these periods is that planning is addressed from different perspectives and the organization is structured accordingly (Övgün, n.d.). In the 1930s, when the idea of planning first emerged, a planning approach based on industrialization and state leadership was adopted under the umbrella of the statism policy. The 1940s, on the other hand, were a period in which the state should not carry out economic development, and the private sector should play a leading role in the economy. It was fundamentally desired that the private sector develop. Unlike

previous practices, the development planning approach of the 1960s was put into practice to ensure the country's rapid and balanced development not only in the economic field but also in the social and cultural fields. The development planning envisaged to be carried out under the coordination of the SPO brings industrialization to the forefront. The 1980s, on the other hand, were a period in which development was shelved in light of the adopted economic and social policies and planning shifted to market conditions. The 2000s were a period in which the transformation of planning that began in the 1980s continued, but a new and different phase was entered as strategic planning.

Planning is fundamentally a process that must be approached in conjunction with many disciplines. Accordingly, economics, political science, administrative law, constitution, and management science are closely related to the planning process and experiences. Planning is the process of reflecting the demands from political channels into the country's development by passing them through a scientific and technical filter with legal and economic dimensions (Ekiz & Somel, 2005). The main driving force behind the emergence of planning in Türkiye has been the search for development aligned with the recommendations of international economic organizations and focusing on social welfare. As initially mentioned, Türkiye's planning periods can be categorized into industrial, development, and company-based market planning. In this last category, the planning models are "strategic planning" and "pre-national development planning" (Ekiz & Somel, 2005).

Strategic planning describes the path between where the organization is and where it wants to go. Accordingly, strategic planning ensures harmony between the organization's resource goals and environmental conditions and creates a strong vision (Coşkun & Park Yıldırım, 2018). Organizations that do strategic planning are more prepared for the future and are more prepared for developments in the environment than those that do not. In strategic planning, the strengths and weaknesses of the organization are determined with the SWOT analysis method, and

the opportunities and threats in the organization's environment are determined. The strategic planning approach is one of the strategic management tools based on a long-term perspective. In this respect, strategic planning is a long-term planning approach that evaluates the current situation, the goals to be achieved within a certain period, and the methods, resources, and tools needed to achieve these goals, and is essentially closely related to the concept of vision. Strategic planning is the way to realize the vision of the future. Urban planning is a type of strategic planning that also includes spatial planning (Avcı, 2016).

Some global institutions such as the World Bank, OECD, and the European Union have also started to pressure countries on these changes and transformation issues. Türkiye has also been affected by these changes and the pressures of the aforementioned international institutions towards restructuring. In Türkiye, strategic planning in public administration emerged as institutional planning industrial planning, with the understanding that development and basic investments were made by the state within the framework of the principles determined at the Izmir Economic Congress (Uyan, 2021). The Undersecretariat of the State Planning Organization presented the Strategic Planning Guide it had prepared to all relevant institutions and strategic planning pilot studies were initiated in eight public administrations. The Long-Term Strategy Document and the Eighth Five-Year Development Plan brought the issue of spatial strategic planning to the agenda for the first time in 2000. Following these plans, the law that addressed the issue of strategic planning in detail was the Metropolitan Municipality Law No. 5216, which entered into force in 2004 (Sınacı Özfındık & Sat, 2016).

In Türkiye, especially after the 1980s, the financial and administrative crises experienced in the public sphere led decision-makers to think more strategically and make long-term plans that would overcome future uncertainties, and the Public Financial Management and Control Law No. 5018 was enacted in 2003, creating the legal infrastructure for the “strategic planning in the public sector” process (Sınacı

Özfindık & Sat, 2016). The first strategic planning applications in private sector organizations emerged in the 1950s. The use of strategic planning increased in the 1960s and 1970s, and it became an almost indispensable element of organizational management. It is seen that strategic plans were widely used in public and non-profit organizations and public institutions in the 1980s and later.

Regional development studies also started in Türkiye in the 1960s with Development Plans. Efforts were made to create policies that yield rapid results to ensure regional development and to close the gaps between regions in a balanced manner. For this purpose, in addition to regional development plans, tools such as Priority Region in Development, incentive, and investment practices, the establishment of Organized Industrial Zones, social responsibility projects, and rural development projects were used (Yiğit & Işık, 2019). Theoretical foundations have shaped regional policy in Türkiye, particularly concerning the institutional restructuring process. Regional disparities and competitiveness have been significant challenges for many years. Various policies and tools have been developed to reduce regional disparities and promote local and regional development. Following global regional development trends, regional policy activities have also gained momentum in Türkiye. As a result, regional development plans such as The South-eastern Anatolia Project (GAP), The Zonguldak-Karabük-Bartın Regional Development Project (ZBK), The Eastern Anatolia Project (DAP), The Eastern Blacksea Regional Development Plan (DOKAP), and The Yeşilırmak River Basin Project were formalized. However, these plans, especially those dominated by the central system, were not adequately implemented, except for GAP (Kayasü & Eldeniz, 2013).

Türkiye's regional policies have been influenced not only by domestic social and economic developments, but also by experiences in European countries and transformations in regional development paradigms. In this context, Türkiye has also been implementing new theoretical clusters, albeit a little late, by following the experiences of various countries, primarily the EU (Keskin & Sungur, 2010). The

context for regional policy underwent a significant transformation with the increased collaboration between Türkiye and the EU, driven by the potential for full membership. Although a final decision on the latter continues to be postponed, despite four decades of pre-accession agreements, Türkiye has been fully dedicated since 2001 to aligning its governance structures and procedures with the EU's (structural) policy framework, including regional policy (Legendijk et al., 2009). In recent years, EU countries have been forming their economic development and growth strategies based on smart specialization, and third-generation innovation strategies covering the years 2014-2020 are also being developed based on smart specialization. This concept, which is also seen as the basis of the Europe 2020 Strategy, constitutes smart, sustainable, and inclusive growth. This approach, which differs from traditional approaches in two aspects, has the first feature of the innovation system, and the other feature is the methods by which this strategy is processed. The innovation system, which expresses the evolution of the region, its inherited structures, adaptation, and changes in the region as a whole, suggests that it be subject to dynamic applications through the method of determining information-intensive areas (Yiğit & Işık, 2019).

Especially in developed countries, with the economic and technological changes and developments, the development of information technology, and the strategic resource of information, the social changes observed in the society in the form of the prominence of locality and participation principles have led to significant changes in regional development policies (Sarica, 2001). Two basic approaches constitute the regionalism approach. These are; the Internal Growth Approach and the Center of Attraction Approach. The Center of the Attraction Approach came to the agenda in the 1960s and has a parallel structure with the Development Poles Theory (DPT, 2000). The fact that development starts in a certain region is not a coincidence but is seen as a prerequisite for development. Therefore, development starts in certain sectors and certain regions are seen as a condition of economic development beyond a coincidental development. Development poles are included in unbalanced

development theories with this feature. The state makes intensive public investments in cities called centers of attraction that it has determined to transform the regional structure. In line with this purpose, it is also aimed to provide an increase in welfare on a regional scale thanks to externalities such as new job opportunities and increased production capacity that this agglomeration economy created by public investments will create for the entire region. Development Poles Theory is a development model used in most settlements. As a result of incentives and subsidies, welfare increases and growth are expected in the region. The actors in the infrastructure of the model are entrepreneurs (DPT, 2000).

Along with the globalizing economic system, development paradigms are also changing. The global economy is shaped by the competitiveness of regions, and competitiveness is defined as an element that develops based primarily on local resources. In other words, as the view that regional inequalities, which are the fundamental problem of the development field, should be eliminated not only by the public but also by the regions' own resources gains weight, a regional development approach based on the evaluation of local resources and opportunities comes to the fore (Dedeoğlu & Serteser, 2011). The new regional policy axis is on a line that aims to increase the capacity of the region and activate internal dynamics. In this direction, the competitive power of each region is shaped depending on several elements such as basic infrastructure, technological infrastructure, information infrastructure, quality of space, human resources, entrepreneurial culture, sectoral concentrations, internationalization, innovation, governance, institutional capacity, specialization and social capital (Keskin & Sungur, 2010). Türkiye's perspective on regional policy is also affected by this transformation and is progressing in a positive direction. However, it is a controversial issue how long and to what extent this positive progress observed in the objectives, tools, and policies included in the development plans will have its effects in practice in Türkiye (Keskin & Sungur, 2010).

The specific conditions of regions determine what development means for that region and therefore what kind of policies should be designed. Therefore, development is **context-dependent** and cannot be copied; no development prescription can be applied to every region. At the same time, regions' historical development processes largely determine the future development bars. For these reasons, development strategies specific to regions should take into account the historical and cultural equipment of that region, its unique potentials, opportunities/constraints, the relationships of regional actors within this context, and the ways they are articulated to the region and each other. For the endogenous growth model to be effectively implemented, decision-making processes should also be localized and these processes should be based on a governance model based on consensus in the public sphere. In this way, it may be possible to ensure effective and on-site control and to develop policies that can better respond to local needs (Dedeoğlu & Serteser, 2011). Institutional settings play a crucial role in shaping and implementing effective regional policy practices. The shift from centralized, state-driven actions to neoliberal policies has led to the growth of private entrepreneurship in regional development. However, the global order suggests that regions should not follow a single, uniform model. This explains why some regions become centers of local success, while others fail to achieve similar outcomes. As a result, the most recent theoretical approaches focus on regional survival by leveraging their competitive strengths and developing unique identities that reflect local conditions in policy actions. In this context, institutional approaches emphasize the concepts of **context-specificity** and **path dependency** (Kayasü & Eldeniz, 2013).

The regional development problems can be addressed by systematically improving local business, organizational, and institutional networks. Therefore, it would be unrealistic to expect Regional Development Agencies (RDAs) to resolve all issues. However, RDAs can still play a crucial role as intermediary agencies, making significant contributions and driving change. Achieving this will require more focus on the organizational and institutional integration of RDAs. A critical challenge is

determining how to effectively legitimize RDAs within their regions (Lagendijk et al., 2009). As a result, development agencies should have a role that encourages participation, communication, and coordination in both their business processes and the decision-making and implementation processes of local institutions. One of the most important functions of development agencies to ensure development in their regions is to ensure the creation of a local/regional common sense by keeping open/active dialogue channels that will enable local actors to perceive their priorities within the framework of their mutual interests.

With globalization, the importance of regions as a critical point for innovation-based economic growth has been increasing. As a result of the increasing importance of regional economies as a source of national competitiveness in the global economy and the increasing number of successful examples, the need to reconsider regional policies has emerged and as a result, serious transformations have occurred in the field of regional policy both in theory and practice. With this transformation, traditional regional policies have lost their importance and new regional policies have begun to gain importance (Dulupçu et al., n.d.). With the new approach called **new regionalism**, regions have begun to be considered as a unit with variable boundaries, determined by a network of relations, formed by locals without the requirement of spatial continuity, and directly open to international relations. In this process, **local dynamics** come to the fore as the driving force in the economic development of regions (Dulupçu et al., n.d.). Regional development is understood as a complex, historically and geographically dependent series of processes that unfold within specific regional contexts of production. While the regional economy is at the core, this concept also encompasses social, cultural, political, and environmental factors. The **local context of human and natural resources**, along with the competitive advantages that emerge from it, are not static but are continuously influenced and transformed by regional cultures, politics, and planning over time (Soja, 2009). According to Soja (2009), the evolution of regional planning

and regional development theories can be divided into four stages from a historical perspective.

1. Regional Planning as Resource Development: 1920–1950
2. Regional Planning 1950–1980: Welfare Regionalism
3. Regional Planning as Entrepreneurial Regionalism 1980 to present
4. The Rise of a New Regionalism

Starting from 1980, the spatial pattern in Türkiye has changed with the effects of globalization, technological progress, economic, social, and demographic changes, and geographical and political developments. In this process of change, the provincial, district center hierarchy, urban, rural area, city-center, city-periphery, and similar dichotomies in the settlement system have gradually disappeared and the relationships established in space have differentiated. Settlements are no longer just structures with clear boundaries but have become variable structures woven with networks of various scales, densities, and functions. The flow of people, matter, and energy has created new spatial units. The settlement system ranking defined according to functional, administrative, and managerial regulations has lost its meaning (Yetişkul Şenbil & Şenbil, 2020).

The focus of the discussions on region, regionalization, and regionality has been on Europe in the 1980s and 1990s. This is partly due to the policies and strategies of the European Union, which has created its regional geographical maps. Since its establishment, the NUTS regions have played two main roles in the regionalization process. The first is a technical role, which involves the collection, development, and harmonization of regional statistics in Europe, and the second is an integrative role, which ensures the implementation of policies and programs aimed at regional, economic, and social integration in Europe and the provision of financial assistance to underdeveloped regions (Yetişkul Şenbil & Şenbil, 2020). **Complexity theory** and a different perspective on planning: it has become impossible to explain

settlements with basic production and consumption relations or with a small number of variables (Yetişkul Şenbil & Şenbil, 2020). The research conducted to date, the concepts used and the theoretical framework developed are weak in explaining the change or dynamism in space. Planning cannot be constructed on this basis, and settlements cannot be designed with long-term and standard-based absolute decisions. Instead of trying to explain settlements through basic variables, different studies and research aimed at understanding the dynamism in the settlement pattern by leaving these variables aside are increasing.

Moving beyond relations to consider the nature and kind of entities that make and are made through relations is not especially “post-relational”; rather it is closer to Deleuze’s “realism” without, that is, the baggage of Western philosophy’s internally inscribed essences. In a similar vein, it might have been useful for the authors to think through what kind of geography works for assemblage thinking, beyond that of its various topographical forms. Insofar as many of the metrics of topography are a product of space/time as a dynamic and changing topology, such thinking could have taken us towards a more than relational geography (Allen, 2012, p. 4).

New Regionalism found a place in social scientific thought until the end of the 1990s. However, in the 21st century, it has also been criticized with the advancement of network geographies, or rather the spread of relational thought. The approach that puts networks at the center of the region conceptualized regions as open, fluid, and probabilistic (Allen & Cochrane, 2007). According to the relational approach;

- Regions do not naturally provide spatial integrity,
- Even if their areas and authorities are defined, it is not possible to talk about a regional community or partnership,

- Concepts of regionality (scales, levels, borders) do not match today's dynamism and cannot grasp relationality (unions, flows, connections),
- It is clear that spatialities cannot be fixed with any intervention and that the tools and mechanisms developed in this direction will fail (Paasi et al., 2018).

In the process that can be defined as the urban awakening period experienced in the 1980s, the most fundamental power of economic renewal was determined as creating local income and new labor employment opportunities, and the entrepreneurial city model was adopted. During this period, Urban Projects came to the agenda and these projects were carried out to pave the way for regional competition (Yılmaz Bakır, 2013). Multi-purpose strategies were used to balance economic, social, and ecological goals. The applications in this period focused on urban transformation, renewal, employment and education projects, and public transportation projects. However, with the development of the economic structure based on rent, city centers and areas close to the center were seen as profitable investment areas by local, national, and global capital and began to transform rapidly through urban projects.

Tekeli (1992) defines **urban projects** as projects that have a significant impact on the development dynamics of the city, require large amounts of investment, take a long time to implement, create changes in the level of rent in the city, and are important enough to create positive or negative changes in the lives of those living in the immediate vicinity. According to this definition;

- Urban projects are part of more comprehensive textures and are closely related to other urban services and projects
- They significantly affect the development dynamics of the city
- They create changes in the distribution and sharing of urban rent

- They require a wide-ranging network of intergovernmental relations that extend beyond the boundaries of the area where they are implemented
- They create changes in the lives of the local community in and around the area where they are implemented
- They require large-scale investment and, accordingly, financial resources and labor
- They require a relatively long design, preparation, and implementation process and effective management, and are a large-scale structuring practice (Tekeli, 1992).

In recent years, social, political, and environmental criteria have come to the agenda to increase economic competition, and discourses such as effective management, social infrastructures, sustainability, holistic regional development, urban revitalization, and public-private partnerships in social welfare have begun to guide the development of cities. These rapidly developing processes of change have begun to criticize traditional planning, which has a rigid stance on issues such as location selection, density, form, land harmonization, and land use. The most fundamental discourse of this period is the emphasis on flexibility in planning, transformative and integrative plans, analyzing opportunities and threats well, and being aware of the importance of determining important actors (Yılmaz Bakır, 2013). The traditional planning approach has been abandoned in many countries, and instead of a flexible, short-term, fragmented, and easily adaptable to market and political pressures, project-based and complex approaches have prevailed. The project-based approaches experienced in the 1980s have today given way to the action-oriented and vision-based understanding of strategic planning (Yılmaz Bakır, 2013).

According to Yılmaz Bakır (2013), there are common aspects of the definitions made under the concept of urban projects. They appear as spatial outputs of the economic

and cultural globalization process. They are accepted as a new interface for local culture, institutional structure, and planning culture. They are large-scale, development-providing projects that provide advantages in terms of attracting investment. The aim of these projects, which have a mixed structure with their use and users, can be evaluated as adding dynamism and liveliness to the area. Public and private collaborations are taking shape. They have development schemes that attract investment and create renewal with their pioneering features.

Although it has become a general tendency to manage cities with a marketing logic by turning them into prestige spaces through projects, it is of great importance to draw attention to the social and public costs of this approach. As a result, urban projects are development-oriented projects that provide public character to space and time. Development is the integration of different urban functions and connections in economic, social, spatial, and frame dimensions. Since they are formulated with spatial strategies, they can also be described as spatial strategic projects (Yılmaz Bakır, 2013). They should be perceived as local integrated development forms that strengthen, and ensure the existence of the city in competition, and are shaped by public and private investors. This means that urban projects have an innovative structure not only by achieving fundamental spatial changes but also by creating transformations in social relations, creating new social productions, and changing decision-making mechanisms.

Plans are roadmaps prepared to reach the imagined future. Therefore, they can only be put into practice if they are documents in which the goals and objectives are jointly decided upon to solve the common problems of the citizens. Planning is a feedback and dynamic system. Planning and implementation processes should be considered as a whole. It is necessary to take measures appropriate to the constantly changing conditions and to follow the strategies envisaged for the implementation of the plan (Ersoy, n.d.).

The need for creative urban intervention policies and planning instruments for complex urban development processes is evident. A new understanding of complex urban dynamics would be developed, along with further research on the current dynamics of the neoliberal agenda (Kayasü & Yetişkul, 2014). The space view is about complex socio-spatial relations and how these relations and patterns overlap and determine everything in time and space. The density of flows on the global network now defines space. Time-space, which is **local, context-dependent, real**, creates constantly changing space. Accepting this change also means accepting that space is 'n' dimensional and that perfect calculation and therefore control is not possible; in other words, it means accepting that knowledge produced by the local comes to the forefront instead of deterministic scientific knowledge (Tekeli, 2010).

2.1.2 Development of the Sustainable Development Concept

The first international consideration of environmental problems caused by human activities dates back to the 1970s. The Human Environment Conference was held in Stockholm in 1972, addressing settlement and ecological issues. The World Conservation Strategy framework emphasizes that conservation and development should be addressed together to achieve a sustainable society. Many agreements, protocols, conventions, and conferences have been organized since the concept of sustainable development first emerged to prevent environmental problems caused by human activities, and the changes they cause in the climate and to prevent these problems. Some international agreements that have made a name for themselves in the historical process are the 1992-Rio Conference, the 2005-Kyoto Protocol, the Paris Agreement (2015), Habitat III (2016), and the COP26 (2021).

The concepts of sustainability and sustainable development, which have been on the agenda since the 1980s, are now seen as urban resilience and urban flexibility. Sustainability as a policy concept originated in the 1987 Brundtland Report. This document addressed the conflict between humanity's desire for an improved quality

of life and the constraints imposed by the natural world. Over time, the concept has been re-interpreted as encompassing three key dimensions: social, economic, and environmental (Kuhlman & Farrington, 2010). The exact definition of urban sustainability or a sustainable city remains uncertain. However, the concept of a sustainable city is still seen as an ideal goal. The interpretation of sustainability varies depending on the social group idealizing it. While social, economic, and environmental parameters may be similar, the ideal sustainable urban is changed according to each culture. Despite the lack of consensus on a precise definition of sustainability, there is broad agreement that **sustainability** aims to balance human needs with environmental preservation. The concepts of preserving resources for future generations and addressing social justice issues are also widely accepted as key components of urban sustainability (Barbosa, et al., 2014).

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Jonathan, 2003, p. 1). The idea of sustainable development was signed in Agenda 21, a document developed during the United Nations Conference on Environment and Development in Rio in 1992, and has since been included in various global development and human rights agendas. While the concept is widely supported by society, it is still under construction and involves several controversial discourses (Barbosa, et al., 2014). The term "Sustainable Development" is commonly used in today's political and environmental discussions. Its ambiguity enables various social groups with differing views on development to adopt it. This lack of clarity is partly due to the concept itself, which can take on different meanings depending on the perspective and the person or group interpreting it.

One of the essential elements of urban sustainability, which is one of the important elements of sustainable development, is the urban planning function. Unfortunately, many developing countries lack urban planning and design strategies. Urban planning in these countries is inadequate in coping with many problems specific to

rapid expansion. Ineffective and unsustainable urban policies; excessive development and inadequate control, unplanned settlements far from the city center, poor connections resulting from insufficient space allocation for streets and transportation systems, urban design practices that are far from providing optimal development density are concrete evidence of this (Avcı, 2016).

The concept of **urban resilience** is defined as the potential that cities have for sustainability. The concept of urban resilience is an important criterion for reducing vulnerability within the scope of sustainable development (Partigöç & Baş, 2022). Urban resilience is a concept related to adaptation and adjustment processes. Mitigation and adaptation studies are indispensable for preventing climate change, reducing the effects of disasters caused by climate change, and benefiting from these disasters. Sustainable development in urban areas is only possible with a successful adaptation process (Partigöç & Baş, 2022).

The theme of the next issue of Urban Planning will be Paradigm Shifts. Sustainability can be seen as requiring shifts in cognitive paradigm that are transformational, and radical (Wheeler, 2016). According to Wheeler, three key perspectives are critical. First, sustainability calls for a **proactive, result-oriented focus**. Addressing social injustices is crucial in a world in which growing inequities, conflict, and economic despair, could lead to social upheaval. A second cognitive shift behind sustainability involves adopting a more **long-term perspective**. As highlighted by the Brundtland Commission, which provided one of the most widely known but imperfect definitions of sustainable development, sustainability connotes a long-term approach to problem-solving. The third shift is towards a more **holistic** or **ecological** way of thinking, the ability to understand the dynamic, evolving, radically contingent, and interdependent nature of human and natural systems (2016).

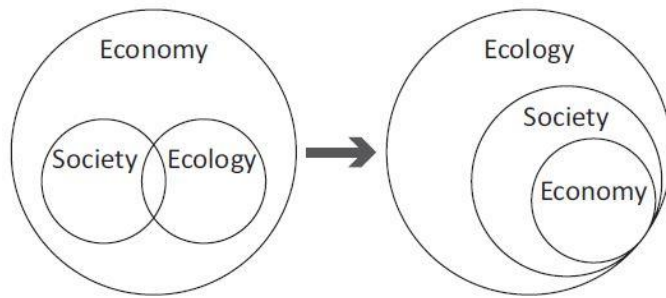


Figure 2.2. Sustainability as a Transition from the Modernist Paradigm Grounded in Economics toward Ecological Thought (Wheeler, 2016)

Table 2.8. Modernist, Postmodernist, and Ecological Worldviews (Wheeler, 2016)

	Modernist Worldview	Postmodernist Worldview	Ecological Worldview
Values	Universal values based on modern science	Pluralistic values based on cultural and cognitive traditions	Acknowledges pluralism but also a shared core value set based on common problems
Cognitive Approach	Atomistic (break problems down into constituent parts; view the world as a collection of individual elements)	Acknowledges multiple ways of viewing the world	Focuses on interrelationships and dynamic, evolving systems
Core Influences	Newtonian physics; neoclassical economics	Twentieth-century physics (relativity, uncertainty principle)	Ecological science; chaos theory; systems theory; and many social theories
Political Implications	Reinforces centralized authority	Undermines centralized authority	Emphasizes flexible and evolving relationships between many different institutions
Preferred Planning Modes	Rational, comprehensive planning	Decentralized local planning to meet pluralistic community needs; communication to gain consensus on directions	Emphasizes communication and education to help evolve understanding; advocacy planning to achieve shared goals; evolving incentives and mandates between different levels of government

An ecological worldview can offer both a sophisticated cognitive perspective, highlighting the dynamic coevolution of systems, and a moral framework in the values essential for the well-being of all species to thrive on a small planet (Wheeler, 2016). Sustainability planning necessitates three key paradigm shifts: results-oriented problem-solving, a long-term perspective, and holistic or ecological thought (Wheeler, 2016). While these new ways of thinking may seem simple, implementing them in practice is quite challenging. Achieving these shifts demands a supportive framework of institutions, incentives, peer networks, and education. It also requires professionals to collaborate openly with diverse communities, fostering collective learning and communication.

Sustainable development is seen as an ongoing, non-linear process that requires continuous learning, adaptability, and the willingness to embrace change. By focusing on structural transformations, innovations, and adaptive flexibility, societies can better manage the complexities of sustainability in a rapidly changing world. Adaptive flexibility refers to the ability of systems, whether ecological, social, or economic, to adjust to new challenges and conditions. This flexibility is crucial for addressing the complex and dynamic nature of global environmental and societal issues. It requires continuously learning from experiences and applying that knowledge to initiate new development pathways.

According to Bagheri et al., there are several important points in sustainable development. The first one is focusing on **processes** rather than on fixed goals. The premise that decision-making is a social learning process necessitates the development of a polycentric perspective of policymaking. Traditional planning techniques ought to change their emphasis from "what" to "how," moving from a "goal-based optimization framework" to a "process-based multi-scale approach guided by a target or vision." The second is **conventional** planning: the challenge of uncertainty. Many ambiguities in risk and environmental policy concerns now need to be addressed by science. This calls for a change from "normal" sciences defined by laboratory-based, puzzle-solving methodologies that frequently externalize

uncertainty and are unsuitable for tackling intricate global environmental issues to "post-normal" sciences. This latter strategy is intended to address environmental concerns where quick decisions are needed and there is a great deal of uncertainty and conflicting values. Third is **social learning**: the process of perceiving and adapting to change. Adaptive reactions to uncertainty are the result of the learning process. This method highlights how critical it is to recognize environmental difficulties, adjust to them, and actively develop solutions. It focuses on a more dynamic and proactive involvement with these challenges, going beyond simple public participation or group learning. Fourth is **model building**: a process of learning rather than a means of predicting. In traditional modeling, the model is usually created by one person or a team of experts, who subsequently present the findings to decision-makers. On the other hand, policymakers, stakeholders, and experts must work together to construct the model to promote a true learning process (2007).

How is the local planning process organized to deal with established cross-cutting sustainability goals? What are the conditions for promoting sustainability in small-scale development projects? Those are the questions looking for answers through a study. The study employed a small-scale development project as an illustrative instance and was carried out in the Tyresö municipality in Stockholm, Sweden. The study is a component of the Södertörnsmodellen¹ research program, which was started in 2013 to investigate new avenues for sustainable urban development that are founded on collaboration between academic institutions, private industry, and municipalities.

According to Högström et al., five factors make it difficult to govern and integrate knowledge in the planning process, according to the interviewees. First, the managers of different administrations within the municipality are reluctant to share resources at the early stages of the planning process due to the municipality's lack of resources. Second, the developer and the municipality both tend to move quickly through the early phases of the process, missing the chance to consider the project's

inherent conditions. Third, it is difficult to be explicit and articulate when you do not possess expert knowledge, particularly when it comes to "fluffy" situations where neither the developer nor the municipality have the necessary knowledge. Fourth, each project is distinct and changes as it progresses. Fifth, it's unclear how the instruments that were provided such as the preliminary response, project order, start-PM, and program of quality applied in the planning process to support the making available of information (2019).

Three interlaced challenges related to linking small-scale development to the long-term strategy were identified in the study. First, the municipality's planning is influenced by organizational challenges. The local planning authority is under pressure from the need for development, which has an impact on the process's organizational structure, workload, and available resources. Next, the planners experience procedural challenges that are related to (i) assuming responsibility as project leaders for the efficacy and efficiency of the planning process and for reaching an outcome that can be agreed upon by all parties involved; (ii) making use of the "architecture of instruments" at their disposal and making sure that developers implement decisions through negotiation, concretization, and formalization; (iii) adapting and adjusting the process as the process itself reveals new information; and (iv) preserving the legitimacy of the statutory process by adhering to the procedural and substantial requirements associated with the various planning process phases. Finally, the knowledge-related challenges include; applying translation processes, determining whether expert knowledge relevant to each project needs to be integrated, and developing and communicating, ideally early on, "clear and concise" guidance and demands for developers to ensure a satisfactory level of quality (Högström et al., 2019).

Understanding climate change in a local context can highlight opportunities to maximize the local benefits of mitigation and adaptation action. Politically, this will also make the climate change issue more manageable (Corfee-Morlot et al., 2010). A crucial instrument for local decision-making is communication that facilitates an

interface between specialists and local stakeholders, including the local government, to increase knowledge of how local development decisions may be impacted by climate change and how those decisions will impact the climate in the future.

Only by taking action at all governmental levels, international, national, regional, and local, can the issue of climate change be effectively handled. Local efforts to combat climate change are entwined with national policy and advancements in adaptation or mitigation (Corfee-Morlot et al., 2010). National policy can benefit from local knowledge and action. Equally, a multitude of activities that manifest in different ways at the local level will be necessary to advance national efforts to limit consequences (i.e., to adapt) and reduce GHG emissions (i.e., to mitigate). On the other hand, national and local governments might collaborate to mandate and promote the creation of **locally specific-policies** and volunteer initiatives (Corfee-Morlot et al., 2010). The nested institutional structures of any given national setting ultimately determine the capabilities of local governments and institutions, which are formed by national legislation and policy.

The most thorough analysis of climate assessment in history, the Fifth Assessment Analysis of the Intergovernmental Panel on Climate Change (IPCC), identified city regions as the primary places that need to adapt to the hazards posed by climate change. Urban-scale climate change research has grown in importance (Jiang et al., 2014). The significance of cities in adapting to climate change has already been established by the worldwide literature. Some people are taking climate issues more seriously as a result of the rapid development of urbanization, which has produced a variety of issues, including the high greenhouse gas emissions of metropolitan systems, the disorganized use of land, and the spreading layout of urban spaces. As a result, urban systems must adapt to the main climate change challenges.

IPCC's definition of adaptation to the urban climate is the process by which human systems adapt to the actual or expected climate and its impacts in order to minimize harm or take advantage of opportunities (Jiang et al., 2014). This demonstrated how governments and international organizations in numerous nations have made city-

region climate change issues and tactics a priority for global climate change research and have aggressively supported "city climate change act planning".

Words that summarize sustainable urban development are given in Table 2.9. Urban resilience, Proactive, result-oriented focus, Long-term perspective, Holistic, ecological way of thinking, Focusing on processes, Conventional planning, Social learning, model building, and Locally specific policies are the ones that come to the fore. These elements are central to fostering sustainable urban environments and guide the development of effective strategies for addressing urban challenges.

Table 2.9. Words that Summarize the Sustainable Urban Development

Urban resilience
Proactive, result-oriented focus
Long-term perspective
Holistic, ecological way of thinking
Focusing on processes
Conventional planning
Social learning, model building
Locally specific policies

2.2 Climate Change and Its Impact on Cities

By 2050, 66% of the world's population will live in cities. Rapid urbanization and urban sprawl are driving increasing energy demand and the need for efficient energy management strategies. The importance of natural resources and the sustainability of cities is also becoming clear in the face of this consumption. Meeting the energy needs of urban areas from clean sources and making energy use more efficient are becoming priority targets. An estimated 2.5 billion people will be added to the urban population between 2015 and 2050, with almost all of this growth occurring in middle- and low-income countries. This urban expansion will further intensify the risks of climate change in the world's cities (Adelekan et al., 2022). Climate change is creating a range of social, environmental, and economic problems that are undermining sustainable development in many cities around the world. Unplanned

urbanization, especially in low- and middle-income countries, is rapidly growing unplanned and informal settlements, and urbanization is turning into hazard-prone areas, placing large numbers of people beyond the reach of many official climate policies, making it difficult to implement climate-resilient urban development and other similar concepts (Adelekan et al., 2022).

In a planet that is faced with various environmental, social, and economic problems, it is very important to develop more environmentally friendly approaches in order to cope with these problems or to be prepared. In this sense, the concepts of **mitigation** and **adaptation** are particularly emphasized. Cities and urban areas are faced with higher warming levels, flood disasters, and many risks related to these. By first understanding these risks, it becomes a necessity to develop options for climate action plans to be developed. System transitions are needed to limit climate impact, including rapid and simultaneous transitions in energy; land, ocean, coastal, and freshwater ecosystems; industry and society; urban, rural, and infrastructure systems are the main issues that need to be focused on (Gallardo et al., 2022). The IPCC Working Group II report, Adaptation and Vulnerability, focuses on the risks posed by climate impacts to lives, livelihoods, ecosystems, and biodiversity, showing how cities are leading the way in adaptation action. Together with the IPCC Working Group III report on Climate Change Mitigation, the global community demonstrates how cities play a central role in climate change and sustainable development, with a map of solutions (Gallardo et al., 2022). However, cities often face challenges when it comes to implementation, with only a limited number of city adaptation plans implemented to date. Furthermore, most of these adaptation strategies focus narrowly on climate risk reduction. While generally complementary to city-wide climate mitigation and sustainable development plans, a more integrated approach could create significant opportunities for co-benefits. Near-term mitigation plans are important to preserve the space needed for such adaptation (Adelekan et al., 2022).

Climate change mitigation in cities and urban areas has a significant role in determining the future of the global climate. All cities have significant opportunities

to implement mitigation strategies; city typologies provide a roadmap for the most applicable and effective approaches for each city type. With city typologies as a framework, urban mitigation strategies fall into four categories:

- Reducing energy and material consumption through spatial planning
- Decarbonizing the urban energy system through electrification while also moving to net-zero emission sources
- Capturing and storing carbon in cities
- Changing urban demand and energy behaviors (Babiker et al., 2022).

2.2.1 European Green Deal

The European Green Deal can be described as a form of roadmap that shows the way to a sustainable economy in Europe. The strategy implementation aims to achieve resource efficiency in a circular economy, preserve biodiversity, and reduce pollution. The main objective of the European New Green Deal strategy is linked to reducing net greenhouse gas emissions by at least 55% compared to 1990 levels by 2030 and achieving climate neutrality by 2050 (Szpilko et al., 2022). The European New Green Deal is the EU's new growth strategy that "aims to transform the EU into a fair and prosperous society with a competitive economy". It is also an important part of the EU's plan to achieve the 2030 Agenda for Sustainable Development. It also aims to protect citizens from environmental damage and impacts and to be fair and inclusive. It puts well-being at the center of economic policy (Fetting et al., 2020). The main objective of the European New Green Deal strategy is to place sustainability and human well-being at the center of economic policy, as a fundamental dimension of all policy decisions and the actions resulting from them. It emphasizes that achieving climate neutrality is only possible with the participation of all stakeholders from different sectors, such as construction, biodiversity, energy, transport, agriculture, and food.

The main goals of the EGD are a net **carbon-neutral** European Union by 2050 and the decoupling of economic growth and resource use. The EGD is not a law in itself, but rather an overall policy strategy that outlines ambitions and targets across different policy sectors. To implement it, existing regulations and standards will be revised over the next few years, and new laws and directives will be developed and implemented. The eight key areas that make up the Green Deal are as follows:

- Increasing the EU's climate ambition for 2030 and 2050
- Supplying clean, affordable, secure energy
- Mobilising industry for a clean and circular economy
- Building and renovating in an energy and resource-efficient way
- A zero pollution ambition for a toxic-free environment
- Preserving and restoring ecosystems and biodiversity
- Farm to Fork: a fair, healthy, and environmentally friendly food system
- Accelerating the shift to sustainable and smart mobility

As can be understood from the items, a new and sustainable approach is required from many different sectors. In this respect, the issue of infrastructure comes to the fore. The new smart sustainable infrastructure enables new business models and new types of mass employment that characterize the transition to a green economy. Infrastructure resembles a vast technological organism that brings together a large number of people as an extended figurative family that collectively enters into more complex economic, social, and political relations (Rifkin, 2019). Infrastructure, in the context of the Green New Deal, is a **techno-socio nexus** that brings together new communication technologies, new energy sources, new modes of mobility and logistics, and new built environments, enabling communities to manage, power, and move their economic activities more efficiently (Rifkin, 2019). Communication

technology is the brain that controls, coordinates, and directs the economic organism. Energy is the blood that provides the nutrition to transform nature's gifts into goods and services to keep the economy alive and growing. Mobility and logistics are extensions that allow communities to physically interact across spatial and temporal domains to facilitate the movement of goods, services, and people. Buildings are semipermeable membranes that allow us to store the energies and other resources we need to sustain our physical well-being and to provide safe and secure places to produce and consume the goods and services we need to thrive. They serve as gathering places to grow our existence, our families, and our social life (Rifkin, 2019).

It is revealed in many studies that the majority of the world's population will live in cities by 2050. Rapid **urbanization** and **urban sprawl** are causing increasing energy demand and the need for efficient energy management strategies. As complex urban systems emerge in the urbanization process, city morphology is becoming a popular and effective method in the field of urban planning (Wang et al., 2017). In particular, the built urban physical environment offers various opportunities in terms of energy efficiency. The physical environment also offers the opportunity to address issues such as climate change, energy consumption, renewable energy development, traffic analysis, wind comfort, and air pollution (Wang et al., 2017).

The study of the environmental quality of urban areas is linked to the built environment as a key factor in ensuring sustainability. It is known that the amount of energy consumed by buildings for heating and cooling is responsible for the poor air quality in today's cities and the increase in greenhouse gas (GHG) emissions that affect global climate change. Urban morphology is defined as the study of urban form, the factors of transformation processes, and climate. It is possible to understand how towns grow and develop from the physical complexities of various scales, from individual buildings, plots, street blocks, and street patterns that make up the structure of towns (Tsirigoti & Tsikaloudaki, 2017).

The built environment includes the city and buildings, towns and villages where people live and work, and their infrastructure. It is where most human activities take place, where most energy services are used, and where most of the advantages and disadvantages of energy use occur. The area where energy efficiency can best be applied can be found in urban design and planning processes. Various issues such as urban physical structure, urban occupancy and vacancy rates, and the structure, material, and form of buildings affect energy efficiency. The formation of the built environment affects not only urban microclimates and thermal comfort but also the energy consumption patterns needed to achieve thermal comfort (Peker, 2016). For example, areas with warmer climates use tight spacing as an important tool in providing thermal comfort. Similarly, green space planning included in the design processes also has significant effects on perceived temperature values. The design of a common park in a city can provide a visual aesthetic that creates psychological relaxation while contributing positively to physiological conditions as a result of its capacity to provide natural ventilation to the city (Peker, 2016). Urban structure that avoids large distances between buildings in areas defined as compact areas is among the most important factors that can make the urban environment more conducive to physical activity, including walking and cycling. All of this reminds us of the many advantages that nature-based solutions can provide in built urban living environments.

Nature Positive: Guidelines for the Transition in Cities is a publication by the World Economic Forum in partnership with Oliver Wyman. It is part of the Nature-Positive Transitions report series, which outlines various strategies to stop and reverse nature loss by 2030, aligned with the Global Biodiversity Framework's mission. The series includes two main parts: sector transitions and city transitions. These reports emphasize the importance of nature-related risks, examine the economy and society's impacts and reliance on nature, and offer recommendations to city and business leaders on essential actions to accelerate the transition toward a nature-positive future (World Economic Forum, 2024).

Launched by the European Commission in 2020, the New European Bauhaus (NEB) initiative links the European Green Deal with our living environments and experiences. It embodies the EU's vision of creating beautiful, sustainable, and inclusive spaces, products, and lifestyles. The initiative encourages innovative ways of living where sustainability and style go hand in hand, helping to drive the green transition across various sectors of the economy, society, and daily life. Its goal is to ensure that all citizens have access to products that are circular, less carbon-intensive, and contribute to the regeneration of nature and the protection of biodiversity (Urban Initiative, n.d.). The New European Bauhaus looks at projects, places, practices, and experiences that are:

- **Beautiful:** Aesthetically pleasing, but also inspired by art and culture, responding to needs and improving quality of experience beyond functionality.
- **Sustainable,** in harmony with nature, the environment, and our planet.
- **Inclusive,** encouraging dialogue across cultures, disciplines, genders, and ages (Urban Initiative, n.d.).

Several aspects of the original Bauhaus have inspired the vision of the New European Bauhaus. Established in 1919, the historical Bauhaus emerged during a time of significant societal and industrial change. Similar to a century ago, the exploration of innovative materials is still crucial. While cement and steel were the key materials at that time, today we must focus on nature-based materials produced sustainably and develop low-carbon production methods for all materials (European Commission, 2021).

A triangle of three core inseparable values guides the New European Bauhaus:

- sustainability, from climate goals, to circularity, zero pollution, and biodiversity,
- aesthetics, quality of experience and style, beyond functionality,
- inclusion, valorising diversity, equality for all, accessibility and affordability

The New European Bauhaus embraces three key approaches. First, a multilevel approach that connects global goals with local actions, supporting small-scale initiatives in communities. Second, a participatory approach that engages diverse civil society groups, ensuring inclusion and fostering collective creativity. Third, a transdisciplinary approach that bridges different fields, such as culture, technology, design, and science, to create innovative solutions for a better future, focusing on nature, belonging, and those in need (European Commission, 2021).

The Eyes Hearts Hands project introduces an innovative approach that aligns with the principles of the New European Bauhaus (NEB). It seeks to connect art, culture, and education with science and technology. Additionally, the project will support EU Missions that share common goals with the NEB, working to address critical challenges in health, climate, and the environment by fostering closer citizen engagement and utilizing research and innovation (Eyes Hearts Hands., n.d.).

The Re-Value partnership takes a holistic approach to urban development, addressing not only physical infrastructure but also community well-being, to achieve climate neutrality in urban areas. The project is inspired by the New European Bauhaus aesthetic approach to sustainability and supports the EU Mission for Climate-Neutral and Smart Cities. Partners are focusing on nine waterfront cities, working together to understand, plan, develop, and share a comprehensive strategy for tackling the interconnected challenges cities face today (Re-Value Cities, n.d.).

The Re-Value partnership is an innovative initiative focused on redefining the value of urban spaces by integrating social, economic, and environmental factors. By promoting transparent decision-making, utilizing technology and data, empowering communities, and emphasizing sustainability, the project aims to create cities that are climate-neutral, socially inclusive, and economically prosperous. Ålesund (Norway), Bruges (Belgium), Burgas (Bulgaria), and Rimini (Italy) will demonstrate how integrated urban planning can achieve climate neutrality and reduce GHG

emissions by 2030. Meanwhile, Cascais (Portugal), Constanta (Romania), İzmir (Türkiye), Písek (Czechia), and Rijeka (Croatia) will replicate and adapt data-driven models and participatory approaches to accelerate their paths to climate neutrality (Re-Value Cities, n.d.).

2.2.1.1 Nudging Theory

A nudge is any factor that significantly changes people's behavior, even if it is ignored by Econs. When people cannot make good choices, some change in the choice architecture can improve their lives. In many cases, an organization or agent must make a choice that will affect the behavior of other people. In such cases, it is impossible to avoid some nudges, and these nudges, whether intentional or unintentional, will affect people's choices (Thaler & Sunstein, 2008, p. 20).

Nudging theory is based on a rich and well-established body of empirical research in the behavioral sciences, particularly in experimental psychology and behavioral economics. Research has shown that small, imperceptible changes in the context in which a decision is made can significantly alter subsequent behavior (Evans & Geene, 2017).

There are two types of thought systems. There are differences between these two systems. One is through intuition and automatic understanding, the other is through thinking and logic. The first is called System 1, the second is called System 2. The Intuitive System is fast and instinctive and generally has nothing to do with the word thinking. The Reflective System is a system that has been thought about beforehand, almost a self-conscious system (Thaler & Sunstein, 2008). **System 1** quickly proposes intuitive answers to judgment problems as they arise, and System 2 monitors the quality of these proposals, which it may endorse, correct, and override (Kahneman & Frederick, 2002, p. 51). The basic features of both systems are shown in Table 2.10.

Table 2.10. Two Cognitive Systems (Kahneman & Frederick, 2002)

System 1 (Intuitive)	System 2 (Reflective)
Automatic	Controlled
Effortless	Effortful
Associative	Deductive
Rapid, Parallel	Slow, serial
Process opaque	Self-aware
Skilled action	Rule application

Nudging has shown promising results in encouraging desired actions and behaviors among individuals; the majority of the literature has reported positive effects in nudging targeted actions and behaviors among people. Overall, the nudging approach has the potential to be expanded into a **pro-environmental** context. Furthermore, according to Wee et al. (2021), there are several types of nudging techniques that can be referred to in encouraging pro-environmental behaviors, such as Prompting, Sizing, Proximity, Priming, Presentation, Labelling, and Functional design. The application concepts and brief descriptions for each technique can be summarized as follows:

Direction: It can be defined as the use of non-personalized information to increase or encourage awareness of a targeted behavior. Information suggested to encourage pro-environmental behavior (e.g., environmental protection information, current environmental issues) and social norm information.

Sizing: It is related to changing the size or quantity of the object. Some of the suggestions for pro-environmental purposes are; increasing the size of the recycling bin to encourage recycling behavior, separating in trash cans to encourage waste separation, reducing the size of the plate to reduce food waste.

Proximity: It is to make behavioral options easier or more difficult. It can be said that this is related to the implementation of pro-environmental settings by making them the default settings and changing the placement of pro-environmental products or objects to be close to people. For example, placing sustainable foods or energy-saving products at consumers' eye level, placing recycling bins next to the exit door.

Priming: It can be associated with placing cues in the environment to influence subconscious decisions. Placing cues in environments to trigger subconscious reactions that will appeal to people's subconscious and lead to pro-environmental behavior. For example, painting footprints that can encourage and guide people to walk in the desired direction.

Presentation: Changing the visual design or presentation of the object. The presentation of pro-environment objects or tools can be changed or redesigned to attract people's attention so that they adopt or consume them. For example, changing the appearance of a recycling bin, and changing the packaging of sustainable foods.

Labeling: Putting the approved information or specific details of an object or option. The approved pro-environment information or details can be labeled on pro-environment products to provide information to consumers.

Functional Design: Changing the functional design of the object or environment. The functional design of the object can be changed to influence people's use to promote or reduce resource consumption (Wee et al., 2021).

There is a close relationship between Green and Nudging theory in many other studies. The relationships revealed by a study conducted in this direction are schematized as in Figure 2.3.

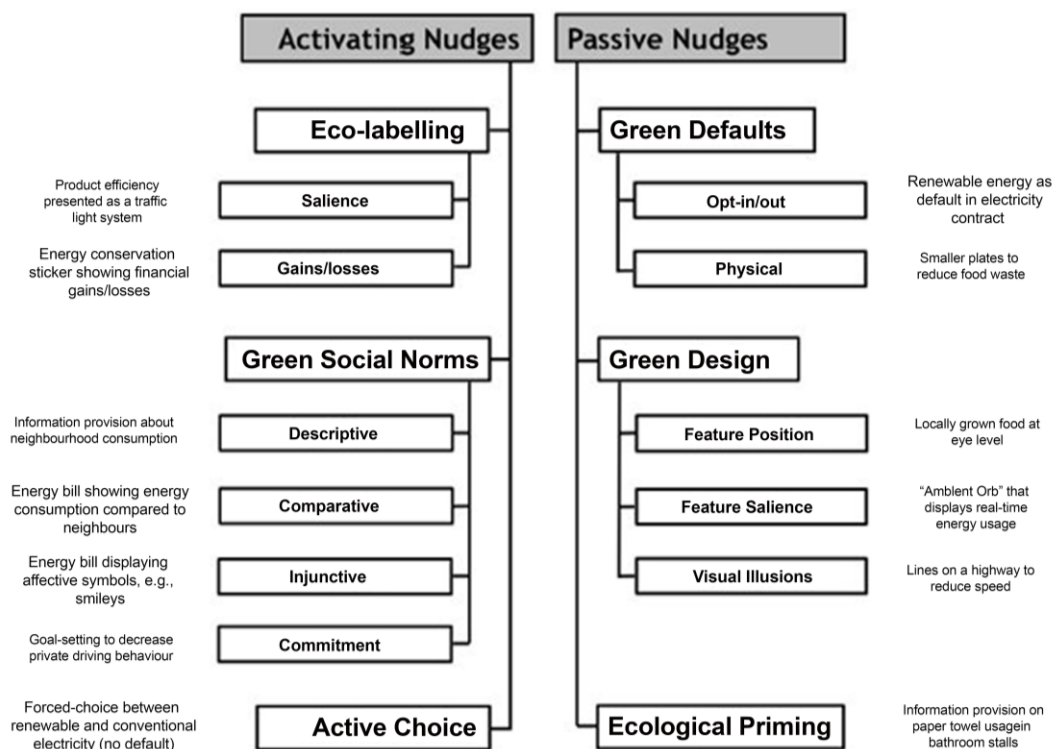


Figure 2.3. Green Nudging Typology (Evans & Geene, 2017)

Figure 2.3. shows a developed Green Nudge Typology. The typology represents a blend of many of the previously mentioned approaches to categorizing nudges. The typology uses a three-tiered hierarchical system of increasing specificity. At the first level, passive nudges influence automatic, **habitual behavior** and do not require any additional mental effort from the individual to work as intended. In contrast, activating nudges also draw on System 1 processes (e.g., social norms) but prompt the individual to weigh and evaluate alternatives before making a more deliberate decision. The nudge types are then grouped according to the underlying psychological mechanism. Finally, at the third level, specific nudges are explained using real-life, practical examples (Evans & Geene, 2017).

It is very important to associate the subject of **nudging** with **green**. The reason is that human behavior and preferences have an impact on the success or failure of many studies. It would be useful to remind at this point that those who live in the city and construct the built environment are human.

“Watching the Green New Deal spread across America, Europe, and the world is heartening. To this extent, ideas do have consequences. We are a storytelling species. We live by our narratives and the stories we share, and in doing so, we come to know ourselves as a collective social being. The Green New Deal is a “storyline” that has evolved and matured over the years, taking on ever more sophisticated and nuanced meanings. And now humanity finds itself in the throes of either a potential endgame or, hopefully, a new beginning. The Green New Deal gives us our collective voice and a shared sense of our shared mission.” (Rifkin, 2019, p. 111).

2.2.2 Sustainability Studies in Türkiye

Türkiye has made progress in the field of climate action in terms of policy, legislation, institutional framework, and project stock. The integration of climate change-related measures into national policies, strategies, and plans has also reached a certain maturity. The main needs that stand out within the scope of this objective are; monitoring indicators in different and critical areas such as local/sectoral adaptation and climate risk plans in addition to standard indicators, encouraging the efficient use of water in agriculture, protecting agricultural lands, improving meadow/pasture areas, combating erosion, early detection of risks and developing new strategies on issues such as selection of drought-resistant species in plant and animal production (Sürdürülebilir Kalkınma Amaçları Değerlendirme Raporu, 2019).

Combating climate change and strengthening the adaptation capacity of all groups and institutions, especially vulnerable groups, against the negative effects of climate change, especially climate-related disasters, are included. Within the scope of the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement, which outlines the framework of the new climate regime, it is aimed to meet the technical, financial, and capacity needs of developing and least

developed countries in the process of combating and adapting to climate change (Sürdürülebilir Kalkınma Amaçları Değerlendirme Raporu, 2019).

Sustainable Development Goal 13 is to take urgent action to combat climate change and its impacts. There are 5 targets under Sustainable Development Goal 13, 3 of which are applicable to Türkiye shown in Table 2.11.

Table 2.11. Sustainable Development Goals for Türkiye (Sürdürülebilir Kalkınma Amaçları Değerlendirme Raporu, 2019)

13.1 Strengthen resilience and adaptation capacity to climate change-related hazards and natural disasters in all countries
13.2 Integrate climate change measures into national policies, strategies, and planning processes
13.3 Develop training, awareness, individual and institutional capacity on prevention and mitigation of climate change, adaptation to climate change, and early warning
13.a To meet the needs of developing countries in the context of meaningful mitigation actions and transparency in implementation; Ensure that developed countries that are party to the United Nations Framework Convention on Climate Change fulfill their commitments towards the joint mobilization of USD 100 billion annually from all sources by 2020 and activate the Green Climate Fund by completing capital formation as soon as possible
13.b In least developed countries and small island developing States; Promote mechanisms to increase capacity for planning and management of climate change, including a focus on women, youth, and local and marginalized communities

The way to understand Türkiye's strategy towards climate change in its entirety is to consider the strategies, action plans, and basic reports on climate change, starting from the Strategic Plans and the 5-Year Development Plans. When the relevant documents are examined, it is seen that Türkiye's approach to climate change is essentially shaped by the mission of placing economic and social development within a sustainable framework and that the understanding that the fight against climate change can be achieved through coordinated efforts with all Sustainable Development Goals is developed (Gökçin Özuyar et al., 2021). In order to

understand the current approach of Türkiye, it is necessary to examine the basic strategy and action plan documents that are still in effect and that concern the environment, sustainability, and climate change. Those plans are given in Table 2.12.

Table 2.12. Important Plans for Türkiye (Gökçin Özuyar et al., 2021)

Strategic Plan (2019- 2023)
5-Year Development Plans
Türkiye Climate Change Strategy 2010-2023
Climate Change Adaptation Strategy and Action Plan (2011-2023)
Türkiye’s 2nd Sustainable Development Goals-Voluntary National Review Report (2019)
National Energy Efficiency Action Plan (2017-2023)
Energy Efficiency Strategy Document (2012-2023)

In Türkiye, the Ministry of Trade has published the Green Deal Action Plan in line with the harmonization with the Constitutional Court, and the priority given to this issue is increasing in the country's policies. The issue of harmonization with the European Green Deal will also be on the agenda regarding the updating of the Customs Union, which regulates trade relations between Türkiye and the EU (Uzbay Pirili, 2024). Harmonization with the change brought by the Constitutional Court requires an all-out effort in which all actors in society channel their energy to this transformation. The coordinated and collaborative efforts of the public sector, local governments, companies, financial sectors, civil society, universities, and research institutions are important factors in both rapidly realizing this process and ensuring that this process is a fair transformation (Uzbay Pirili, 2024).

There are several conceptual studies to address the urban strategies outlined. Nature-based solutions are one of the examples. For example, a hybrid strategy that integrates Nature-based solutions, such as protecting and restoring marshes, can reduce further risk and costs, and provide additional livelihood and biodiversity

benefits. While maintaining a strict conservation pathway may be preferable due to the costs associated with switching to an alternative pathway, switching to softer adaptation options may be less costly in the long term. Nature-based solutions are increasingly being used in cities to protect, sustainably manage, and restore natural or modified ecosystems for disaster risk reduction and effective adaptation (Adelekan et al., 2022). When focused on adaptation, these are called Ecology-based adaptation measures. Ecosystem-based adaptation measures use ecosystem management to increase resilience and reduce the vulnerability of people and ecosystems to climate change (Adelekan et al., 2022).

Nature-based solutions relate to a broader set of actions that are expected to have adaptation and mitigation co-benefits, including the protection and restoration of forests and other high-carbon ecosystems. There is increasing evidence that these solutions can contribute to climate adaptation and mitigation, and provide co-benefits for human health, well-being, and local biodiversity at household, neighborhood, municipal, and regional scales (Adelekan et al., 2022).

Nature-based solutions can provide a low-cost means of reducing air temperature and the effects of heat waves by cooling private and public spaces through street trees, green roofs, green walls, and other urban vegetation and shading. Vegetation along streets or in urban forests can also reduce particulate matter, the ambient air pollutant with the greatest global health burden.

Nature-based solutions can also provide ancillary benefits such as contributing to the food supply, providing recreational spaces, or improving mental health. Carbon-rich ecosystems in urban areas, such as wetlands and forests, also store and sequester carbon, thus having the potential to link adaptation and mitigation. Finally, lifestyle and behavioral change are key to preparing for and responding to climate change. This is because the ultimate implementers are the living practices and behaviors of people living in urban and rural areas. According to Adelekan, tools to encourage adaptation behavior include: better knowledge of climate impacts and risks to shape individual risk beliefs; creating codes to guide climate-resilient infrastructure

development; and improving climate literacy. Regulatory tools, including tax and fiscal incentives for businesses and individuals, can support city-wide behavioral change toward low-carbon and risk-reducing options (2022).

CHAPTER 3

NATURE-BASED SOLUTIONS

3.1 Introduction of Nature-Based Solutions

Nature-based solutions have become a viable alternative for infrastructure development and upgrades in cities that evaluate new approaches and rethink the future and costs of sustaining them. Nature-based solutions are inspired by nature, use nature, and are supported by nature (European Commission, 2016). Specifically, nature-based solutions have been defined as living solutions supported by natural processes and structures designed to address various environmental challenges while simultaneously providing multiple benefits to the economy, society, and ecological systems.

There is a growing need to transition economic growth away from reliance on fossil fuels and towards bio-based, regenerative, and environmentally friendly models. This shift is essential for mitigating climate change and ensuring a sustainable future. Nature-based solutions are at the forefront of this paradigm shift, offering innovative ways to address pressing environmental challenges by harnessing natural processes and ecosystems, ultimately promoting greener, more resilient growth (European Commission, 2022). They are becoming more widely acknowledged as an essential component of biodiversity and climate action. It's time to transition from a niche to a larger movement, even though an increasing number of companies are already arguing for NbS. Therefore, there is a need for a bigger uptake, even since NbS are already being supplied, are visible, and are credible. One way to do this is by using the efforts and supportive policy framework provided by the European Green Deal (European Commission, 2022).

The European Commission has invested over €350 million in initiatives that show how to implement NbS and on large-scale ecosystem restoration, mobilizing science and innovation to support policy (European Commission, 2022). The EU's Biodiversity Partnership, Biodiversa+, and Horizon Europe Missions, particularly those on Ocean and Waters and Adaptation to Climate Change, all prominently incorporate nature-based solutions. European and international frameworks, including the EU Biodiversity Strategy for 2030 (European Commission, 2021), the EU Green Deal (European Commission, 2019), the Urban Agenda 2030 (UN, 2016), the UN Climate Action Summit 2019 Convention of Biological Diversity's Biodiversity Framework (CBD, 2021) highlight multiple benefits that NbS deliver (European Commission, 2022).

Global demand for NbS is rising, partly as a result of its mainstreaming in international policy and partly as a result of citizen and other actor initiatives that acknowledge the many advantages they provide. The fundamental need for NbS arises from multiple sources: (a) Experts, policymakers, and public managers see their potential advantages for the ecology and environment, as well as for the urban environment, health, and social and economic well-being. (b) Private companies, developers, entrepreneurs, and financiers who can identify prospects for growth and financial gain. (c) Citizens and representatives of the "third sector" (charities, community organizations, and non-profits) see chances to solve issues in their communities, launch new projects, and realize new resources like public space and meaningful activities (European Commission, 2022).

Green infrastructure provides an environment for physical exercise, such as running or walking, that contributes to personal health. Increasing vegetation on the streets creates more suitable conditions for gentle mobility, such as cycling and walking, thus helping citizens to be healthy. In this context, it should not be overlooked that it can offer important opportunities in terms of regulating ecosystem services, especially when changing climate conditions are taken into account (Hanzl, 2021). In addition, green infrastructure contributes to both air purification and retention of

rainwater in the soil. The integration of ecosystem services should take into account the forms of the urban fabric (Hanzl, 2021).

The importance of nature and its functions in cities have been studied for many years using different metaphors such as Urban Forest, Ecosystem Services, Urban Green Systems, Biophilic Urbanism, Green Infrastructure, and more recently Nature-based Solutions. Ecosystem services are generally valued in terms of their benefits to human well-being and economy, while Urban forests, Urban green spaces, Biophilic urbanism, and Green infrastructure focus on the provision of these ecosystem services through biodiversity conservation, while nature-based solutions simultaneously address various societal challenges in the long term, providing benefits to people and the environment (Barreira et al., 2020).

Nature-based solutions have largely evolved from previous ecosystem-based concepts and principles, but also pay attention to the social and economic benefits of resource-efficient and universal solutions that combine technical, business, financial, governance, regulatory, and social considerations (Barreira et al., 2020). Since the definition and scope of NbS are broad, it can be considered as an umbrella for the previously mentioned concepts. The main challenges for sustainable cities are to significantly increase the efficiency of resource use while addressing issues related to transportation, climate change, and water and air quality.

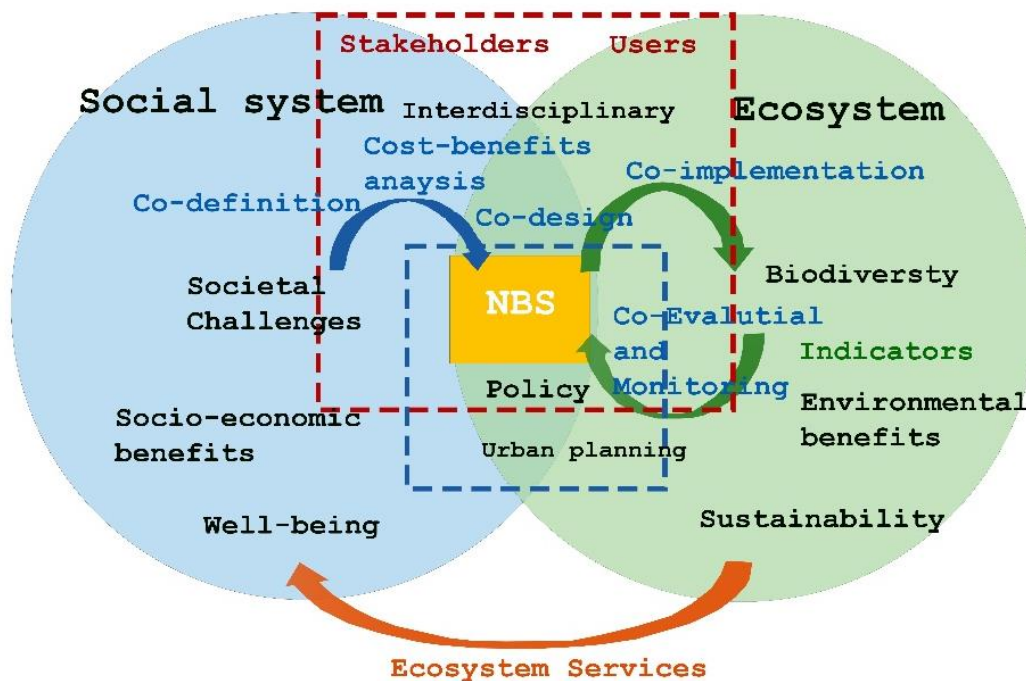


Figure 3.1. Conceptual Representation of Nature-based Solutions (Barreira et al., 2020)

According to Frantzeskaki (2019), there are several lessons learned from experiments with nature-based solutions in cities. These are that the design of nature-based solutions requires multiple disciplines, diversity for co-creation, and the recognition of the place-based transformative potential of nature-based solutions as “superior” to grey infrastructure. For people to value and protect nature-based solutions, they must be aesthetically pleasing in many ways. In particular, they need to be multipurpose and attractive to residents in order to fit into the urban fabric. Another important point is that they contribute to the creation of new green urban commons using natural solutions. Every participatory process regarding planning, policy, and implementation requires trust. Case studies using nature-based solutions demand and develop trust between the city and its residents, both for the study and for the process itself. Various platforms that include urban social innovation and learning from them are necessary to co-create nature-based solutions. In many cities, there are skilled urban actors such as residents and companies who can co-create and co-design nature-based solutions, not in the background of urban planning but in the

foreground as a city-making practice. In this sense, it can be said that nature-based solutions require a collaborative governance strategy. An overarching mission to use natural solutions can connect the knowledge and goals of the city's various institutions and resolve conflicts between them. Actors are necessary for their design, implementation, and connection to urban life. While there is a lot of emphasis on partnerships between the city and its residents, all city institutions must be informed and included when considering, developing, and planning a nature-based solution. Nature-based solutions should be planned and scaled in a way that makes it easy to learn from their successes and apply these lessons to new situations. Using natural solutions at every level can make cities more livable and resilient. In particular, conceptual designs such as expanding courtyards, green walls, and green roofs, which can be given as examples of areas of application, can be considered in a way that can contribute to the creation of widespread use by bringing localization and finding areas of application at lower scales.

In summary, it can be stated that nature-based solutions offer many beneficial uses in different ways. Nature-based solutions provide numerous benefits to businesses, society, and the environment. They can improve the physical and mental health of local communities, reduce noise pollution, contribute to better air quality, and support corporate net zero commitments. The increasing public focus on well-being, including green space, in the wake of the global pandemic, is providing further impetus for the Built Environment and Linear Infrastructure industries to adopt nature-based solutions (CISL, 2022). Nature-based solutions offer an effective alternative to the 'hard' engineering approaches traditionally applied by built environment practitioners. In particular, they promote resilience to current and intensifying climate impacts on buildings and infrastructure, such as overheating and flooding (CISL, 2022).

actors to adaptive and mitigate climate change. According to Velibeyoğlu, the method followed in the current period brings this awareness, that is, nature-basedness, even more to the center. It makes what the “Green Infrastructure Strategy” tries to develop and disseminate to a certain extent and on a certain scale more comprehensive, spreads it to wider areas, relates it to the world, and not only feeds on the experience of the world but also thinks of a way to present the experience it creates from here to the world. Each application develops by building on the other, developing and improving even better (2021, p. 20).

It is understood that green areas designed at different scales within urban areas have many important effects. First of all, while they contribute to the formation of urban forms, they can also serve as certain resting areas for people. From here, the positive aspects they present in terms of people experiencing urban life are understood. In addition to all these, they also serve as a natural cooling function in addition to the increasing temperature values. Thus, cities become more livable in terms of thermal aspects without using any energy. On the other hand, it is possible to say that as a result of the increase in such green areas and their good integration into urban design, people can develop certain behaviors in terms of using these areas.

3.2 Analyzing Nature-Based Solutions as an Approach

According to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) released in 2021, human-induced warming has reached approximately 1.09°C above pre-industrial levels. At this present rate, global average surface temperatures are expected to reach or surpass 1.5°C around the year 2040. The IUCN and other international organisations such as the World Bank and the European Commission formulated the concept of NbS.

The term ‘Nature-based Solutions’ was initially adopted by the IUCN in the late 2000s. Emphasizing the urgency to combat the negative consequences of climate

change and the threats posed to natural ecosystems, the IUCN referred to the term NbS in its position paper on the UNFCCC. The term's emergence forms the basis of conservation actions mapped out to serve the main objective of the UNFCCC, i.e. "to stabilize greenhouse gas concentrations in the atmosphere at a level that will prevent dangerous human interference with the climate system, in a time frame which allows ecosystems to adapt naturally and enables sustainable development".

Although technical solutions are being developed, they are not sufficient to combat climate change on their own. There is a growing movement toward more comprehensive and integrated approaches to addressing climate change that acknowledge the dynamic complexity of socio-ecological systems and make use of nature to reduce damage and boost resilience. Using nature for climate mitigation and adaptation serves two purposes: (i) conservation and proliferation of ecologically significant ecosystems, and (ii) protection of human health, well-being, and infrastructure (Climate and Development Knowledge Network, 2022).

The idea of NbS has the ability to address the socio-environmental problems of the twenty-first century, according to research led by the European Commission (Climate and Development Knowledge Network, 2022). In order to preserve, rebuild, and sustainably manage the planet's ecosystems while also considering human welfare, these solutions make use of nature. The fundamental goal of these solutions is to improve society and the environment so that in the long run, organic and sustainable responses to environmental threats and change are made possible. Beyond conventional biodiversity conservation and management concepts, NbS shifts the focus by re-focusing attention on human activity and systems and including societal elements.

The World Bank introduced the idea of nature-based solutions in 2008. In 2013, the first NbS research program was started. The idea came about due to efforts to find novel approaches to managing natural systems so that the advantages to civilization

and the environment might be balanced. Put another way, human societies may create and execute solutions that lead to a resilient, resource-efficient, and green economy by cooperating with nature rather than against it.

Many attempts have been made in the last 10 years to define and explain the term "NbS" with precision. "Actions address environmental, social, and economic challenges simultaneously by maximizing the benefits provided by nature... inspired by, supported by, or copied from nature" is how the European Commission (EC) first officially defined NbS in 2015. The International Union for Conservation of Nature (IUCN) offered another widely accepted definition, defining it as "actions to protect, sustainably manage, and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing benefits to biodiversity and human well-being." The most current EC report on NbS argues that the concept of nature-based solutions contains new approaches to address socio-ecological adaptation and resilience, with equal dependence upon social, environmental, and economic domains.

According to Sowińska-Świerkosz et al., there are many definitions for NbS, these definitions, however, are somewhat general and blurry and fail to indicate which green and blue solutions should be regarded as NbS (2022). This has led to an ongoing discussion about the range and kinds of interventions that fall under the NbS category. The primary cause of this ambiguity is the fact that any definition of NbS must integrate data from several scientific disciplines, and specialists from various backgrounds interpret NbS through the lens of their respective base disciplines.

Some definitions can be examined to understand the development of the approach of the main sources on this subject over the years.

According to IUCN, Natural solutions are used to address global issues like food, development, and climate. Ecosystems that are in good health and have been restored can help address the global concerns of food security, economic and social

development, and climate change at a reasonable cost. The following are indicators: (a) The degree to which international, national, and corporate policies on food security, climate change, and economic and social growth incorporate nature-based solutions. (b) The amount (in hectares) of diversified, resilient landscapes that are preserved, restored or managed sustainably for food, climate change mitigation, or economic gain. (c) The quantity of public and private organizations as well as governments that have included biodiversity values in their accounting or planning processes (2012).

The concept of nature-based solutions initially emerged as a means of identifying conservation actions designed to contribute directly to the objectives of the UN Framework Convention on Climate Change (UNFCCC). The underlying assumption was that such an approach offered unique and effective solutions to climate change, helping the conservation community reach beyond its traditional constituencies, build new alliances, and broaden its messaging beyond the immediate imperatives of addressing biodiversity threats. The following principles, the essential characteristics of the system, are an initial attempt to provide some guidance on what type of interventions could be considered as a nature-based solution.

1. The intervention delivers an effective solution to a major global challenge using nature. Nature-based solutions will contribute significantly, palpably, and economically to a recognized issue. Instead of implying that nature-based solutions are stand-alone options, it will be crucial to show them as a supplement to more traditional methods.
2. The intervention provides biodiversity benefits in terms of diverse, well-managed ecosystems. It is important to remember that while nature-based solutions may not be able to achieve every possible conservation goal, they must at the very least preserve the values of the current ecosystems and prevent further loss of biodiversity.
3. The intervention is cost-effective relative to other solutions. It is important to comprehend and accurately state the true costs and benefits of nature-based solutions, both in the short and long term, so that they can be compared to alternative

solutions. Nature-based solutions can generally increase resilience at a lower cost than infrastructure expenditures, which are typically expensive and unstable.

4. The rationale behind the intervention can be easily and compellingly communicated. External audiences need to be made aware of the reasoning behind nature-based solutions in a way that is convincing, transparent, and above all else, clear.

5. The intervention can be measured, verified, and replicated. Nature-based solutions must allow for the formulation and validation of clear results that can be quantified in terms of the specific problem and related conservation advantages.

6. The intervention respects and reinforces communities' rights over natural resources. Clear and explicit articulation of the actual conditions is necessary for the successful implementation of specific nature-based solutions. This is especially true concerning local participation, rights, tenure, and other institutional and governance systems.

7. The intervention harnesses both public and private sources of funding. Many nature-based solutions will be able to leverage the power of businesses and markets to complement public sector investments to attain significant size and financial sustainability (IUCN, 2012).

1. Utilizing the strength and complexity of nature, nature-based solutions transform environmental, social, and economic problems into chances for creativity. In addition to potentially promoting green growth, "future-proofing" society, promoting citizen well-being, opening up commercial prospects, and establishing Europe as a global leader in markets.

2. Actions that draw inspiration, support, or inspiration from nature are referred to as nature-based solutions. They have a great deal of potential to be resilient to change, energy and resource-efficient, and effective, but they need to be tailored to the local environment.

3. Compared to more conventional methods, many nature-based solutions can be more successful and economical since they have several co-benefits for the environment, society, economy, and health.

4. Europe will be able to lead the world in both research and innovation (R&I) and the expanding market for nature-based solutions if the EU adopts an agenda for R&I on the subject.

5. Four principal goals have been identified that can be addressed by nature-based solutions:

- Enhancing sustainable urbanization using nature-based solutions can boost human well-being, improve the environment, and make cities more appealing while also promoting economic growth.
- The resilience of ecosystems can be increased by restoring damaged ecosystems with nature-based solutions, which will help them meet other societal problems and continue to provide essential ecosystem services.
- Creating nature-based solutions for climate change adaptation and mitigation can boost carbon storage and yield more resilient responses.
- Enhancing risk management and resilience through the use of nature-based solutions can yield more advantages than traditional approaches.

6. Based on the four goals, seven nature-based solutions for R&I actions are recommended to be taken forward by the European Commission and Member States:

- Urban regeneration through nature-based solutions
- Nature-based solutions for improving well-being in urban areas
- Establishing nature-based solutions for coastal resilience
- Multi-functional nature-based watershed management and ecosystem restoration
- Nature-based solutions for increasing the sustainability of the use of matter and energy
- Nature-based solutions for enhancing the insurance value of ecosystems
- Increasing carbon sequestration through nature-based solutions

These are retrieved from a report produced by the Horizon 2020 Expert Group on “Nature-based Solutions and Re-Naturing Cities,” informed by the findings of an e-consultation and a stakeholder workshop (European Union, 2015).

Looking at the questions IUCN handled in the 2020 report is crucial. Those are; Why do we need the Standard? What does the Standard do? Who can use the Standard? What does the Standard look like? Greater accuracy and clarity regarding the nature of NbS and the conditions necessary for its successful implementation are crucial as the concept finds its way into policy and is embraced by real-world projects. Without it, using NbS could lead to ungrounded and inconsistent implementations. Decision makers will consequently have more faith in NbS as a result of the Standard's structured learning architecture, which allows lessons to advance and enhance the implementations. As a result, the standards offer the chance to establish a global user community that aids in directing field implementation, expediting the creation of policy, and producing conservation science on NbS. NbS will have a shared vision for a fair and sustainable world through the standards, as well as a common understanding of how it should be interpreted.

The goal of these standards are to provide users with a strong framework for designing and verifying NbS that addresses one or more societal challenges and produces the intended results. It has been developed as a facilitative standard, deliberately avoiding a strict normative framing with fixed, definitive thresholds of what NbS needs to achieve, based on the feedback of present and potential users. According to IUCN, by using the standards, specific on-the-ground activities provide measurable additional value. First, when presenting the intervention to donors, investors, and other stakeholders, the outcome might provide credibility to it. Second, by employing the results to pinpoint areas for improvement and potential solutions, the standard's implementation offers recommendations for specific interventions. Thirdly, the standard can be used to foster cross-sector participation

and communication by establishing new dialogues and providing a vocabulary and shared framework for talking about trade-offs (2020).

Based on IUCN's vision, the standard's key consumers will be national and local governments, planners, corporations, donors, financial institutions, particularly development banks, and non-profit organizations (IUCN, 2020). Stakeholders operating in various environments, such as metropolitan areas, productive landscapes, protected areas, and distinct regions with altered or intact ecosystems, can use the standards. The standards apply to both small- and large-scale interventions.

There are eight criteria in the standards. According to the NbS conceptual framework, achieving synergistic outcomes that benefit communities and the environment requires addressing the connection between human well-being and biodiversity. The IUCN has developed a set of NbS principles that serve as a foundation for a comprehensive comprehension of the idea of NbS, including:

Criterion 1 embraces nature conservation norms. Its main goal is to pinpoint the societal issue that the NbS is meant to address. As NbS expands in its scope, additional specific challenges may be recognized within the current scope of societal challenges, which include climate change (adaptation and mitigation), disaster risk reduction, food security, human health, social and economic development, and water security.

Criterion 2 guides the design of the solution responding to the scale of the issue. In this context, "scale" mostly refers to the geographic scale that spans land and sea, as well as the social, ecological, and economic dimensions of the land or sea. Whether it is an ecological, economic, or social system, the target area where the societal concern is being addressed is frequently a component of a larger system.

Criteria 3 is determined by site-specific natural and cultural contexts that include traditional, local and scientific knowledge. Criteria 4 produces societal benefits in a fair and equitable way, in a manner that promotes transparency and broad

participation. Criteria 5 maintains biological and cultural diversity and the ability of ecosystems to evolve. They correspond to the three pillars of sustainable development: social equity, environmental sustainability, and economic viability. To implement effective nature based solutions, it is necessary to have a baseline understanding of the resources and context for each criterion as well as sustainable activities for the future.

Criterion 6 addresses the balancing of trade-offs and choices that need to be made to achieve short and long-term gains, and how to ensure that there is a transparent, equitable, and inclusive process to determine such trade-offs. NbS makes use of ecosystems' services, which are provided by intricate, dynamic, and self-organizing systems.

Criterion 7 addresses the requirement for adaptive management by making it simpler to continue learning about policies that apply to the entire system and to adjust the NbS in response to changes in the system. NbS can only be fully realized by extensive, long-term application. This can be made possible, as encouraged by Criterion 8, by incorporating the idea and activities into legislative or policy frameworks, connecting them to international agreements or national goals (IUCN, 2020) (Climate and Development Knowledge Network, 2022).

Although NbS is an "umbrella concept," it can be applied in a variety of ways. The IUCN has outlined strategies to guarantee that NbS implementation is undertaken effectively. NbS approaches, also known as ecosystem-related approaches, are separated into five categories, as given in Table 3.1., to further refine the general idea of NbS and its application. These subcategories are further broken into five categories. The IUCN-based classification system for NbS techniques and their definitions is used in this compendium.

Table 3.1. Nature-based Solutions Approaches (Climate and Development Knowledge Network, 2022)

-
1. Ecosystem-restoration approaches (e.g., ecological restoration, ecological engineering, and forest landscape restoration)
 2. Issue-specific ecosystem-related approaches (e.g., ecosystem-based adaptation, ecosystem-based mitigation, and ecosystem-based disaster risk reduction)
 3. Infrastructure-related approaches (e.g., natural infrastructure and green infrastructure approaches)
 4. Ecosystem-based management approaches (e.g., integrated coastal zone management and integrated water resources management)
 5. Ecosystem-protection approaches (e.g., area-based conservation approaches, including protected-area management)
-

The general definition of nature-based solutions provided by international organizations is given above. Also, there are studies in the literature on how it is addressed conceptually.

Previous to 2020, there was a notable lack of precise, comprehensive NbS criteria. Consequently, certain acts that are now considered measures related to or supplementary to NbS but do not meet all the requirements to be considered NbS were labeled as such. Studies, however, highlight how multifunctional NbS are and how they may handle several societal issues at once. Secondly, there is a noticeable tendency to blend the NbS concept with currently implemented related activities, like managing Green-blue Infrastructure (GBI), conservation strategies, putting ecological/environmental engineering projects into action, and ecosystem-based management. Third, there has been a delay in establishing clear standards for NbS, IUCN published its standards in 2020, as well as practical guidelines for their implementation (Sowińska-Świerkosz et al., 2022).

The fundamental tenet of the NbS philosophy is "the use of nature," since it offers answers to the world's problems and ought to be viewed as a cure rather than a hindrance to human endeavors. For this reason, NbS have also been referred to as

green interventions, acts that make use of blue or green infrastructure, and activities that have the backing of the natural world. According to Sowińska-Świerkosz et al., (2022), there are several aspects that NbS should have, they could be summarized as follows:

Actions tackling the challenge. The term challenge-orientation describes how NbS helps to address specific environmental, social, and economic problems. The IUCN has established a number of societal concerns, including adaptation and mitigation of climate change, catastrophe risk reduction, ecosystem degradation and biodiversity loss, human health, socioeconomic development, food security, and water security. NbS should target at least one of these challenges. The effects of an intervention's implementation can embrace the micro, meso, and macro levels, referring to local, regional, national, continental, and/or global dimensions.

Actions providing multiple benefits. NbS has been defined as solutions that benefit natural ecosystems and the people who depend on them by utilizing natural capital and cooperating with the environment. Consequently, they generate services that fall into three broad categories: social, environmental, and economic. Since they serve as public gathering places that are open to all residents, open green spaces promote social cohesion and community support. By lowering energy and water expenses and generating green jobs and business opportunities, NbS also has a good impact on the economic side of things.

Actions with a certain level of effectiveness and efficiency. The NbS should effectively address at least one societal concern. The effectiveness of NbS can be divided into four categories. The first dimension pertains to management and governance capabilities. The involvement of various actors, including people, non-governmental organizations, and researchers from various fields. Thus, NbS incorporates not only scientific and technological information but also traditional and local knowledge. Second, locally specific solutions need to take into account the demands and conditions of the local environment, society, and policies. Therefore, to ensure the effectiveness of a solution, a 'case-by-case' rather than a 'copy-paste' approach should be adopted. The third dimension refers to economic efficiency. A

solution's possible advantages to the environment and society should not outweigh the costs of its adoption, management, oversight, and upkeep over time. The fourth dimension pertains to the issue of producing services and has already been discussed in the previous section.

For better implementation of nature-based solutions, a careful and detailed approach is required in the design and implementation stages of projects. A logical approach should be developed to distinguish undesirable or potentially harmful aspects of solutions. Nature-based solutions require careful specification of the problems they aim to address, considering whether these issues are short-term or long-term and which communities are most impacted. Defining the scope of nature in NbS is challenging, as it can involve both biotic and abiotic components, including ecosystems, energy cycles, and urban landscapes. Many nature-based solutions may involve some level of alteration or design of nature, raising questions about the acceptable degree of change while maintaining their natural essence. Evaluating the pros and cons of an intervention is complex, as it is essential to consider both the benefits and costs in detail. Solutions must address the systemic complexity of problems, acknowledging trade-offs that can not be reduced to simple answers. Moreover, while technological innovations may play a role, intellectual and social innovations are equally important. Finally, ensuring the democratic involvement of all relevant stakeholders is crucial for fostering social cohesion and equity in the development and implementation of NbS.

According to Nesshöver et al. (2017), several aspects of the nature-based solutions design process can help to define what makes NbS sustainable, and why. Those are;

- In most cases, the critical decisions about NbS design, costs, location, and scale as well as levels of management intensity will involve a wide range of stakeholders who may have different ideas and pre-existing ways of managing their problems.

- Dealing with uncertainty and complexity: the adaptive management approach as an example. A portion of these techniques are included in adaptive management, a suggested strategy for handling dynamism, complexity, and uncertainty.
- Ensuring the involvement of multiple stakeholders. Any issue or problem facing society is likely to impact or be impacted by a number of different stakeholder groups. Ensuring the sound use of multi- and transdisciplinary knowledge.
- Developing a common understanding of multifunctional solutions, tradeoffs, and natural adaptation. NbS will be able to establish its objectives based on common knowledge of the available options, their respective costs, as well as the social and ecological implications.
- Evaluate and monitor for mutual learning. Numerous indicators could be regarded as success criteria, but they must be directly tied to the particular "solution" goals in terms of ecosystem services and biophysical features. Problems that appear at various geographic scales, ranging from local to regional, national, and even global, are frequently handled by NbS (Nesshöver et al., 2017).

Nature-based solutions, as explored in various studies by international organizations and through relevant literature, have been thoroughly examined in previous sections. This segment aims to synthesize the key findings from these works, drawing attention to the critical outcomes and insights of the concept.

Table 3.2. Nature-based Solutions Principles (IUCN, 2012)

Principle 1. The intervention delivers an effective solution to a major global challenge using nature

Principle 2. The intervention provides biodiversity benefits in terms of diverse, well-managed ecosystems

Principle 3. The intervention is cost-effective relative to other solutions

Table 3.2. (cont'd)

Principle 4. The rationale behind the intervention can be easily and compellingly communicated

Principle 5. The intervention can be measured, verified, and replicated

Principle 6. The intervention respects communities' rights over natural resources

Principle 7. The intervention harnesses both public and private sources of funding

Table 3.3. Nature-based Solutions Principles (IUCN, 2020)

Criterion 1 embraces nature conservation norms

Criterion 2 guides the design of the solution responding to the scale of the issue

Criteria 3 is determined by site-specific natural and cultural contexts that include traditional, local, and scientific knowledge

Criteria 4 produces societal benefits fairly and equitably, in a manner that promotes transparency and broad participation

Criteria 5 maintains biological and cultural diversity and the ability of ecosystems to evolve

Criterion 6 addresses the balancing of trade-offs and choices that need to be made to achieve short and long-term gains, and how to ensure that there is a transparent, equitable, and inclusive process to determine such trade-offs

Criterion 7 addresses the requirement for adaptive management by making it simpler to continue learning about policies that apply to the entire system and to adjust the NbS in response to changes in the system

Criterion 8, by incorporating the idea and activities into legislative or policy frameworks, connecting them to international agreements or national goals

Nature-based solutions were discussed in detail in terms of their definitions, standards, and criteria. These are seen in Tables 3.2 and 3.3. When all these values and their definitions are brought together, the basic concepts they reveal are given in Table 3.4. Adaptive management, Effectiveness, and efficiency approaches are important terms of nature-based solutions. It is also significant for different parties/stakeholders to take part in the work. This is crucial in terms of producing more original and permanent solutions to local problems. At the same time, nature-

based solutions is aware of the intertwinedness of ecological, social, and economic problems of society and believe that the solution is possible by addressing these three points together.

Table 3.4. Keywords that Identify Nature-based Solutions

Adaptive management approach
Effectiveness and efficiency
Multiple stakeholders
Locally specific solutions
Multiple benefits (ecological, social, economic)
Multi- and transdisciplinary knowledge
Mutual learning, Innovative approaches

When producing solutions to problems, participation from different sectors is needed due to the complex nature of the issues that cities face. In this respect, knowledge needs to be addressed with a multi- and transdisciplinary approach. For projects to be successful, not only the experts in their field but also the experiences and points that the city residents have to share are valuable. This supports the mutual learning process to be educational for both locals and other initiatives. For the projects implemented in pilot regions to be spread to other parts of the city, the transformation of this knowledge produced into a systematic structure and making it usable in other places is fundamental in terms of producing permanent solutions to the social, economic, and environmental issues of the city.

CHAPTER 4

EXAMINATION OF THE GREEN CITY CONCEPT AND URBAN IMPLEMENTATION EXAMPLES OF NATURE-BASED SOLUTIONS

4.1 Cities with Green City Vision

Within the scope of the European Green Deal, the Green City concept has been effective in determining the vision of some cities. Many cities have made decisions in this direction, especially in Europe. Izmir from Türkiye has also developed a city vision within the framework of the green city concept. Before moving on to examples of nature-based solutions supported in this direction, some cities with a green city vision have been discussed. This will be a useful section in terms of better understanding the Izmir case.

Table 4.1. Cities with Green City Vision

City	Copenhagen	Reykjavik	Essen	Izmir
Vision	Regenerative City	Green City	Green Capital	Green City
Objectives	Sustainable urban planning, Mobility, Energy and Resources, Green lifestyles, and Cities initiatives.	Transportation, Planning, Environmental quality, Climate issues, Sustainability in education, Nature and recreation, Consumption and waste.	Creation of green areas, Expanses of water, footpaths and cycle paths.	Planning and governance, Water areas, Green areas, Corridors and connections, Structures, abandoned and renovated areas.

4.1.1 Copenhagen, Denmark

Copenhagen has a vision of becoming a Regenerative City. Over the last 50 years, Copenhagen has become one of the most bicycle-friendly cities, and today one of the city's biggest goals is to become a carbon-neutral city by 2025. The pressure on Copenhagen is constantly increasing, because the city attracts population from various places due to its many features (Fayet et al., 2020). While achieving the vision of green growth-oriented urban development, on the one hand, the city also needs to cope with the pressure that the population will attract. In this respect, Copenhagen's Regenerative City concept has been developed under five main headings: Sustainable urban planning, Mobility, Energy and Resources, Green lifestyles, and Cities initiatives (Fayet et al., 2020).

The city's parks and landscapes make Copenhagen a great place to live and move. This also creates opportunities to create a resilient, climate-adapted city that can withstand the challenges of the future, because urban nature plays an important role in this. Copenhagen aims to use urban nature to adapt the city to the climate of the future, to increase biodiversity, and to create the best possible conditions for an active life for all citizens, for the benefit of both today and the future (Sustainable development goals, n.d.). The City of Copenhagen's vision is to have more trees along the streets, more green courtyards, green urban open spaces, and an increase in the number of green roofs. It also aims to improve the quality of urban nature, which will contribute to the protection of local species, the retention of rainwater, the enhancement of biodiversity, and the creation of more recreational experiences for Copenhageners. It aims to ensure that biodiversity is taken into account when developing and transforming the city, by increasing measures aimed at strengthening biodiversity (Sustainable development goals, n.d.).

There are four main headings that Copenhagen has set as targets for 2025. As can be understood from the explanations given, various areas that will reduce carbon use are addressed in different subjects. It aims to reduce carbon use by distributing it to

different sectors in various areas under the headings of Energy Consumption, Energy Production, Green Mobility, and City Management (European Union, 2013).

4.1.2 Reykjavik, Iceland

In the Municipal Plan 2010-2030, the city of Reykjavik wants to strengthen its urban development model as a Green City. This means increasing the emphasis on the densification of urban areas and the mixed use of land, the accessibility of various recreational and green areas, and the strengthening of environmentally friendly transportation (Reykjavik Municipal Plan 2010-2030, 2014). The Green city concept developed by the city aims to support good urban living, improvements in public health, and the green appearance of the city with trees and other vegetation. The Municipal Plan proposes an environmental and resource policy that includes general objectives and actions related to the valorization of natural resources and the minimization of negative environmental impacts in the following nine categories: transportation, planning, environmental quality, climate issues, sustainability in education, nature, and recreation, consumption and waste (Reykjavik Municipal Plan 2010-2030, 2014).

The Green city emphasizes the promotion of changes in transportation behavior, the preservation of green open spaces, the reduction of pollution and the promotion of a more sustainable lifestyle in urban neighborhoods. The importance of improving the quality of life for people, within the city and in local neighborhoods, as well as the promotion of more meaningful design of buildings and the spaces between them is emphasized (Reykjavik Municipal Plan 2010-2030, 2014).

The Reykjavik Municipal Plan 2010-2030 (2014) has several points for sustainable urban development in Reykjavik. These are briefly as follows: (a) Increase in urban density and mix of land uses. (b) Less new land uses and less land reclamation. (c) More environmentally friendly transportation systems. (d) More concise protection

of open green spaces. (e) Clearer requirements regarding the quality of the urban area.

4.1.3 Essen, Germany



Figure 4.1. Krupp Park (Horn et al., 2017)

Essen inhabitants can use the green network in their neighborhood because of the ‘ESSEN New Ways to the Water program,’ which is one of the many projects started in 2017. The Emscher River's ecological renaturalization finished in 2023. Next, in 2027, the International Gardening Exhibition will take place in the Ruhr Metropolis (Essen Green Capital Agency, 2023). The focus is on the goal of making Essen a zero-emission city by 2040 at the latest. The Green Capital Agency of the city of Essen has assumed a prominent position in the continuous environmental management process of the region. It continually carries out Green Capital aims and is the cornerstone of all climate policy initiatives, whether they come from businesses, community members, or municipal authorities (Essen Green Capital Agency, 2023).

The Sustainable Energy and Climate Action Plan (SECAP), which covers the entire city, establishes goals, lays out mitigation strategies, and aids in adaptation to the effects of climate change. The mobility transformation is given equal weight to the energy transformation. One important point is making Essen residents able to complete an equivalent share of their trips by bicycle, vehicle, public transportation, and foot by 2035. Two of the key strategic plan initiatives are to significantly increase public transit and invest in the development of the city's bike infrastructure.

Essen, which is located in the center of Germany, is a heavily industrialized region with numerous potential, and problems. It has effectively accepted change, moving from a heavily industrialized past to a more environmentally friendly future. Essen serves as an example of how resilience-building, long-term planning, and sharing best practices can all have a significant impact. The city now serves as an example of an industrial metropolis undergoing change (Essen Green Capital Agency, 2023).

The European Green Deal's lofty goals and the pressing need to address several crises need prompt implementation. Cities play a key role in this shift to a greener economy. To create an environment where people want to live and can live long healthy lives, it is important to create metropolitan areas with clean air and water, more green spaces, and increased social inclusion. Essen was designated the 2017 European Green Capital in honor of its great aspirations and accomplishments. The city is an inspiration to other post-industrial communities aiming to revitalize their cities. It has transition from grey to green. Essen, which is part of the Ruhr Metropolitan Area, Germany's old industrial heartland, has transformed from a gray, industrialized metropolis to a green city with a good standard of living (Horn et al., 2017).

Although remnants of the city's coal and steel past can still be seen throughout the landscape, abandoned manufacturing buildings and mining sites have been converted over the past few decades to create hundreds of hectares of green space.

For instance, the site of the former Krupp cast steel factory was developed into a 230-hectare green belt that stretches from the city center to the Altendorf area, and the industrial wasteland next to it was expanded by 11 hectares to become part of Krupp Park (Horn et al., 2017). Essen's objective of allowing all citizens to have access to the city's green and blue infrastructure network within 500 meters is further supported by the progressive ecological restoration of the Emscher River and its tributaries, which traditionally functioned as open sewers (Horn et al., 2017).

4.1.4 Izmir, Türkiye

Izmir is a city in Türkiye situated on the western coast of Anatolia and is the country's third-largest city by population. It has a Mediterranean climate, characterized by long, hot summers and mild winters. With a history spanning 8,500 years, Izmir is one of the oldest cities along the Mediterranean. Izmir Metropolitan Municipality has improved its environmental performance in the last decade by developing strategies and investing in green infrastructure, waste, and water management infrastructure. Izmir Metropolitan Municipality (IMM) has expressed its desire to adopt a more synthesis-based approach to address the urban environmental problems it is currently experiencing. Figure 4.2. demonstrates some of the important plans that were prepared for Izmir.

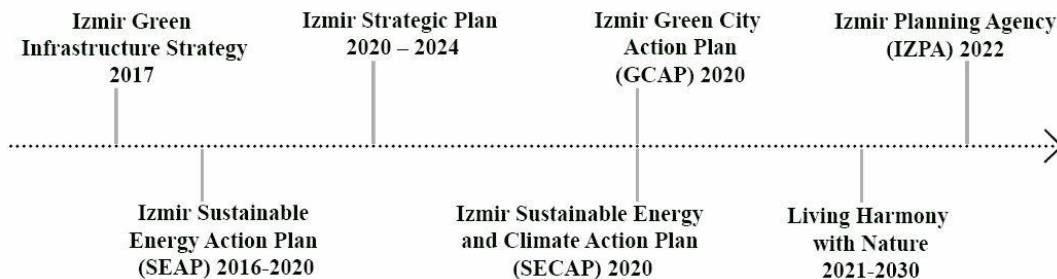


Figure 4.2. Timeline for some of the Plans of Izmir

The Izmir Green Infrastructure Strategy will undertake a unifying function such as the interaction of marine and terrestrial systems, the transitivity in natural-semi-

natural-urban areas, the use of innovative nature-based solutions in all implementations, and the definition and expansion of ecosystem services (Izmir Green Infrastructure Strategy, n.d.).

The most important reasons for the Izmir Green Infrastructure Strategy can be listed as follows:

- Integration of blue-green infrastructure solutions with the existing urban gray infrastructure
- Establishing a green-blue network system and relations with the gulf and the dense urban fabric surrounding the gulf within the scope of the Izmir city region
- Green infrastructure demo application projects will be carried out within the scope of the H2020 project "nature-based solutions"
- Creation of a project spatial database sensitive to nature and climate data, mapping and integration of gray and green infrastructure projects of different units
- Being able to establish inter-institutional cooperation
- Supporting other thematic strategies and projects
- Sustainable energy action plan, sustainable local development strategies, smart city strategy, European Union Projects, and campaigns, etc.

The Izmir Green Infrastructure Strategy was initiated in June 2017 by establishing a secretariat within the Izmir Metropolitan Municipality to support Nature-based Solutions. Later, a Municipal Working Group was established with the participation of municipal units related to the subject, and with the work of this group, the Izmir Green Infrastructure Expert Workshop was held in 2017 with broad participation and over 150 experts from all local and national institutions (university, public, NGOs). Ideas were created by the participants within the scope of the theme titles created in this workshop, facilitated by the Municipal Working Group and the Moderators in the relevant theme (Izmir Green Infrastructure Strategy, n.d.). These themes are:

- Planning and Governance

- Water Areas
- Green Areas
- Corridors and Connections
- Structures, Abandoned and Renovated Areas

To develop the ideas that emerged, to determine the transition and responsibilities between the themes, to develop the time plan and related explanations and definitions, the Municipality Working Group conducted focus group studies with the Expert Workshop Moderators in October-November 2017. The results obtained were shared with all municipal units in December 2017, and it was decided that the draft strategy, which was created as a result of an internal evaluation, would be shared in a meeting to be held in January 2018, where the Nature-based Solutions projects would facilitate the discussion of local and international experiences with broad participation. The themes here are briefly explained below.

Planning and Governance: The main purpose of the green infrastructure strategy is described as the creation of a green system surrounding the central city and other elements related to this system with nature-based solutions and the provision of governance opportunities in order to prevent the expansion of the central city of Izmir by sprawl. It will basically consist of data collection, analysis, planning, and implementation stages, and is designed to develop an organizational model and special projects to be proposed for implementation. Supporting projects related to ecological solutions in rural structures within the Central Green Belt and conducting financial and risk analyses to increase the feasibility of these projects have been given importance.

Water Areas: The bay, Bakırçay, Gediz, and Küçük Menderes Basins, sub/micro basins, peninsula, and urban settlements that constitute the city of Izmir are in relation with the “underground and surface water assets/system” that exhibit a dynamic structure depending on time and geography. Therefore, addressing water-

related issues primarily at the basin/regional level and designing the green infrastructure at the regional-city-local scale index constitute the upper framework of the study.

Green areas: The main objective is to create a green network consisting of all kinds of green areas and provide ecological and usage connections such as city-rural, seaside-inner parts, riverways-seaside-inner parts, and so on while spreading throughout the city.

Corridors and connections: Ecological corridors and connections are “integrative elements of urban and rural green texture”. By considering the green texture as a whole, a vital integrity that complements each other and provides transitions from city to countryside and from countryside to city for all living things will be realized. In other words, the unity of surface green, linear green, and point green will be achieved.

Structures, Abandoned and Renovated Areas: The evaluation of idle areas inside and outside the city, their repair, revitalization, and re-functioning, and making them a part of the city constitute an important pillar of the green infrastructure strategy in terms of both urban economy and socio-cultural aspects.

IMM’s Strategic Plan 2020-2024 is very critical for Izmir as it represents a road map for the next 5 years. The Strategic Plan 2020-2024 was prepared in collaboration with the metropolitan municipality teams, affiliated institutions; IZSU (Izmir Water and Sewage Administration), ESHOT (Electricity, Water, Coal, Gas, Bus and Trolley Bus Company, Public Transport Institution) and directors of related corporations, under the leadership of the Metropolitan Mayor and Directorate of Strategy Development and Coordination. It was created based on thorough preliminary research and is grounded in a solid foundation of vision and core values. The plan's vision is outlined through 7 strategic objectives: Infrastructure, Quality of

Life, Economy, Democracy, Nature, Experimental Learning, and Culture and Arts, which together include 26 specific targets (Green City Action Plan, 2020).

The Green City Action Plan and the Izmir Sustainable Energy and Climate Action Plan, which aim to identify, prioritize and address the most urgent environmental challenges in line with the IMM Strategic Plan 2020-2024 Vision, which enables a completely nature-compatible future for Izmir, were prepared simultaneously (Sustainable Energy and Climate Action Plan, 2020).

IMM is participating in the Green Cities program of the European Bank for Reconstruction and Development (EBRD) and conducting a province-wide analysis within the scope of this program. The Green Cities process has been prepared according to a consistent methodology utilized by all the cities preparing and implementing the Green City Action Plan (GCAP). The EBRD has developed this methodology in collaboration with the Organisation for Economic Cooperation and Development (OECD), and the International Council of Local Environmental Initiatives (ICLEI) (Izmir Metropolitan Municipality, 2021). Throughout the GCAP process, the objectives and goals of IMM's strategic plan were considered and aligned with the key GCAP actions, such as infrastructure investments, policy measures, capacity development, and advocacy. This alignment ensures that all initiatives contribute to realizing the vision of IMM's Strategic Plan 2020-2024 while also working towards a more sustainable and greener Izmir (Green City Action Plan, 2020).

As a result of the voting carried out within the workshop, the best application for Sustainable Development Goal 11 was selected as the "Green City Action Plan" with 31.4% of the votes. Izmir Metropolitan Municipality, which received a grant support of 300 thousand Euros from the European Bank for Reconstruction and Development (EBRD), has created an action plan for environmental problems including important issues such as water, biodiversity, air, soil, and climate crisis with the green city

action plan. In the voluntary evaluation report, 5 sub-goals and 5 indicators were determined at the global level in order to achieve this goal. 5 local sub-goals and 5 indicators were determined specifically for Izmir which are shown in the Table 4.2. (İzmir Gönüllü Yerel Değerlendirme Raporu, 2021).

Table 4.2. 5 Local Sub-Goals and 5 Indicators for Izmir (İzmir Gönüllü Yerel Değerlendirme Raporu, 2021)

13.1 Strengthening resilience and adaptation capacity against climate-related hazards and natural disasters in Izmir
13.1.1 Resilience Plans and Implementation Rates
13.2 Integrating climate change measures into local policies, strategies and plans
13.2.1 Representation of climate actions in city strategic planning
13.3 Ensuring that Izmir reaches its 2030 carbon target, developing human and institutional capacity through awareness-raising training on adaptation to climate change, reducing impact, and early warning
13.3.1 Number of trainings and participants that raise awareness and increase knowledge capacity about climate change and its effects
13.a Strengthening Izmir's capacity to benefit from climate funds
13.a.1 Number of funds and projects used regarding climate
13.b Supporting mechanisms that will increase effective planning and management capacity regarding climate change by focusing on women, youth, and vulnerable groups in Izmir
13.b.1 Activation of working group of Izmir City Council environmental issues and health

Izmir's metropolitan strategies are based on the city's historical heritage, aiming to enhance the connections between eastern and western communities. The primary goal is to position Izmir as a global city while aligning with its natural characteristics. Key priorities have been established for both the management of IMM and the city's development. Environmental issues have been identified, prioritized, and actions have been taken to address them (Green City Action Plan, 2020). Izmir Metropolitan Municipality and affiliated institutions have developed a diversified set of plans and

strategies. These plans include agreements and partnerships with international institutions. The reasoning behind the group of plans and projects, is to combat climate change, to establish and maintain sustainable growth standards for the city, and to integrate nature-based solutions for the resilience and sustainable development of Izmir.

The Izmir Metropolitan Municipality, which is involved in some projects developed within the European Union, continues its work to achieve reduction and adaptation targets. In this context, the aim of the Grant Program for Capacity Development in the Field of Climate Change in Türkiye is to use, increase, and support the green infrastructure potential in Izmir within the scope of combating climate change. The specific objectives of the projects are to develop a framework that makes the city more resilient to the effects of climate change, to increase the technical capacity for the development of the capacity of target groups and stakeholders against climate change, and to create public awareness on climate change by disseminating knowledge and experience (Orhan, 2019).

Established by the Izmir Metropolitan Municipality, the Izmir Planning Agency (IZPA) works in synergy with various units of the municipality and other institutions. *IZPA uses science, ecosystem information, and citizen participation as the main inputs to develop strategies and action plans for Izmir* (Izmir Planlama Ajansı, 2022). These strategies and activities are supervised by three committees operating at international, national, and local levels. Members of these committees also take part in thematic working groups that design sectoral programs. IZPA's committees and working groups also work to strengthen the synergy between Izmir and cities around the world. The strong interaction between Izmir and other metropolises forms the basis of the Circular Cultural Cities Alliance, which aims to develop circular cities. Izmir Planning Agency is identified itself as one of the first examples of third-generation planning agencies that combine academic knowledge, citizen participation, and ecosystem data to propose new urban development strategies

(Izmir Planlama Ajansı, 2022). This new perspective offers significant opportunities to build cities in harmony with nature, acting as an integral part of the web of life on Earth. IZPA's strategy outlines a roadmap to address the urban paradox of the climate crisis, a global crisis caused by urbanization, yet one that must be solved in cities. This strategy and related tools can easily be replicated in other cities around the world.

IZPA's strategy draws a roadmap to address the urban paradox of the climate crisis, a global crisis caused by urbanization but still requiring solutions in cities (Izmir Planlama Ajansı, 2022). IZPA adopts the four main axes of circular culture as a concrete strategy to implement circular urbanism. These four main axes also form the basis of IZPA's four closely interconnected programs. They can be summarized as follows:

Neighborhood Gardens: To facilitate access to good, clean, and fair food within the framework of the Izmir Metropolitan Municipality's "Another Agriculture is Possible" vision and the understanding of a city in harmony with nature, the Neighborhood Gardens project was implemented in cooperation with the Izmir Planning Agency and the Emergency Solution Team. This process, which started in Kadifekale in 2022, continues to be expanded to include various districts and regions. In addition to food production, the project also aims to socialize the local people, especially women and children, while increasing social awareness and producing in safe areas. Community-based urban agriculture practices in Izmir continue with the neighborhood gardens established in Fırat and Meriç Living Parks within the scope of the Living Parks project, following the Kadifekale Neighborhood Garden.

Izmir Living Gulf Strategy: Izmir Metropolitan Municipality's Izmir's life-in-harmony-with-nature strategy aims to eliminate potential crises and repair damaged ties. Creating a city resilient to disasters, adapting to climate change, supporting biodiversity, protecting the sea and coastal landscape, and ensuring sustainable

development in the city and countryside through circular economy practices constitute the fundamental foundations of the city in harmony with nature's goal. Izmir Planning Agency has created the Living Gulf Strategy in partnership with IZSU under the name of the Ecosystem Izmir program.

Living Parks: A detailed strategy will be implemented to establish Izmir's green infrastructure, starting from rural areas and extending to city streets, parks, public buildings and finally households. Within the framework of the vision that "another agriculture is possible" in rural areas, agricultural product planning resistant to the climate crisis is being carried out and ancient production basins are being protected. Living Parks extend in the transition area between the rural and urban centers of the green infrastructure. Thanks to the Natural Green project, trees and shrubs belonging to Izmir's nature began to be used instead of foreign plant species in green areas.

Ecosystem Izmir Program: Harmony with Our Nature: The main purpose of the Ecosystem Izmir Program is to ensure that Izmir's ecological richness and economy, which has made Izmir a universal port city for centuries, can be sustained together. Under the program, steps are being taken to increase Izmir's resilience by protecting and strengthening the city's extraordinary ecosystem diversity. The essence of this program is to eliminate the conflicting priorities of ecology and economy. Urban and rural areas need to be designed and intertwined to achieve this. With this design approach, the main focus of urban planning is shifted from the city center to transition corridors and rural areas. The projects carried out within the scope of the Ecosystem Izmir Program are expanding from Izmir Gulf to rural areas, crossing all layers of the city.

What is required now goes beyond the current understanding, calling for the transcendence of all perceptions that view humanity as opposing nature. It calls for a holistic re-foundation of life, taking bold steps towards the radical re-naturalization of cities and embracing a nature-based lifestyle (Izmir Metropolitan Municipality,

2021). In contrast to the rigid, traditional approach to urban planning, Izmir seeks to foster a harmonious relationship between the urban and ecological aspects of the city. This comprehensive perspective not only considers the physical environment but also the cyclical interactions between the city and its economic and cultural dimensions. Izmir's goal is to bring about the cumulative realization of three key outcomes, in line with the principles of the overarching strategy defined:

- To be a city resistant to natural disasters
- To raise prosperity and ensure fair distribution
- To conserve biodiversity (Izmir Metropolitan Municipality, 2021).

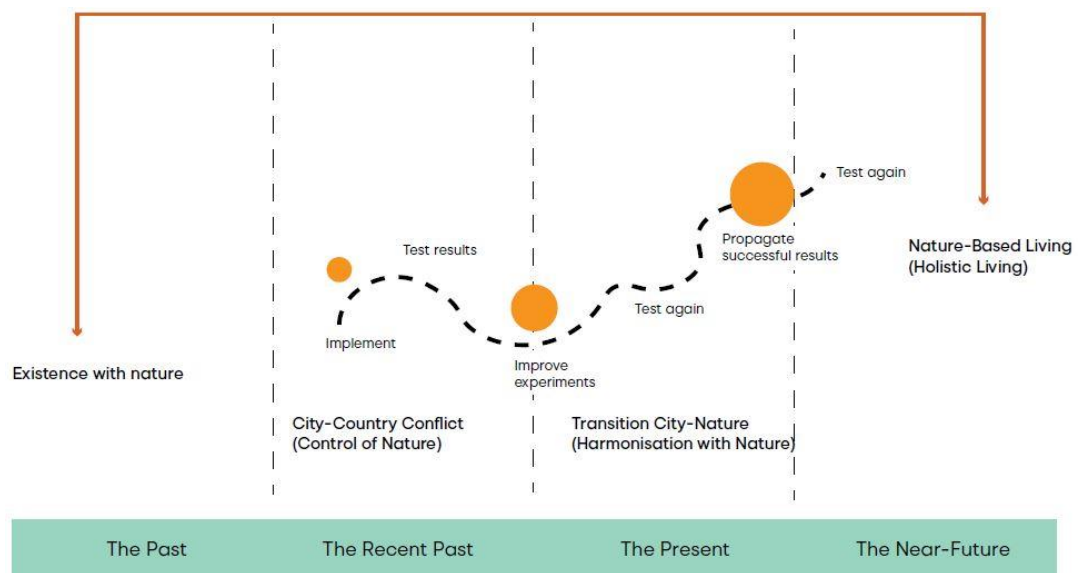


Figure 4.3. The Development of the Principles of a Nature-based Lifestyle (Izmir Metropolitan Municipality, 2021)

The culture of **living in harmony with nature** requires a strategic transition across all city systems. This process involves a prolonged period of constructive development within the city. To support this shift, physical plans, and thematic strategies must be executed comprehensively, allowing for the testing and sharing of new ideas that evolve into projects and, strategically, as bottom-up practices (Izmir Metropolitan Municipality, 2021). The action plan operates on five levels, focusing on spatial, cultural, and economic integration, and includes examples of 25

innovative projects, given in Table 4.3., and programs that are leading the way in testing these strategic objectives. In addition to these examples, the Izmir Metropolitan Municipality is carrying out numerous other programs and projects, which are outlined in the GCAP and SECAP reports.

Table 4.3. Innovative Projects Based on Living in Harmony with Nature (Izmir Metropolitan Municipality, 2021)

The Izmir Nature Atlas Project
The Natural Green Project
Forest Plantations resistant to Climate and Fire
IzMiras Routes
The Izmir Living Parks Project
The Efe Road Project
Increasing Park Space in Green-Impoverished Neighbourhoods
The Flamingo Nature Park Project
The K�lt�rpark Ecological Rehabilitation Project
The Olivelo Ecological Common Living Area on the Izmir Urban Periphery
The Urban and Ecological Backbone: The Meles Creek and its Environs
The Sponge City Program
The Nature-Based Solutions Project- Urban GreenUp
The Rural Renewal Project-Ruritage
The Project for Bringing a Public Space Character to Unused Areas
The Nature-Based Rural Development Program
The Cittaslow Metropolis Project
The Izmir Sustainability Centre (S-Hub)
The Izmir Bay Ecological Rehabilitation Project
Izmir Agriculture - “Another Agriculture is Possible” Program
The Sustainable Urban Enlivenment Program
Spreading the Use of Solar Energy
The Program for Reducing the Effects of Urban Heat Islands
Increasing the Number of Electric and Low-Carbon Vehicles
The Recycling Program

Urban Greenup, which was selected as the best practice for Sustainable Development Goal 13 with a rate of 33.3% in the workshop, was the first among 39 international projects in the Izmir project, which proposed innovative applications to protect the environment in the area from Mavişehir to the Natural Life Park, from Çamaltı Salt Pan to Menemen Plain within the scope of the Horizon 2020 program. For the Mavişehir Region, which is considered to be most affected by climate change and has dense urban construction, Nature-based Solutions have been developed to eliminate the negative effects of urban air temperature, reduce the risk of sudden floods, and make streams more accessible to the public (İzmir Gönüllü Yerel Değerlendirme Raporu, 2021).

With the redefinition of metropolitan borders and their functioning thanks to Metropolitan Law No. 6360, a need for local development and improvement of quality of life has emerged, based on the provincial borders of Izmir and including a wider rural hinterland (İzmir Gönüllü Yerel Değerlendirme Raporu, 2021). In this context, multi-dimensional, basin-focused studies have been carried out in the Gediz, Bakırçay, and Küçük Menderes Basins of Izmir. The “New Strategy for Re-Naturing Cities through Nature-Based Solutions - Urban GreenUp” project was initiated in the region formed by the old bed of the Gediz Basin, which intersects the Karşıyaka and Çiğli districts of Izmir. One of the important applications in this project, the Izmir Climate Sensitive Agriculture Development Center, will develop nature-based solutions for agricultural basins, focusing on biodiversity and climate adaptation, and will also serve as an interface for urban agriculture (İzmir Gönüllü Yerel Değerlendirme Raporu, 2021). In Table 4.4. some other studies were carried out in line with the Sustainable Development Goal 13 in Izmir.

Table 4.4. Sustainable Development Goal 13 – Outstanding Practices in the Izmir (İzmir Gönüllü Yerel Değerlendirme Raporu, 2021)

Plan or Project	Description
Master Plan for Wastewater, Rainwater, and Rivers	İZSU, which prepared the “Drinking Water Master Plan” to prepare the city against global climate change and to establish new and economical facilities against possible water shortages in 30 districts, and the “Sludge Master Plan” for systems that will ensure disposal and evaluation of treatment sludge, is preparing the “Master Plan for Wastewater, Rainwater and Rivers”.
Climate Crisis Advocates	It was implemented by the Social Climate Association within the scope of the ‘Local Solutions to Local Problems: Environmental Participation Grant Program for Türkiye-IV’ program supported by the European Union and env-net and implemented with the support of TEMA in our country. The project aims to raise awareness among young people between the ages of 15-25 from all 81 provinces.
Peynircioğlu Stream Restoration Project	With the Peynircioğlu Stream Restoration Project, which is an application of the Urban GreenUp Nature-Based Solutions project, which was selected as the best practice for SDG 13 prepared within the scope of the European Union's "HORIZON 2020" program, an "uninterrupted ecological corridor" was created on the coastal section of Peynircioğlu Stream in Mavişehir, Halk Park and the following route.
Izmir Climate Sensitive Agriculture Development Center	Opened in June 2021, the center is supported by URBAN GreenUP, the European Union’s Horizon 2020 program. The project aims to naturalize urban plans, together with a group of partner cities from Europe and outside Europe, to reduce the effects of climate change, improve air quality, improve water management, and implement innovative nature-based solutions.
Before It’s Too Late (Geç Olmadan), Climate Ambassadors Program	The EU Information Centers Network and the program organized to instill a passion for science in young people aim to spread awareness of climate change and sustainability among young people. The correct understanding of the European Green Deal is also part of the program. The Izmir module of the program, and the training processes that started in June 2021, have been completed.

Table 4.4. (cont'd)

Green Revision: A Framework for Resilient Cities	The project was carried out within the framework of the Capacity Development Grant Program in the Field of Climate Change in Türkiye to make the city resilient to changing climate conditions. In the project, optimistic and pessimistic climate scenarios and models for the years 2050 and 2100 were presented and the measures to be taken were determined.
Izmir Gulf Real-Time Numerical Flow and Sediment Transport Modeling Project	In Izmir, where Türkiye's the second most important port, 54 Real Time Meteo-Oceanographic Observation Stations were established within the scope of the project. In this way, sea parameters are constantly monitored and precautions are taken against possible flood risks and algae blooms that may occur due to sea swelling, and resilience can be ensured in this sensitive area.
Enchant (Energy Efficiency Through Behavior Change Transformation Strategies) Grant Program	The aim of the project is to develop interventions to reveal the potential of energy efficiency to the public and to test these interventions. The main aim of the project is to create an empirically based "Decision Kit (tool)" for decision-makers, municipalities, NGOs, and energy providers for an effective energy efficiency campaign. The role of Izmir Metropolitan Municipality in this project is to contribute to the development of methods.

The concept of urban green infrastructure can be defined as connected green areas located in and around the city, providing ecosystem services and improving the quality of life in cities. Ecosystem services and green infrastructure systems are in a dynamic relationship. Green infrastructure systems provide many ecosystem services such as purifying water and air from pollutants, preventing floods and erosion, increasing ecosystem resilience, ensuring carbon retention and decomposition, reducing the urban heat island effect, ensuring the continuity of biodiversity and regulating the climate, as well as meeting the aesthetic, cultural and recreational functions of the city. Urban design and architectural scales address strategies and decisions related to green systems at the scale of parks, squares, pedestrian paths, streets, gardens, parcels, and buildings (Vural, 2022). At the upper scale, protection and restoration of natural landscapes such as forests, floodplains,

and wetlands; in urban areas, systems such as rain gardens, permeable surfaces, green roofs, and rainwater collection constitute green infrastructure components (Vural, 2022). Ecosystems at the scale of cities, districts, and neighborhoods maintain climatic and ecological balance and are effective in controlling the physical environment.

Green infrastructures can be examined at different layers. There are four different ones: bioregions that include regional interventions, green belts and corridors within or outside the city, urban planning, and design projects focused on green infrastructure, and urban design and architectural projects that offer nature-based solutions (Velibeyoğlu et al., 2024). The first layer is basins and microbasins based on the bioregion scale. One of the studies conducted within this scope was conducted in the Menderes Basin in cooperation with the Izmir Development Agency and the World Bank. The “Kapra-Risk Assessment Study on Critical Agricultural Products” report is the output of this study. The resilience of the agricultural economy in Izmir and the impact of climate change on this were examined within the scope of the study (Velibeyoğlu et al., 2024). The second layer focuses on green belts, and green inner-city or outer-city corridors. Ecological areas in cities are again evaluated within the scope of critical blue-green infrastructures. They are at a critical point, especially in terms of both solving the problems and disasters brought about by climate change and reducing their effects. The third layer can be mentioned as planning and urban design projects that use green infrastructure components. The last layer is micro-scale urban green infrastructure proposals that focus on nature-based solutions. It is possible to see nature-based solutions in many parts of the city. The places that will create awareness for these applications and where they can be most easily implemented are undoubtedly public spaces (Velibeyoğlu et al., 2024).

In the strategy plan foreseen by Izmir Metropolitan Municipality between 2020-2024, green infrastructure strategies have also been mentioned. This goal aims to consider the green areas in the city as a whole green infrastructure, to create green areas in line with climate change, and to protect existing green areas. The Izmir

Bioatlas Project is carried out with the coordination of Izmir Metropolitan Municipality and the Mediterranean Academy, to reveal the city's plant diversity, namely its flora, and document it, with the participation of academics and citizens. *What is important here is that civil society groups, local governments, academics, and the local people produce data together and create that data in the most applicable way in real life* (Velibeyoğlu et al., 2024). Another project supported by Izmir Metropolitan Municipality is the 6-year Urban GreenUP project. Within the scope of the project, the best nature-based solutions practices of Izmir city were determined as green corridors, permeable pedestrian paths, green stream rehabilitation, and industrial heritage routes.

4.2 Nature-Based Solutions Projects Examples



Figure 4.4. Locations of Nature-based Solutions Projects

Nature-based solution related examples from different parts of the world have been selected, as given in Figure 4.4. The fact that they were selected from different regions is also informative in terms of showing that the areas where the projects are implemented have some issues. The need for nature-based solutions shows the importance and need for a nature-based life all over the world. The reason for selecting these examples is the success of the projects in terms of their

implementation. On the other hand, being projects at different scales has helped to create implementation examples of different nature-based solution approaches. This is crucial for showing the variety of solutions. Some informative studies about these projects have been examined and information has been provided. Later, the projects have been analyzed under several titles. It is valuable to see positive conclusion in terms of understanding how the vision, purpose, and standards presented by nature-based solutions are reflected in the projects. It has been understood that Izmir - Urban GreenUp has similar implementation examples with other projects. The examination of these projects has made a positive contribution to the better understanding of the Izmir Urban GreenUp project selected from Türkiye.

4.2.1 Yamuna Biodiversity Park, Delhi, India

Yamuna Biodiversity Park (YBP) in Delhi is a successful example of how rivers can be restored in biodiversity parks. The park, which comprises about 457 acres in the vicinity of Wazirabad on the Yamuna's level alluvial plains, was created in two stages: the first stage included 157 acres of inactive floodplain and the second phase included 300 acres of active floodplain that receive yearly floods. An animal movement friendly 200 meter wide corridor connects the two sections.

The YBP is divided into two zones: (i) the nature protection zone and (ii) the vizitor's zone. Both zones have a variety of landscape components and structural features. The area's many terrestrial habitats as well as a mosaic of wetlands and marshes scattered with grasses are all included in the nature conservation zone. This is not open to visitors. The visitors' zone includes a butterfly corner or conservatory, a herbal garden, a climbers' grove, wetlands, marshes, swamps and lakes, a field gene bank, a conservatory of fruit-yielding plants, an amphitheater, a nature interpretation center with exhibits of representative ecosystems of the area, and small recreational parks (Climate and Development Knowledge Network, 2022).

The different ecological niches found in the woods, grasslands, and wetland communities of YBP are home to a large variety of floral and faunal species. Yamuna Biodiversity Park has grown in popularity both domestically and internationally among a number of public demographics. Impressed by the accomplishments, bird watchers, naturalists, students, NGOs, policymakers, planners, forest officials, judges, elected representatives, foreign dignitaries, and other park stakeholders have highlighted the park as a model for environmental resilience and sustainability. The overall number of plant species has increased from 90 to 915 in just 18 years (Climate and Development Knowledge Network, 2022).



Figure 4.5. View of the Site of Yamuna Biodiversity Park before Restoration (Climate and Development Knowledge Network, 2022)



Figure 4.6. View of Yamuna Biodiversity Park after Restoration (Climate and Development Knowledge Network, 2022)

Similar to nature reserves, Yamuna Biodiversity Park is a unique environment created in-house by Delhi Development Authority (DDA) that supports hundreds of endangered species coexisting in a variety of communities to benefit urban civilization on an ecological, cultural, and educational level (Agarwal, 2015). Biodiversity Parks serve as cultural landmarks and archives for the roughly fifty vulnerable communities in the Yamuna river basin and Aravali hills. It also offer perfect substitute habitats for both migratory and resident bird species, improve groundwater recharge and freshwater availability, act as sinks for CO₂ and other pollutants, moderate local temperatures and improve social cohesion within the urban community, and represent distinctive ecological models with values that include not only wildlife and natural elements but also aesthetic, environmental, and educational aspects (Agarwal, 2015).

Given that a biodiversity park is home to a wide variety of plants and animals and that healthy ecosystems depend on ecological integrity to survive, a multidisciplinary strategy was used, utilizing the knowledge of personnel with various areas of expertise. The initiative's creation and administration have featured a group of scientists with backgrounds in ecology and environmental science. In addition, locals

have worked in the biodiversity park's establishment, development, and management, giving them social security (Climate and Development Knowledge Network, 2022).

To solve the existing environmental concerns of the city and improve the quality of life for its residents, two organizations got together: the University of Delhi's Centre for Environmental Management of Degraded Ecosystems (CEMDE) as the technical and academic partner, and the DDA as the funding and land-owning government body. The primary reason for the park's success is the collaboration between the CEMDE and the DDA. Additional important components have been the DDA's financial support, a committed team with knowledge of various aspects of community mobilization and biodiversity, and careful planning and implementation of strategies (Climate and Development Knowledge Network, 2022). CEMDE offers a wealth of information about the site's natural history, as well as proficiency in soil and water studies, soil restoration, and the skills of specialists in the domains of wildlife, ecology, hydrology, and taxonomy. The DDA established the Delhi Biodiversity Foundation, which offers a publicly-funded entity for long-term Park management, which is essential for sustainability. The initiative's effectiveness has also been aided by community support. The local community has been supportive of the initiative from the start and has provided complete cooperation for its progress. The fact that several locals worked as gardeners for YBP increased community support for the program (Climate and Development Knowledge Network, 2022).

The Delhi Biodiversity Foundation was established by the DDA to better preserve the natural environment and to maintain the ecological, artistic, and cultural qualities of the biodiversity areas located in the National Capital Territory of Delhi. Teams of scientists with expertise in field biology, ecology, wildlife, taxonomy, conservation, habitat restoration, natural resource management, and nature education are among the technical inputs. The creation and administration of these parks are handled by qualified technical support workers in addition to these specialists (Agarwal, 2015).

Self-sufficiency is a crucial factor for a biodiversity park to be considered successful. This is only feasible in situations where there is sufficient space for the development of an ecosystem, as smaller spaces can only support lower levels of species variety (Agarwal, 2015). As a result, choosing a sufficiently broad and appropriate location to start the process of introducing ecological assemblages is crucial for such a project. The idea of a biodiversity park was initially conceived using the Ecological Restoration approach. A park like this seeks to improve the environment while also preserving the natural history of metropolitan areas. Any such park must first identify and gather the local native species in order to reconstruct, reintroduce, and preserve them throughout the park's little amount of degraded land.

Overall, a biodiversity Park serves three most important functions besides enhancing the quality of the urban environment which are Educational, Cultural, and Conservational. The manifestation of the above functions can take the form of the following among others: (a) It helps to connect the natural biodiversity to the city and its people who have lost contact with it. (b) It provides new livelihoods to the local people. (c) Preserve rare, endemic, and threatened species. (d) Serves as a living lab to study the processes and functions of a functioning ecosystem. (e) Buffers the local weather. (f) Serves as a sink for CO₂ and urban air pollutants (Agarwal, 2015).

4.2.2 Integrated Development of the Hatirjheel Area, Including the Begun Bari Canal, Dhaka, Bangladesh

Bangladesh's capital, Dhaka, is one of the world's densest cities and a rising megacity. The city is located in Bangladesh's center. The city of Dhaka is situated in the world's largest delta system, where four rivers converge: the Buriganga, Turag, Balu, and Tongi. Water characterizes the city's surroundings. Home to 44.5% of Bangladesh's urban population, Dhaka serves as the nation's center for the economy, finance, culture, and education. Up to 35% of the nation's economic activity is derived from it, with the textile and apparel, furniture, food and beverage, plastics, and leather industries being its main sectors. 33% of the city's canals and ponds and

53% of its low-lying areas vanished as a result of uncontrolled urbanization, encroachment, and disregard for zone restrictions (Climate and Development Knowledge Network, 2022).

Flooding during the monsoon season has resulted from drainage issues and rainwater stagnation as a direct result. Transportation, telecommunications, water supply, and electrical services in the city are all impacted by waterlogging. In 2009, WWF declared that Dhaka was the megacity most vulnerable to climate change. The 1960s saw an increase in urbanization, turning this lake, the canal, and the nearby wetlands into a landfill for commercial and domestic trash. As a result, the waterbody had significant levels of chemical and organic contaminants. It was completely changed in the 1990s when almost 1,200 illegal settlements with lots of slums, real estate firms, and businesses encroached on it (Climate and Development Knowledge Network, 2022). As a result, during the past few years, the Hatirjheel basin's retention capacity and function have greatly decreased. Hatirjheel, which was formerly used as a symbol of environmental degradation, is now a stunning example of environmental restoration and continues to serve as an inspiration for similar projects around Bangladesh (Climate and Development Knowledge Network, 2022).

The Hatirjheel area development project is focused on restoring wetlands and exploring ways to reintroduce water edge elements in Dhaka. It combines both engineered infrastructure and Nature-based Solutions (NbS). The revitalized jheel (wetland) and Begunbari khal have enhanced stormwater management and improved aquatic biodiversity in Dhaka. Additionally, the project has expanded green and open spaces in the city's busy capital. The primary goal of the initiative was to establish a connection between the densely developed southern part of the city and the newly organized northern region (UNA, 2024). The project's objectives include ensuring the protection of the designated area for stormwater retention to minimize the risk of flooding in surrounding areas and reduce environmental hazards. It also aims to restore the degraded Hatirjheel environment by converting the wastewater canal into

a freshwater lake, achieved by installing a large-diameter wastewater diversion sewer around the project perimeter. Additionally, the project seeks to connect the missing east-west link between two major roads by constructing a peripheral road system to help reduce traffic congestion in the area (Khan et al., 2015).

There is a narrow strip of verdant greenery near the margin. However, due to the substantial amount of acreage needed for both vehicle movement and water retention, the project does not feature any significant public parks. The development agency chose a pedestrian walkway that was just 0.9 meters wide, despite Vitti Sthapati Brindo Ltd.'s proposal for a six-meter-wide pedestrian path that included a bicycle lane. Small public plazas were kept in the plan for the pedestrian pathways; some of these are connected by lookouts, ghats, and bridges. Because of this, it has become one of the main public gathering spots for middle and lower-middle-income groups of Dhaka (Climate and Development Knowledge Network, 2022).

The Integrated Development of Hatirjheel Area including parts of Begunbari Canal intended to carry out the development of the Hatirjheel lowlands. Three major objectives were set for achieving the desired development of the area:

- To ensure the protection of the required area for stormwater retention, in order to minimize the risk of inundation of the adjoining areas and also reduce related environmental hazards
- To restore the degraded environment of the Hatirjheel area by transforming the wastewater canal into a freshwater lake
- To connect an important east-west missing link between two major arterial roads namely the Tongi (Climate and Development Knowledge Network, 2022).

The entire project plan was developed from the combined analysis and proposals of Bangladesh University of Engineering & Technology (BUET) consultants and implemented through RAJUK, LGED, DWASA, Engineering Construction Battalion of Army, and Special Works Organisation (SWO). RAJUK has been

assigned the tasks of land acquisition, compensation, land excavation, site protection, and waste management. LGED is responsible for constructing a two-lane road along the lake, a two-meter-wide footpath, a 2.5-meter-wide walkway, a bridge, an overpass at the Pathapath crossing, and landscaping. DWASA has been entrusted with developing the stormwater and sanitary drainage systems as well as the water supply network. The Bangladesh Army, as the Special Works Organization, is in charge of overseeing the implementation of the project (Jalal, 2012). The project also successfully brought together the government, some clients, the implementation authority, technical and design consultants, and citizens. This approach was later used in development work. The Hatirjheel project has significantly improved social cohesion, quality of life, and natural drainage. It has also had a substantial impact on the city's immediate physical shape and overall environmental performance. It has enhanced public spaces along the waterfront, promoted outdoor activities like running, walking, and socializing, and enhanced accessibility by tying together the various parts of the city.

In addition to these significant initiatives, re-excavation of the whole Hatirjheel and portions of the Begun Bari Canal has been contemplated as a means of improving the lowland's ability to retain stormwater, with the ultimate goal of converting the entire area into a freshwater lake. The components of the landscape and infrastructure consist of:

- 8.5 km of expressway, service road and a footpath on two sides, a 400-metre-long overpass, a children's play area, water gardens and floating walkways
- 10 km of lakeside walkways with five foot-over bridges, one-foot bridge over the lake, over 500 sitting benches, 24 viewing decks, two 100-meter long ghat, garbage bins, passenger sheds, a bicycle stand and vehicle parking bays
- A floating amphitheater, children parks, an information centre and celebration point
- Public toilets, police box, bus stop with a ticket counter, a food court, and a souvenir shop

- Four bridges with a total length of almost 475 m, three viaducts with a total length of 270 m, two water taxi terminals of almost 200 m in length, four electrical substations, and a pump house (Climate and Development Knowledge Network, 2022).



Figure 4.7. Overview of the Lake prior to the Project (Architecture Prize, 2024)



Figure 4.8. The Lake after Restoration (Architecture Prize, 2024)

Unfortunately, there aren't many urban leisure places available to Dhaka's residents, public open spaces especially. Those few remaining open spaces are gradually

deteriorating and may soon face increased extinction due to illegal encroachment, poor upkeep, and strict legislation. Recently, Dhaka's Hatirjheel wetland region was restored, serving as a vital public open space that connects the city's green-blue network (Rahman, 2021). Because Dhaka has a limited amount of land, a high density of buildings, a preponderance of wetlands, and a rapidly expanding population, creating new public open spaces is extremely difficult. So, the existing open spaces need to be utilized at an optimum scale, possibly with significant additions and alterations on a micro-scale.

A number of noteworthy urban leisure areas, including an open-to-sky amphitheater, an urban park next to the Gulshan-Hatirjheel Link Road, walkways, ghats, boating facilities, and restaurants, were added to the Hatirjheel waterfront region during the most recent rehabilitation. The 311-acre restored area was encircled by multiple densely populated residential neighborhoods. When assessing a project's chances for success, accessibility is an important spatial factor. To service the nearby residential communities, four pedestrian bridges and four heavy vehicle bridges were also developed (Rahman, 2021).

Three pillars support the vision: livability, functionality, and resilience. Additionally, it has two requirements: environmental sustainability and sensitivity to the sociocultural fabric of the area. The layout is propelled forward by the pillars, which have an upward orientation (Dhaka Structure Plan, n.d.). The conditions are more restricting than limiting; rather, they act as rails to guide forward movement in the intended direction. Bringing a simple analogy, if the pillars are the accelerator that gives speed, the conditions are the brakes and steering wheel that guide and control that speed (Dhaka Structure Plan, n.d.).

4.2.3 Spoorpark, Tilburg, Holland

Tilburg is 10 km from the Belgian border. Its population, which includes people of many nationalities, is over 200,000. The student population of over 27,000 makes Tilburg one of the main educational centers of the Netherlands. The city was formed from a group of small villages whose main economic activity was wool production. Over the years, the city has become one of the largest cities in the Netherlands. The main factor underlying this growth is the development of the textile industry in Tilburg. This change transformed the villages into textile cities, and over time, the city became one of Europe's most important textile centers (Arslantaş et al., 2020).

The rising textile industry affects the socio-economic and cultural structure, natural systems, and environment. The discharge of factory wastewater into the river and open sewage system has damaged nature and threatened people's health. Applications related to improving water quality are of great importance in Tilburg's urban agenda. Tilburg citizens have an influence on urban-related decisions (Arslantaş et al., 2020). The main reason behind the success of nature-based solution applications in Tilburg is the participation of citizens in urban planning decisions. Tilburg is a city with active green areas, parks, pocket parks, gardens, and other green areas with high accessibility opportunities for citizens. However, there was a need for an open and natural area where citizens could gather and spend time together.

The project transformed a 10-hectare empty area in the city center, very close to the train station, which was planned by the Municipality of Tilburg as a business center before 2016. However, the planned business center could not be realized due to the economic crisis. In 2016 the Municipality of Tilburg organized a survey and competition to collect the ideas of the city's residents. The municipality set some criteria for the project competition regarding the use of this area. The most important criterion was that each idea should include financial support. 82 ideas were submitted by the public. These were reviewed by the committee and 8 were selected. The 8

idea owners met and the planning process was facilitated by 3 consultants. The consultant group consisted of a builder/contractor, a business consultant, and a process guide. Many meetings were held and a project team was formed consisting of a landscape architect, 3 independent process managers, engineers, a project leader and a person who would maintain communication with the municipality (Arslantaş et al., 2020).



Figure 4.9. Spoorpark (Spoorpark Tilburg, 2019)

The most striking aspect of the project is the presence of a stream and a biological pond where rainwater is used and children can play. The park, which opened in 2019, attracted great attention and was visited by approximately 200,000 people (Arslantaş et al., 2020). During the planning phase, a landscaping study was carried out by using local plants and preserving the existing vegetation and trees. The government made donations for these ecological studies and nature education, and many ecologists contributed voluntarily. The park has recreational areas such as walking, picnicking, camping, a concert area, and a cafeteria. The park also includes appropriate landscape planning to reduce the noise of the railway using the topography. A barrier was established to block the flow of the stream and a small lake with a biological

pond feature was created in the middle of the park. The biological pond creates a natural filtering system with surfaces and plants that clean and filter the water.

4.2.4 EcoCity Augustenborg, Malmö, Sweden

EcoCity Augustenborg is one of Sweden's largest urban sustainability projects. The project is a collective name for a program aimed at transforming Augustenborg into a more socially, economically, and environmentally sustainable neighborhood. As part of the project, open rainwater channels combined with green roofs and ponds have halted flooding in the area, creating an aesthetic environment and enhancing biodiversity (Kaçmaz, 2021).

Sweden's Ekostaden, or "Eco-city," Augustenborg, has been a global leader in sustainable urban development. The neighborhood of Augustenborg was already established and had a number of social and physical issues that could not be resolved by all-encompassing architectural solutions. Augustenborg's narrative primarily focuses on initiatives to modify the constructed surroundings in order to concurrently address ecological, financial, and interpersonal problems. Augustenborg's retrofitting is intricately linked to the city's larger historical development.

Following the 1992 United Nations Rio Conference, where Agenda 21 emphasized the value of community involvement, local action, and a comprehensive approach to sustainable endeavors, the government decided to participate in the local investment program (Persson & Mansson, 2021). Augustenborg would provide decent housing and a future to the unemployed laborers as well as their recently arrived Balkan neighbors. The early 1990s financial crisis made it difficult to get the money needed to realize Malmö's new post-industrial story. However, the different stakeholders managed to draw in funding from local, national, and international sources to support a number of projects that all have sustainable urban regeneration as their common

theme. As a symbol of the problem engulfing the entire city, Augustenborg proved to be a perfect location to test out possible remedies (Persson & Mansson, 2021).

One of Augustenborg's main advantages is that it is a geographically isolated region, bordered on all sides by strong transit networks. The experimental limits are easily distinguished from one another by the sizable primary roadways and rail lines. Additionally, the property is primarily homogeneous, with MKB-owned and maintained public housing predominating (Persson & Mansson, 2021). This makes it easier for the municipality to unite the community's stakeholders around a common redevelopment plan. Efforts to retrofit the built environment within the Augustenborg limits offered very concrete and evident proof of deliberate alteration.



Figure 4.10. Green Roofs in EcoCity Augustenborg (Persson & Mansson, 2021).

The governance model that developed at Ekostaden Augustenborg points to a transdisciplinary model of sustainable governance that incorporates synergistic thinking and breaks down departmental silos. Sadly, this new system of government would not endure (Persson & Mansson, 2021). The municipality progressively reverted to its previous practices when several financing sources ran out, and the main proponents of Augustenborg either retired, moved on, or passed away. But the project's strengths have also exposed its flaws. It started with a sequence of handshakes between powerful figures from MKB and the city's departments. Strong individuals drove the development; without these men, who were largely men who had risen through the ranks, the project would not have progressed as far as it did, or not in such a radical way. The Eco-city became what it is today thanks in large part to their dedication and the dedication of others who joined throughout implementation.

The path traveled by the lessons and experiences from Augustenborg's procedures and methodologies has been interesting. Malmö's Eco-city has emerged as a crucial component of the city's sustainable character, and it has been showcased to businesses, government evaluations, and development initiatives across the US, France, China, and several other nations. However, the concepts created within the Eco-city have not caught on. The project's link between tangible investments and social challenges is still not explicitly incorporated into Malmö's local development initiatives. There isn't much of a replication of Augustenborg's stormwater solutions throughout the rest of Malmö (Persson & Mansson, 2021).

Almost a thousand people visit the project annually to witness the open drainage systems, green roofs, photovoltaics, and other retrofit technologies in operation. In fairness, though, none of the technologies were particularly new or unproven; open drainage systems had been operating since the late 1980s, at least partially, in other parts of Malmö, PVs were well-known and dependable, and green roofs were modeled after examples seen in Germany. Nonetheless, putting various technologies

together in one location produced a varied display where their effectiveness could be shown. Ekostaden Augustenborg offered tangible evidence that the preexisting urban structure might be restructured (Persson & Mansson, 2021). Not only were these exhibits meant for tourists to see, but the sustainability concepts were meant to be taken and used in different places. Not limited to the Augustenborg Botanical Roof Garden, green roofs are now an inherent feature of the Augustenborg neighborhood.

4.2.5 Pocket Parks the Greening of Degraded Public Spaces, Lalitpur, Nepal

Nepal's capital city is Kathmandu. The city is located in the center of Nepal's densest urban area. Lalitpur is located on the south bank of the Bagmati River on an elevated piece of land in the Kathmandu Valley. With the biggest concentration of artists, particularly those working with metal and wood, the city is regarded as the artistic center of Nepal and is a significant hub for the country's cultural heritage and craft industry. Durbar Square, a World Heritage Site with palaces, temples, shrines, and monuments, is its most famous feature. One of the ten nations in the world with the fastest rates of urbanization is Nepal. The valley's urbanization has also brought forth environmental problems like air pollution, traffic jams, a drop in the water table, and the loss of open space (Climate and Development Knowledge Network, 2022). Public open spaces, in particular, are essential to a healthy urban environment and are part of the urban architecture that supports a variety of social, ecological, and economic activities.

Mr. Milan Rai, a local artist, started looking for ways to use art to raise awareness of social and environmental issues and make it more accessible to the typical Nepali in 2012. Mr. Rai started going to different government agencies in 2017. He and a group of volunteers began growing their efforts after realizing the importance of addressing problems like air pollution and the disregard for these issues by both the local administration and the public (Climate and Development Knowledge Network,

2022). This led to the foundation of a community-led art practice that eventually covered environmental issues as well. Environmental campaigns centered on the shrinkage of open spaces, both democratically and spatially. The concept of creating a pocket park came about as a result of three years of persistent work to increase public awareness of air pollution and urban greening (Climate and Development Knowledge Network, 2022).

Pocket parks, sometimes referred to as mini-parks or vest-pocket parks, are extremely small-scale urban open areas. Pocket parks, which are often no larger than a few home lots, can be incorporated into and dispersed around an urban neighborhood to serve the needs of the local populace. Pocket parks have a limited ecological purpose, although they do contribute to the city's increased percentage of permeable surfaces and act as little sanctuaries for biodiversity. These mini park's trees and other vegetation serve as "green lungs," reducing the impacts of urban heat islands and fostering a microclimate.



Figure 4.11. The Site before the Intervention (Vriksha Foundation, 2024)



Figure 4.12. The Site post the Intervention (Vriksha Foundation, 2024)

To provide a network of breathing places, a community sanctuary, and more green space, pocket parks were designed in Lalitpur to be both environmentally friendly and innovative. Additionally, the effort aimed to improve the microclimate and provide access to green spaces by establishing habitat for micro-fauna, especially insects and pollinators. The particular goal was to create a comprehensive open space planning strategy by:

- Constructing a well-planned network of open places that is safer, more inclusive, better ecosystem services, and more connected and accessible
- Creating classifications for the Kathmandu Valley's open spaces to more accurately identify and describe its regional, historical, religious, social, cultural, and environmental significance
- Creating policies and procedures for the planning, development, and administration of these open spaces in various categories (Climate and Development Knowledge Network, 2022).

The Vriksha Foundation was established in early 2019 as a result of teamwork and the recognition that it was necessary to collaborate with numerous stakeholders from a variety of project sectors. From the beginning, the Foundation used a multidisciplinary strategy that involved the community to produce results that were

advantageous to all. The Foundation is still dedicated to developing sustainable landscape designs that are artistic and regenerative, bringing people, beauty, and the environment together. It took four months to turn this 800 m² plot of land into a pocket park, which was finished in April 2020. UNDP's Accelerator Lab Program also took notice of the project. The Vriksha Foundation team from World Wide Fund for Nature (WWF) Nepal and UNDP's Accelerator Lab raised a portion of the initiative's finances to show the efficacy of a pilot project. Additionally, Lalitpur Sub-Metropolitan City provided some of the funds (Climate and Development Knowledge Network, 2022).

The Vriksha Foundation uses a community-based participatory method to design and create improved public spaces for city people. In 2019, the Vriksha Foundation hosted a "collective intelligence" workshop for Lalitpur Sub-Metropolitan City officials, involving local communities and the corporate sector to raise knowledge about the park's construction and project sustainability (Climate and Development Knowledge Network, 2022). The crew started working on site clearance and delineation as soon as the park's final design was ready. Due to its local availability and ability to enhance natural aesthetics, stone was selected as the primary material for the building of numerous elements. The new pocket park had a winding route because the property was once used as a pedestrian shortcut between two roads before the incursion. The park's entrance was maintained open on both sides of the road to provide easier, safer access and a hassle-free journey. Additionally, it was made sure that no fencing would be erected around the park's perimeter in order to solve the sociocultural challenge and foster a sense of community among the populace.

In early 2020, the WWF, Lalitpur Metropolitan City, and the United Nations Development Programme collaborated with the Vriksha foundation to create a pocket park in Jawalakhel (United Nations Development Programme, 2021). The pocket park was created to address urban problems and provide breathing room in

Lalitpur City by converting underutilized public areas into accessible pocket parks for people regardless of their age, ethnicity, and disability. Simultaneously, it was anticipated to augment affirmative communications, foster psychological wellness, and elevate the city's visual appeal.

Key Informant Interviews (KIIs) have been held with the appropriate individuals throughout the project to investigate how a small initiative to build pocket parks has inspired local governments and community members to consider and plan for further pockets (United Nations Development Programme, 2021). These discussions have revealed that the establishment of pocket parks has catalyzed the initiation of constructive dialogue between the local government and residents. In a similar vein, the local administration has approved policies and initiatives to start and encourage the development of parks in the Lalitpur Metropolitan area (United Nations Development Programme, 2021).

4.2.6 Urban GreenUp, Izmir, Türkiye

Grant Program: Horizon 2020 Program Smart Cities and Communities 2 - Call for Implementation of Nature-Based Solutions

Applicant: Cartif Research Center (Spain)

Total Budget: 14,724,694 Euros

Grant Amount: 2,326,000 Euros (Izmir Metropolitan Municipality)

Horizon Europe is the European Union's key funding program for research and innovation. It addresses climate change, supports the achievement of the UN's Sustainable Development Goals, and enhances the EU's competitiveness and growth. The program fosters collaboration and strengthens the impact of research and innovation in developing, supporting, and implementing EU policies while tackling global challenges. It promotes the creation and wider distribution of high-quality knowledge and technologies, generates jobs, fully engages the EU's talent pool, boosts economic growth, promotes industrial competitiveness, and optimizes

the impact of investments within an enhanced European Research Area. Legal entities from the EU and associated countries can participate (European Commission, 2024).

Considering that 54 percent of the world's population lives in cities and this rate is increasing, the main purpose of the project is to make progress in sustainable urban development and design. To reshape cities following their natural structures in terms of the implementation of nature-based solutions, the project aims to; a) Develop a methodology, b) Develop the capacities of local authorities and stakeholders to implement nature-based solutions more effectively, and eliminate the effects of climate change, c) Prepare "Renaturalization Urban Plans" for cities in this context, and d) Conduct comprehensive implementation actions in three cities, Valladolid (Spain), Liverpool (England) and Izmir, which carry out studies under these plans and include the element of renaturalization in their strategic urban planning. The project also aims to effectively monitor the data obtained from the implementations to create a model and to make this model widespread by using it outside Europe.

Urban GreenUp is a project funded under the European Union's Horizon 2020 program. Its objective is the development, application, and replication of Renaturing Urban Plans in a number of European and non-European partner cities to mitigate the effects of climate change, improve air quality and water management, as well as to increase the sustainability of our cities through innovative nature-based solutions (Urban GreenUp, n.d.). Three runner cities, Valladolid (Spain), Liverpool (UK), and Izmir (Türkiye), will validate and demonstrate the effectiveness of the Urban GreenUp methodology. Based on their experience, five follower cities, Mantova (Italy), Ludwigsburg (Germany) Medellin (Colombia), Chengdu (China), and Binh Dinh-Quy Nhon (Vietnam), will set up their own Renaturing Urban Plans to replicate the Urban GreenUp strategy and its green economy approach (Urban GreenUp, n.d.).

Urban GreenUp aims to improve the quality of life in urban areas, increase environmental protection awareness and consciousness among citizens, and

encourage the creation of international networks and synergies. The project emphasizes the importance of implementing an application that draws attention to the effects of climate change and directly involves citizens through co-production activities, while also ensuring the active participation of local communities, and is included as a criterion (Arslantaş et al., 2020).

Table 4.5. Nature-based Solutions Topics for Izmir - Urban GreenUp

Re-naturing urbanization	Water interventions	Singular green infrastructure	Non-technical interventions
-Cycle and pedestrian routes in the green corridor -Planting of trees and the creation of arboreal areas and parks -Carbon sink via the installation of urban woodland	-Installation of grassed swales and water retention ponds for water storage and filtering -Riverbank restoration and green pavements	-Biochar production and usage -Installation of several pollinator modules -Installation of green fences -Green covering shelters, cool pavements -Construction of Greenhouses for educational purposes	-Engagement of citizens in a variety of educational activities -Support to participation of citizens in co-design activities

The nature-based solutions that will be implemented during the project cover a variety of complementary yet interconnected aspects of urban life and infrastructures. They are grouped into four main categories: re-naturing urbanization, water interventions, singular green infrastructures, and non-technical interventions (Urban GreenUp, n.d.). Examples of the planned initiatives are the deployment of the green bike and pedestrian routes, the installation of parks and urban farming facilities, the usage of smart soils and biopollutant filters, as well as the implementation of sustainable drainage systems, which reduce the impact of floods and for irrigation purposes (Urban GreenUp, n.d.).

Apart from urban green transformation, the project is expected to achieve important results in other fields too. Urban GreenUp will improve life quality in urban areas,

raise awareness on the importance of environment preservation among citizens, generate new market opportunities for European companies at the international level, and foster the creation of transnational networks and synergies. It will highlight the importance of the local communities's active participation when addressing climate problems through co-creation activities also directly involving the citizens, who are at the core of their cities' green regeneration. The project's objectives, challenges, and impacts are summarized based on the information retrieved from Urban GreenUp (n.d.)

Objectives: Izmir is a Turkish city with roughly 4,000,000 inhabitants. Located on the west coast of Anatolia, it is the country's third most populous city. The local climate is Mediterranean, with long and hot summers and relatively mild winters. Izmir is one of the oldest cities on the Mediterranean Sea, with 8500 years of history. It is deeply cultured and offers a variety of historical sites. Izmir is also a modern and dynamic economic center of its region. The local economy benefits from the flourishing service industry, manufacturing, and agriculture. The interventions focus mainly on creating green corridors and on decreasing the city's temperatures.

Challenges: Climate mitigation and adaptation, water management, coastal resilience, green space management, air/ambient quality, urban regeneration, participatory planning and governance, social justice and social cohesion, public health and well-being, potential for new economic opportunities and green jobs.

Impacts:

- Renaturing urbanization

There are four sub-topics; Green route, Arboreal interventions, Resting areas, and Carbon capture and storage. The project includes several environmental interventions aimed at improving urban sustainability. The new green cycle route will allow 700,000 citizens to access the green corridor, including riverside restoration toward the Natural Life Park, while 500,000 more will benefit from the BISIM public bike rental system. Arboreal interventions are expected to reduce CO₂

emissions by 46 tons per year and lower local temperatures by 3-5°C in the summer. Resting areas will provide shaded spaces, and carbon capture initiatives are expected to sequester 36 tons of CO₂ annually while boosting regional biodiversity.

- Water interventions

There are three sub-topics; Sustainable drainage systems, Flood actions, and Green pavements. The project includes several water-related interventions aimed at enhancing urban resilience. Sustainable Drainage Systems are expected to capture 165 tons of water annually. Flood prevention actions will help reduce flash floods and improve water retention, while replacing the riverbank's concrete walls with eco-friendly permeable materials, benefiting 300,000 urban dwellers. Green pavements will also help reduce ambient temperatures by 2-4°C during the summer.

- Singular Green Infrastructures

There are five sub-topics; Biochar implementations, Pollinators, Vertical green infrastructure, Horizontal green infrastructure, and Urban farming. The project includes several additional environmental interventions aimed at improving sustainability and reducing urban heat. Biochar implementations are expected to reduce CO₂ by 1.05 tons and NO₂ by 0.4 tons annually, while also mitigating the heat island effect by 1.5°C. Pollinator initiatives aim to enhance local biodiversity and are expected to increase pollinator activity by 45%, fostering native plant communities. Vertical Green Infrastructure will help manage heavy rainfall and reduce flooding risks. Horizontal Green Infrastructure, including a green shelter in parking areas, will provide shade, and capture CO₂, and water for plants, while high-albedo pavements will reduce heat absorption, lowering surface temperatures by 10°C. These interventions will benefit approximately 230,000 people. Finally, urban farming with water-resistant plants in greenhouses is expected to produce 7.5 tons of water per year.

- Non-technical interventions

There are four sub-topics; Educational activity, Engagement, City coaching, and Support activities. The project includes several educational and engagement initiatives aimed at fostering community participation and environmental awareness.

Green Infrastructure implementations are expected to improve the well-being and sensory qualities of around 90,000 citizens. An educational path in the Bio-boulevard will attract over 150,000 visitors to learn about urban biodiversity, climate change, and related topics. Engagement efforts, including knowledge transfer, farmer welfare support, women cooperatives, and bio-blitz events, are expected to involve 500,000 citizens through a portal, 300,000 through urban farming, 85,000 with women's cooperatives, and 100,000 through bio-blitz events.

The effects of the applications carried out within the scope of Urban GreenUp on the heat island effect, carbon emissions, and biodiversity were measured and reported for two years. According to the results obtained after these measurements, nature-based solution implementations are planned to be spread in the necessary areas of the city. For example; parklets, green-roofed parking lots, permeable surfaces, and pollinator houses (Arslantaş et al., 2020). In order to implement the strategies mentioned in the Izmir Green Infrastructure Strategy, studies have been initiated in two different areas “Meles Stream and Yeşildere Valley Ecological Corridor Urban Design Competition” and “Olivelo Urban Periphery Ecological Park Design Competition” (Arslantaş et al., 2020). These areas include both rural and urban areas due to their scale size. The aim here is; to plan approaches that strategically plan the connection between natural and urban areas, provide and manage biodiversity, and improve nature's ability to provide ecosystem products and services such as clean air and water. The “Climate Change and Environmental Protection Department” has been established within the Izmir Metropolitan Municipality to coordinate analysis and solution-oriented studies on the effects of climate change (Arslantaş et al., 2020).

In the meeting with Prof. Dr. Koray Velibeyoğlu on December 9, 2024, talked about the contributions of the Urban GreenUp project to the city of Izmir, particularly in the context of Nature-based Solutions. During the meeting, he identified and analyzed the key impacts of the project, which can be summarized under four main headings.

- An international concept has proven its success locally. It became specific to the local context. The concepts of Green City and Nature-Based Solutions have been adapted to the city. Nature-based solutions, and therefore Urban GreenUp, are positioned as a tool for combating climate change. NBS and Urban GreenUp have been considered methods for naturalizing urban planning. Different solutions were attempted for various problems and locations, thus a local, place-dependent understanding has been gained.
- Despite changes in the municipality, the work continued. An effective relationship was established with governance. A universal catalog was made locally dependent. The project could continue because it aligned with the new administration's goals. A spillover effect was achieved. Networks were created for different projects, and it paved the way for participation in the CARDIMED project. CARDIMED is a project funded by the Horizon Europe Programme focused on boosting Mediterranean climate resilience through the widespread adoption of Nature-based Solutions across regions and communities (CARDIMED Project, n.d.).
- The project has spread in various ways. Its continuation is due to its success. In addition to the expected impacts, additional effects have occurred: the process of joining the CARDIMED project, the studies on the Meles River as an Urban and Ecological Backbone, and the Olivelo-Ecological Shared Living Space at the Izmir City Periphery. The concept evolves each time and is built upon the previous one, allowing it to find a place within different management units.
- A project involving local government has proven its success. The project, which was included by the municipality, remained somewhat in the municipality phase during the implementation stage, and active participation from city residents was not widely spread. However, efforts are being made to encourage individual contributions through organizations like Green Izmir volunteers. A city consciousness is being fostered under the guidance of Green Izmir.

Izmir is actively following developments in Europe and is becoming an integral part of several ongoing initiatives. Following the completion of the Urban GreenUp project, the city continues to engage in various other projects aimed at urban sustainability and innovation. One of the key projects in this regard is the Re-Value Project.

Re-Value partnership redefines urban spaces and promotes transparent decision-making, technology, community empowerment, and sustainability to create climate-neutral, inclusive, and prosperous cities. With a focus on both infrastructure and well-being, the project aligns with the New European Bauhaus and supports the EU Mission for Climate-Neutral and Smart Cities (Re-Value Cities, n.d.). In the Re-Value partnership, İzmir is working to refine and expand its design strategy for its waterfront and the densely populated areas behind it. This builds on earlier strategies developed through the İzmirSea Project and lessons learned from pilot initiatives like URBAN GreenUP for sustainable transformation. As the largest city in the Re-Value partnership, İzmir's dense urban development around its waterfront places a strong focus on enhancing quality of life as part of its roadmap to achieve climate neutrality and support sustainable growth (Re-Value Cities, n.d.).

To leverage the Re-Value approach in integrated planning and design, İzmir plans to develop a sustainable green zone to improve urban comfort and facilitate a climate-neutral transition in the densely populated areas behind its waterfront. The city also intends to enhance these efforts through Digital Twinning to tackle challenges such as urban flood management, water impermeability, and the heat island effect. With a growing youth population, İzmir has gained strong support from locals for the digital tools already in use and aims to expand data-driven insights to support scenario-building and inform decision-making (Re-Value Cities, n.d.). The initiatives in İzmir are carried out through a close partnership between the İzmir Metropolitan Municipality (IMM) and the İzmir Institute of Technology (IZTECH). IMM leads the overall development and implementation of the city's strategy for the sustainable green zone, while IZTECH primarily supports data creation,

management, and analysis, as well as providing data-driven and innovative transformative solutions (Re-Value Cities, n.d.).

4.2.6.1 Urban GreenUp Implementations

The project covers the area from Karşıyaka city center to Çamaltı Salt Pan. The model that will be put forward to reduce carbon emissions, increase biodiversity, reduce air temperature caused by dense urbanization, increase the amount of green area, reduce flood risk, and increase the quality of life of the people in this region will be a guide for Izmir. Within the scope of the project, an "uninterrupted ecological corridor" was created on the coastal part of Peynircioğlu Stream in Mavişehir and Halk Park and the following route (Izmir Metropolitan Municipality, 2020). Pocket parks were built on Girne Street. Sasalı Natural Life Park and the Vilayetler Evi parking lots were converted into green roofs. The "Sasalı Climate-Sensitive Agriculture Education and Research Institute" project won first place in the "Sustainable Agriculture" category in the "Best Sustainable Practices Competition" in 2019 (Izmir Metropolitan Municipality, 2020). The implementation works of the project are given in Table 4.6.

Table 4.6. Project Implementation of Urban GreenUp in Izmir (Izmir Metropolitan Municipality, 2020)

40 thousand square meters of green area around Peynircioğlu Stream in Mavişehir
Pocket parks
Sasalı Climate Sensitive Agriculture, Education and Research Institute
Insect hotels
Green roofs
Rainwater ditches
Utilization of waste sludge
Industrial heritage route

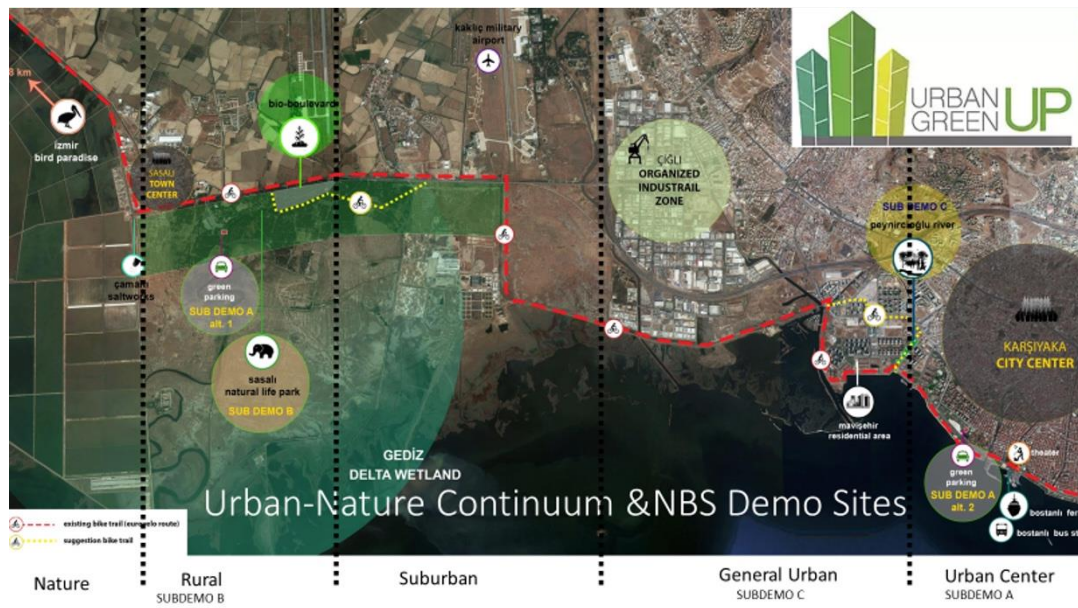


Figure 4.13. Pilot Areas (Velibeyoğlu, 2024)

Within the scope of the project, 3 sub-pilot areas (pilot area a, b, c) were determined in Karşıyaka and Çiğli in Izmir. These areas were selected to constitute a transition zone between the city and nature. Care was taken to ensure that each selected area had different characters and problems (Hepcan et al., 2019). Pilot a: Reducing the Urban Heat Island Effect in the Transition Between the City and Nature: The main components of Pilot a are located in the central area of Karşıyaka District, which has a high-density urbanization, and in Sasalı Town of Çiğli District. The main objective is to implement NbS aimed at reducing the urban heat island effect and increasing human comfort. Pilot b: Climate-Sensitive Urban Agriculture: Pilot b is located within the “Sasalı Wildlife Park”. This area is an interface between urban and natural areas and is ideally located to develop climate-sensitive urban agriculture practices in a special area within the park. Pilot b also includes practices referred to as non-technical interventions in the project and interventions supporting biodiversity. Pilot c: Naturalization of Peynircioğlu Stream and Green Corridor: Pilot c includes a green corridor of approximately 10 km from Sasalı to Mavişehir and interventions aimed at naturalizing Peynircioğlu stream with interventions on its banks and immediate

surroundings, as well as contributing to urban biodiversity with fruit walls and green fences along the stream (Hepcan et al., 2019).

Sasalı Climate Sensitive Agriculture, Education and Research Institute



Figure 4.14. İztam, Sasalı BioLab (Mertuslu, 2021)

The “Sasalı Climate-Sensitive Agriculture Education and Research Institute”, which will provide services to inform society against possible droughts in the future due to climate change and to explain the correct methods in agriculture in practice, started to service in March 2021. *The “Sasalı Climate-Sensitive Agriculture Education and Research Institute”, which will operate in an area of 15,800 square meters in the eastern part of the Izmir Wildlife Park, will have an education hall, laboratory, and library to inform citizens and children (Izmir Metropolitan Municipality, 2020).* Outside the building, application greenhouses are set up to show the effects of climate change on agriculture. Since open-air agriculture is not possible due to drought, sample applications are made in the closed areas created with greenhouses. The effects of climate change are explained to the students and citizens before they visit the greenhouses. 10 insect houses allow bees and insects to rest during long flights (Izmir Metropolitan Municipality, 2020).

In three greenhouses spread over an area of one thousand square meters, where soilless agriculture and vertical agriculture applications are explained, the aim is to

visually inform citizens about the precautions to be taken against drought that may occur until 2080. Visitors to the vertical agriculture greenhouse see products grown in water on shelves one above the other and take samples for their greenhouses. In the institute garden, which also includes open agricultural areas, there is a 550-meter-long education path (Bio-Boulevard) where “Nature-Based Solutions” are explained. Along the Bio-Boulevard path, there are water ditches that support the mixing of rainwater with groundwater and control the risk of floods and inundations. Information boards explaining the applications within the scope of the project are placed along the education route. Visitors to the institute learn about the application of ridge-mounted agriculture in the open agricultural area (Izmir Metropolitan Municipality, 2020).

The project, which was prepared based on the drought prediction that will start in Izmir as of 2080, is the product of an experimental study that will serve the drought situation. In addition to its spatial arrangements, this project, which will be the first of its kind in Türkiye due to the intellectual infrastructure it is based on, is expected to produce solutions with the potential to respond to agricultural activities that are negatively affected by global warming, climate change, and drought problems, and to pioneer the applications that will be implemented after it. The project received the first prize at the SBS 2019 Sustainability Award (Mertuslu, 2021)

Mavişehir River Restoration



Figure 4.15. Mavişehir Restoration Project Area (Urban GreenUp, n.d.)

Innovative applications to protect the environment in the area from Mavişehir to the Natural Life Park, from Çamaltı Salt Pan to Menemen Plain within the scope of the Horizon 2020 program, and was entitled to a grant of 2.5 million EURO. For the Mavişehir Region, which is considered to be most affected by climate change and has dense urban construction, nature-friendly solutions have been developed to eliminate the negative effects of urban air temperature, reduce the risk of sudden floods, and make streams more accessible to the public (İzmir Gönüllü Yerel Değerlendirme Raporu, 2021). The project area is situated in a densely urbanized region, resulting in a significant and damaging heat island effect. Measures were implemented along the banks of Peynircioğlu Stream to address the impacts of climate change, a result of collaboration between the IMM and the European Union, with both budget funding and co-financing (AIPH, 2025). The ecological corridor applications of the Izmir Metropolitan Municipality in Peynircioğlu Stream were deemed worthy of the TMMOB Urban Planners Chamber Raci Bademli Good Practices Encouragement Award (Izmir Metropolitan Municipality, 2022).

As part of efforts to address the global climate crisis, a continuous ecological corridor was established along the coastal section of Peynircioğlu Stream in Mavişehir, Halk

Park, and the surrounding route. Flood control measures were implemented in the stream, and a new green space was developed around it using eco-friendly practices that avoid impermeable surfaces. The sides of Peynircioğlu Stream have been transformed into a recreational area where residents of Izmir can enjoy nature, walk, and exercise in fresh air (Izmir Metropolitan Municipality, 2020). The study involved restoring permeable stream beds for flood management, applying permeable concrete for stormwater control, and expanding the existing green spaces. Additionally, both the quality and quantity of the current green areas have been enhanced (AIPH, 2025)

A green space spanning 26,500 square meters was developed around the stream, with 15,000 square meters dedicated to carbon-absorbing plants. As part of the project, 1,150 trees, 250,000 shrubs, and ground cover suited to the Mediterranean climate were planted (Izmir Metropolitan Municipality, 2020). Seeds were planted in the soil to help green the riverbanks. Additionally, five wooden sun terraces, six wooden lounging units, and seating areas were set up along the stream, enclosed by a green fence of various plants. To support pollinators, ten pollinator houses were placed in the area, providing resting spots for bees and insects that travel long distances to collect pollen.

Permeable two-kilometer bike and pedestrian routes were constructed to let rainwater into the underground and lessen the chance of flooding in the stream. Additionally, a 500-meter racetrack was constructed using semolina, a natural tile material. Fountains were positioned in the stream to give the water oxygen, shield it from pollutants, and provide a lovely sight. Behind the eight lounging units, a 90-square-meter fruit wall was also constructed (Izmir Metropolitan Municipality, 2020).

Pocket Parks



Figure 4.16. Pocket Parks in Girne Street (Urban GreenUp, n.d.)

Izmir, one of the three leading cities in the EU-funded Urban GreenUp project, has installed several parklets in the Karşıyaka district. This initiative is part of the city's broader urban renaturation plan within Urban GreenUp, aimed at enhancing sustainability and resilience to climate change through innovative nature-based solutions (Urban GreenUp, n.d.). The parklets are on-street units featuring seating areas and plant containers, designed to boost carbon sequestration and reduce air pollution. They will also provide shaded, cool areas, helping regulate the local microclimate and promoting biodiversity by offering food sources for wildlife. The parklets are expected to encourage people to spend more time in green spaces within Karşıyaka's dense urban environment.

Within the scope of the program, pocket parks were created on Girne Street. It was created to reduce carbon emissions and the heat island effect on the street where there is heavy traffic, and to provide citizens with rest by creating green areas on the parking lots. It built a pocket park (parklet) on Girne Street where there is heavy traffic, to reduce carbon emissions and the heat island effect, and to provide citizens with a rest by creating green areas between the parked vehicles. The Metropolitan Municipality designed 3 models for a total of 2 pocket parks consisting of 2 modules, each with an area of 5 meters by 2.5 meters (Izmir Metropolitan Municipality, 2019).

One of the pocket parks has a small playground for children, the other has shade and tables, and the other has a bicycle park.

4.3 Comparison of the Projects

Up until now, cities that have adopted the green city concept were examined. These case studies provided a deeper understanding of Izmir's green city concept. Subsequently, example projects of cities that have embraced nature-based solutions were explored. The real-world implementation of the theoretical concepts was assessed by analyzing this practical implementations of these solutions, which were previously discussed in conceptual and theoretical terms in earlier sections. Below is a comparison section comparing selected projects with the Urban GreenUp from Izmir. A comparative analysis of the projects was presented in this section. Then, the commonalities between Izmir's Urban GreenUp project and the examined examples were discussed.

Table 4.7. Comparison of Different Nature-based Solutions Related Projects

Project name	India - Delhi - Yamuna Biodiversity Park	Bangladesh - Dhaka- Hatirjheel Area, Begun Bari Canal	Holland - Tilburg - Spoorpark	Sweden - Malmö - EcoCity Augustenborg	Nepal - Lalitpur - Pocket parks	Türkiye - Izmir - Urban GreenUp
Population	33,807,000 (2023)	23,209,600 (2023)	199,613 (2024)	333,274 (2023)	1,221,592 (2011)	4,479,525 (2023)
Area	1484 km ²		10-hectare		37.4 km ²	
Aim	Biodiversity parks aim to get innovative conservation approaches that bring back lost natural heritage specific to the area and conserve	Objectives were to preserve the low-lying floodplain areas of Hatirjheel, establish connectivity among major urban mobility corridors,	This project aims to address the importance of water quality improvement, while also responding to the need for an open and natural space where	The project aims to transform Augustenborg into a more socially, economically, and environmentally sustainable neighborhood	The initiative aimed to create a network of pocket parks to provide breathing spaces, enhance green cover, and foster community	Its objective is to develop, implement, and replicate Renaturing Urban Plans in a number of European and non-European partner cities, aiming to mitigate climate change effects,

	vanishing ecosystems on degraded vacant lands in and around urban centres.	reintroduce water-based transportation, integrate the northern and southern part of the city, and restore and conserve the urban area.	citizens can gather and spend time together.	d through a collective program.	gatherings. It focused on making parks innovative, environmentally sustainable, supportive of micro-fauna.	enhance air quality and water management, and boost urban sustainability through innovative nature-based solutions.
NBS Approach	Ecosystem Restoration	Issue-specific ecosystem-related approaches	Infrastructure-related approaches	Infrastructure-related approaches	Infrastructure-related approaches	Infrastructure-related approaches
Scale	Regional	Local	Local	Local	City	City
Stakeholders	CEMDE, DDA, Delhi Biodiversity Foundation, Local community	RAJUK, BUET, VITTI Sthapati Brindo Ltd, Bangladesh Army.	Municipality of Tilburg, Idea owners, Consultants	People from MKB, City Departments	Lalitpur Metropolitan City, VRIKSHA foundation, WWF, UNDP	Izmir Metropolitan Municipality, European Union's Horizon 2020 programme
Planning Approach	Multidisciplinary approach	Multidisciplinary approach	Participatory approach	Transdisciplinary approach	Multi-disciplinary approach	Multidisciplinary approach
Importance for city	Park is a model for environmental resilience and sustainability for the city.	It is a notable example of environmental restoration, continues to inspire similar projects across Bangladesh. It served as a key reference for waterfront development and urban design in Dhaka and beyond.	In Tilburg, nature-based solution applications have demonstrated the impact of citizens on urban planning decisions through nature-based solutions.	EcoCity Augustenborg is described as one of Sweden's largest urban sustainability projects that transformed Augustenborg into more socially, economically, and environmentally sustainable neighborhood.	Accessible green spaces have been created for city dwellers. Trees and other plants in these pocket parks help regulate microclimates and reduce the urban heat island effect.	An international concept has been successfully integrated into the city. It has proven that urban problems can be solved harmoniously with nature. It has made positive contributions to the city's green city vision. It has helped to form networks for new projects.

Table 4.7. (cont'd)

<p>Challenges</p>	<p>The Yamuna Biodiversity Park initiative was the first of its kind in India. It brought lost biodiversity back to the degraded landscapes and riverscapes of the Delhi metropolis.</p>	<p>There are three main challenges of the projects; Climate action for adaptation, resilience, and mitigation (SDG 13), Green space, habitats and biodiversity (SDG 15), and Water management (SDG 6).</p>		<p>Investments were divided among many participants. Augustenborg's experiences don't naturally continue. To gain experience and create processes, there are no defined processes, actors, or roles while revitalizing a region.</p>	<p>In the case of the first pocket park in Lalitpur, funding avenues that were explored included the local government, local businesses, and international organizations.</p>	<p>The standardization of the method is one of the relevant milestones of project objectives. The parameterization will allow identifying the factors that influence each challenge to analyze and assess them, according to each case and evaluate the city in respect of each city challenge.</p>
<p>Problems</p>	<p>Delhi has become a mega metropolis with massive urbanization. The 73 years of development led to further loss of natural heritage and threatened the life-supporting potentials of two major landforms, the Ridge and the River.</p>	<p>Urbanization accelerated in the 1960s. High levels of pollution due to dumping of household and industrial waste. High levels of encroachment from illegal settlements, including slum dwellers, real estate companies, commercial establishments.</p>	<p>The discharge of factory wastewater into the river and open sewage system has damaged nature and threatened people's health. An open and natural area where citizens could gather and spend time together was needed.</p>	<p>The neighborhood of Augustenborg had already been established and had several social and physical issues that all-encompassing architectural solutions could not resolve.</p>	<p>Nepal is recorded as one of the top 10 fastest-urbanizing countries in the world. Urbanization caused environmental problems like air pollution, traffic jams, and the loss of open space. The city does not have sufficient green areas or recreational spaces.</p>	<p>Effects of climate change. Large population and expanding urban areas. Air and water pollution, floods, and rising temperature.</p>

Table 4.7. (cont'd)

<p>Solutions</p>	<p>Assisted regeneration, phytoremediation of soil, development of three-storeyed pristine vegetation, two wetlands that simulate natural water bodies have generated.</p>	<p>It has improved natural drainage, social cohesion, and quality of life, positively impacting both the city's physical form and its environmental performance. Drainage has enhanced waterfront public spaces, promoted public activities, and improved accessibility.</p>	<p>The park has recreational areas. It includes appropriate landscape planning to reduce the noise of the railway using the topography. A barrier was built to block the stream's flow, creating a small lake with a biological pond at the park's center. The pond serves as a natural filtration system.</p>	<p>As part of the project, open rainwater channels combined with green roofs and ponds have halted flooding in the area, creating an aesthetic environment and enhancing biodiversity.</p>	<p>To provide a network of breathing places, a community sanctuary, and more green space, pocket parks were designed in Lalitpur with the goal of being both environmentally friendly and innovative. Additionally, the effort aimed to improve the microclimate and provide access to green spaces.</p>	<p>Re-naturing urbanization: green route, arboreal interventions, and resting areas & carbon capture. Water interventions: SUDs, flood actions, and green pavements. Singular GI solutions: biochar, pollinators, vertical GI, horizontal GI, and urban farming. Non-technical interventions: educational activities, engagement, city coaching, and support activity.</p>
<p>Achievements</p>	<p>Improved public health, air pollution mitigation, water recharge, and stormwater retention, carbon sink, livelihood value, habitat for wildlife, treatment of wastewater, green jobs, and</p>	<p>The project's achievements include re-establishing heritage, reducing flood risk, revitalizing a grey urban backyard into a thriving new cityscape for the community, Enhancing city-wide accessibility and</p>	<p>The most striking aspect of the project is the presence of a stream and a biological pond where rainwater is used and children can play. The park attracted great attention. During the planning phase, a</p>	<p>It has emerged as a crucial component of the city's sustainable character. It has been showcased to businesses, government evaluations, development initiatives across the US, France, China, and several other</p>	<p>The Foundation adopted a multidisciplinary approach involving the community, to create outcomes that were inclusive and beneficial for everyone. It remained committed</p>	<p>Improve life quality in urban areas, raise awareness of the importance of environment preservation among citizens, generate new market opportunities for European companies at the international level, and foster the creation of transnational networks and synergies.</p>

	improved urban biodiversity are the fundamental achievements of the projects.	connectivity, re-establishing heritage through the re-introduction of water-based modes of transport, and Improving living conditions for the local community..	landscaping study was carried out. The government made donations for these ecological studies and nature education, and many ecologists contributed voluntarily.	nations. It offered tangible evidence that the preexisting urban structure might be restructured.	to the creation of artful and regenerative sustainable landscape designs that unite people, aesthetics, and ecology. Smooth, safe transition and increased accessibility are encouraged.	Highlight the importance of the local communities' active participation when addressing climate problems through co-creation activities also directly involving the citizens, who are at the core of their cities' green regeneration.
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The purpose of the examined projects in Table 4.7. is to collectively address the problems and needs caused by urbanization pressure with innovative and sustainable methods for Protection, Renewal, and Revitalization studies. Ecosystem Restoration, Issue-specific ecosystem-related approaches, and Infrastructure-related approaches are the main nature-based solutions approaches that are used. The studies are diversified at regional, urban, and local scales.

The projects are also informative in terms of showing the problems of the areas where they are implemented. The fact that cities in different parts of the world need nature-based solutions shows the importance and need for a nature-based life everywhere in the world. The fact that they are projects at different scales has required the use of different nature-based solution approaches. Thanks to the changeable and adaptable definition, emphasized during the NbS part, of nature-based solutions, the urban problem addressed can find a solution that is coherent, local, and unique.

When the participants of the studies are examined, it is seen that each example has a diversity of participants. It can be said that this is a successful direction in terms of multi-learning, which is one of the important concepts of planning theory. As a planning approach, it is seen that the studies are naturally multi- and

transdisciplinary, as they include participants and parties from many sectors. Participatory planning has also been an approach that stands out at various points in most projects.

The fact that the projects are the first in the environment in which they are implemented has been one of the difficulties for some projects. Acquisition of a place, resettlement, and management and maintenance studies are again among the difficult issues. In the EcoCity Augustenborg study, the fact that there were too many investors caused a situation that made the process difficult. On the other hand, finding funds is another difficulty encountered in some projects.

When examining the common challenges faced by the areas where these projects are implemented, several key issues emerge. Foremost among these are the rapid and intensive urbanization, which has led to the expansion of cities beyond their original boundaries. This growth is accompanied by a surge in population, putting immense pressure on existing infrastructure systems. As a result, many urban areas are struggling with inadequate or outdated infrastructure, including transportation networks, waste management systems, and utilities. Additionally, the increasing frequency and intensity of natural disasters, largely attributed to climate change, have exacerbated these problems. These events, such as floods, droughts, and extreme weather patterns, not only disrupt daily life but also place additional strain on urban infrastructure and systems that are already under significant stress. Therefore, addressing these interconnected challenges has become a critical focus for urban development and planning.

In the majority of the solutions, an environmental approach is central, focusing on addressing and mitigating the negative impacts that have arisen over time. The core issues addressed by these projects include the restoration and reclamation of damaged or degraded areas, as well as the protection of environmental factors that are at risk of further deterioration. Efforts to improve urban infrastructure are also a critical component, ensuring that cities are better equipped to handle increasing populations and the demands of modern life. Additionally, reducing the negative

effects of climate change is a fundamental priority, with strategies aimed at enhancing resilience to climate-related events such as extreme weather, flooding, and temperature fluctuations.

The successes of the projects vary significantly, reflecting the diverse challenges they aim to address. In addition to the environmental, social, and economic improvements they bring to the cities, one of the key factors contributing to the success of these projects is the implementation of local, context-specific solutions. By tailoring the interventions to the unique needs and characteristics of each city, these projects have been able to provide more effective and sustainable responses to urban issues. The ability to develop original solutions that resonate with the local community has fostered a sense of ownership and engagement, further enhancing the impact of the projects. Ultimately, the combination of environmental, social, and economic gains, alongside the integration of locally-driven solutions, has played a crucial role in the overall success and effectiveness of the initiatives.

The fact that the projects are a source of inspiration for the city itself and other parts of the country with the original solutions they produce is at the forefront of their importance for the city. Thanks to participatory planning and the diversity of stakeholders, the adoption of the projects by the city residents and their integration with the city have also been important gains for the city.

Table 4.8. Common Features of the Selected Projects with Izmir Urban GreenUp

Common features of the Projects	India - Delhi - Yamuna Biodiversity Park	Bangladesh - Dhaka- Hatirjheel Area, Begun Bari Canal	Holland - Tilburg - Spoorpark	Sweden - Malmö - EcoCity Augustenborg	Nepal - Lalitpur - Pocket parks
Türkiye - Izmir - Urban GreenUp	Sasalı Climate Sensitive Agriculture, Education and Research Institute: An education hall, laboratory, and library to inform citizens and children. 10 insect houses in the area that will allow bees and insects to rest during long flights.	Mavişehir River Restoration: Flood control measures were implemented in the stream, and a new green space was developed. Permeable two-kilometer bike and pedestrian routes were constructed.	Mavişehir River Restoration: The sides of Peynircioğlu Stream have been transformed into a recreational area where residents of Izmir can enjoy nature, walk, and exercise in fresh air.	Sasalı Climate Sensitive Agriculture, Education and Research Institute: Sasalı Natural Life Park and the Vilayetler Evi parking lots were converted into green roofs.	Pocket Parks: Pocket parks were created to reduce carbon emissions and the heat island effect on the street where there is heavy traffic, and to provide citizens with a rest by creating green areas on the parking lots.

Certain results have been reached as a result of the comparisons made. When the implementations in Izmir and other projects within the scope of the Urban GreenUp project are compared in Table 4.8. it has been seen that there are similarities in terms of concept and implementations.

India - Delhi - Yamuna Biodiversity Park example and Sasalı Climate Sensitive Agriculture, Education, and Research Institute both have an understanding that includes the public in the process. The existence of areas established for purposes such as education and exhibitions is one of the common points of the two projects.

Bangladesh - Dhaka- Hatirjheel Area, Begun Bari Canal example, and Mavişehir River Restoration projects have in common that they are restoration works carried out for an area under several urbanization-related threats. In addition to preserving the ecological characteristics of the region, the creation of various recreational areas for city residents is also among the common features of the two projects.

Holland - Tilburg - Spoorpark example is similar in terms of adding new recreational areas to the urban area created by the Mavişehir River Restoration project.

Sweden - Malmö - EcoCity Augustenborg example, green roof applications applied are similar to the work used on the roofs of Sasalı Natural Life Park and the Vilayetler Evi parking lots.

Nepal - Lalitpur - Pocket parks project has the same logic and purpose as the Pocket park implemented on Girne Street.

The fact that the works implemented in Izmir within the scope of the Urban GreenUp project have similarities in various aspects with the other five examples examined is one of the strong and therefore successful aspects of the project.

Overall, the studies conducted in Izmir are compatible with the approaches and standards of nature-based solutions. When the studies conducted in Izmir are compared with other examples, it is understood that they have similar practices and approaches. Since the project is carried out by the municipality, the municipality comes to the fore as the main actor. This is a valuable situation in terms of local government and local participation emphasized in the entire study. In the case of Urban GreenUp, it is important to develop implementations that involve different parties such as local people, and city residents in the process.

Research centers, restoration studies, creation of parks, and green roof implementations are the ones carried out within the scope of the project. With the different and various applications carried out, examples of a new concept (NbS) have been brought to the city with a new approach. To have a positive impact on climate change, to be compatible with the Green City concept, and to achieve the goals aimed

by the Urban GreenUp project, the continuation of the implementations is crucial. Spreading the studies to the whole city, and even region also is significant. For this, research on the post-period implementations of Urban GreenUp is required. In this way, a realistic, applicable model or roadmap can be created for the implementations to spread to the whole city of Izmir. The studies should not be done in a single and fragmentary way but in a spread and holistic way.

4.4 Findings and Discussion

At the beginning of the study, the changes in the historical process of planning theory are discussed. The main reason is to address the changes created in environmental, economic, and social relationships through the human-nature relationship via planning theory. The effects of the changes in the historical process on the natural environment and the problems caused by their consequences have become fundamental issues for most countries today. The reason for this is that global problems have now become issues that affect people's daily lives. Therefore, planning has also had to adapt to this situation. The fact that nature is not an infinite source for consumption has led to the search for life forms aimed at adapting to it. The Nature-based Solutions approach addressed in the study exemplifies this. The concept, which finds its place within planning theory, serves as evidence of the change in theoretical approach.

The shared values adopted by Nature-based Solutions were discussed in detail. It was understood that these values are in parallel with the approaches in planning theory. The dominant approach in this concept does not oppose nature but accepts its existence. Cities became increasingly complex as they expanded, which in turn led to more complex city-related issues and solutions. The absolute limits of planning depend on what can be securely understood as a function of time, scale, and complexity (Friedmann, 2008). Due to the complex nature of the problems, the involvement of multiple parties in the processes is important for providing realistic solutions to the issues. Rather than top-down solutions that approach all problems in

the same way, solutions based on local resources have gained prominence. Given the diverse nature of the problems, it has become a more realistic approach for solutions to address ecological, social, and economic values together. The need for approaches from different disciplines has highlighted the importance of multi- and transdisciplinary knowledge. In this way, the process of addressing the problems has transformed into a learning process for different segments, evolving into a beneficial process for the urban residents, who should be the primary focus of both the problem and the solution. The behavior of urban residents toward approaches and projects is important for the success of the implemented projects. The concept of Green Nudging, which has the potential to shape individual behavior, is also addressed in the study within this context. In this regard, although Urban GreenUp has common features and practices with different examples from around the world, it was understood that these have been adapted to the local dynamics of the city, creating locally dependent, place-specific characteristics.

The effects of climate change, both directly and indirectly, are being observed in different parts of the world. In some places, it manifests as drought, while in others, it appears as flood disasters. These issues are causing social, economic, and environmental difficulties in various countries. The idea of living with these problems, which are said to have reached an irreversible stage, is now widely accepted. The concepts of adaptation and mitigation have been addressed for this purpose. Sustainability and sustainable development serve as the foundational principles of the developed concepts and approaches. Before discussing the example of Izmir, planning studies in Türkiye have been examined. Like most cities, Izmir faces a variety of issues. To address these, the green city concept has been adopted, and various studies have been carried out in this direction. Given the topics addressed at various points of the study, drawing this kind of roadmap is both meaningful and appropriate.

The urban planning process is being revived, driven by two key theoretical and practical breakthroughs: the "urban project," which redefines planning's role, and

"governance," which focuses on the power dynamics in spatial development decisions (Pinson, 2004). The Nature-based Solutions approach and the Urban GreenUp project are phenomena developed by various management entities. Therefore, they highlight the importance of the concept of governance, which also appears in theoretical studies. The role of governance, which shapes decisions and guides their implementation, is as important as the other local dynamics. The size of the community affected by the project varies depending on its scale and scope. In every case, different parties are affected by the processes. Although project decisions are made by the government units, the involvement of various stakeholders and urban residents in the processes is crucial for the sustainability of the implementations. The green city concept and various nature-based approaches have maintained their continuity in Izmir, despite changing local governments. This demonstrates that these approaches have been adopted by local administrations. Efforts are also being made to ensure that the same continuity is embraced by urban residents. In conclusion, the continuation of projects and concepts by different local governments demonstrates the success and sustainability of the concept. However, further work is needed to increase and sustain the involvement of urban residents in these processes.

The fact that the municipality mostly carried out the project reduced the involvement of city residents in the process. More interactive studies could have taken the project to better places. This could have been effective in spreading the implementations, not being limited to the pilot regions. *"The project, initiated by the municipality, remained largely within the municipality's control during its implementation phase, resulting in limited active participation from city residents. However, efforts are underway to promote individual involvement through organizations such as Green Izmir volunteers, encouraging broader community engagement in the process"* (Velibeyoğlu, 2024). Additionally, a significant aspect of the projects for the city is that the efforts made also provide multiple benefits. Projects that create job opportunities for the local population could have brought not only ecological but also social and economic benefits to the work. These projects would have contributed to

mutual learning as well. The knowledge gained from urban development projects is valuable for municipality employees, other involved parties, and city residents. By actively engaging in these processes, residents can deepen their understanding of the work, contribute to project implementation, and provide essential support. Greater involvement allows them to become more invested, enhancing the overall success of the projects. In conclusion, while the project and its approaches aim for the betterment of the entire city, the implementation phase could be more participatory and integrated, ensuring that city dwellers have an active role in the process.

City residents' adoption and usage patterns of urban implementation projects are crucial. Specifically, there are opportunities to shape the movement patterns related to usage through the design method of projects that can also physically organize the city. Explaining the relationship between the built environment and the nature-based solutions being discussed is essential. Cities and urban areas face increased risks, including higher temperatures, flooding, and other related hazards (Gallardo et al., 2022). This can be associated with the example of pocket parks in Izmir. The parks created here not only provide waiting spaces for people but also allow them to experience the waiting process during public transportation use in a comfortable, cool environment, which positively impacts the overall sense of the use of public transportation. Nudging theory is grounded in extensive empirical research from behavioral sciences, especially experimental psychology and behavioral economics (Evans & Geene, 2017). While nudging has proven effective in promoting desired behaviors, it also holds potential for application in encouraging pro-environmental actions (Wee et al., 2021). Therefore, user experience should be considered a critical aspect of the design of projects. By organizing the movement patterns of city residents, the success and impact of projects can be enhanced.

In planning as a learning process, stakeholders are viewed as valuable sources of knowledge and should be involved in the planning. This includes citizens, interest organizations, and key stakeholders with the resources for implementation (De

Graaf, 2005, p.60). The involvement of various stakeholders in the project processes can significantly broaden the scope of the initiatives. By doing so, opportunities may arise to address other underlying issues in the region. Additionally, the inclusion of individuals from diverse fields of expertise enhances the quality and scope of solutions, leading to more comprehensive results. Engaging people with different perspectives and knowledge can not only solve the city's problems but also bring innovative approaches that offer added value for both the city and its residents. Furthermore, involving participants from various sectors can help generate resources for future projects. When examining some of the projects, there are notable examples of successful collaboration and task division among different parties during the implementation phase, as well as various strategies employed for securing project funding.

On the other hand, there is a general consistency of approach for the city of Izmir. This continuity is a very important point for the permanence of the work done. With the developed approach, the fragmentation of practices and work and falling behind have been prevented. *“Despite changes in municipal leadership, the project continued smoothly, as an effective relationship with the new governance was established. The project’s universal framework was adapted to meet local needs, ensuring its relevance. The project could continue because it aligned with the new administration’s goals”* (Velibeyoğlu, 2024). The green city concept adopted by Izmir has been integrated with the subsequent efforts, creating a cohesive and unified approach. The “Living Harmony with Nature” concept, along with nature-based solutions, not only complements each other but also aligns perfectly with the green city framework. These elements work together to form a common goal within the city’s development plans. This alignment ensures that the projects and efforts can maintain their presence and continue independently of specific individuals, making them more sustainable and impactful over time.

Understanding climate change in a local context can reveal opportunities to enhance local benefits from mitigation and adaptation efforts. Politically, this approach also makes addressing climate change more manageable (Corfee-Morlot et al., 2010). Recent theoretical approaches focus on regional survival by capitalizing on competitive strengths and creating unique identities that reflect local conditions in policy actions. In this context, institutional approaches highlight the importance of context-specificity and path dependency (Kayasü & Eldeniz, 2013). The long-term success and sustainability of the project's implementations are closely tied to establishing strong connections with the local context, and Urban GreenUp has succeeded in this regard. While nature-based solutions are an international concept, Urban GreenUp focuses on solving problems specific to Izmir. In doing so, the solutions became tailored to the local context, making them more relevant and impactful. Various issues and challenges in different parts of the city were addressed with distinct solutions, resulting in a deep understanding of local needs and a place-based approach to urban development.

New initiatives are emerging every day, with many projects and organizations in Europe accelerating this process. From this perspective, the Urban Green Up project, in terms of its implementation timeline, may seem outdated in some aspects. As seen in the Re-Value partnership example, projects have moved far beyond being solely human-centered. Izmir, as part of this partnership, is keeping up with the changes. Given the emphasis this partnership places on locality and participation, it is likely that the participation issues identified in Urban GreenUp can be addressed.

When we start looking at the city as a socio-spatial formation that needs to be intervened to provide humane living conditions, instead of seeing it as an object to be shaped by an external authority independent of its actors, we can approach the planning of the city as a democracy project. The problems experienced in the planning of large cities in Türkiye today, especially, can be solved by opening up to new paradigms, not by returning to old urban

planning paradigms. We need to develop this opening up in a mutual learning process by discussing this issue (Tekeli, 2007, p. 20).

Several points can be made regarding creating a model for the city within the framework of the Urban GreenUp project. First and foremost, example projects specific to the city have been developed to create a model. As part of a project developed by international organizations and implemented simultaneously in different countries, this has provided valuable experience for various future works to be carried out in the city. Beyond this, incorporating the nature-based solutions concept into urban studies, aimed at solving similar problems around the world, along with the opportunity to examine different studies, is highly valuable. Additionally, the fact that example projects are being implemented in Izmir and at smaller scales enhances this approach. This creates a movement pattern in which different strategies are tested to solve urban problems. This is, in itself, an achievement for both the urban residents and management entities. Furthermore, some of the implementations made within the framework of the Green City concept, Nature-based Solutions, and Urban GreenUp projects have received awards from the competitions they participated in and have established networks for various other projects. These contributions also represent a significant gain for the city of Izmir.

According to Velibeyoğlu (2024), the initiative's overall impact on the city of Izmir and its potential to serve as a model for other application projects can be analyzed through several key points. The efforts can be examined in three distinct phases. First, an environmental approach was emphasized, with cleanup activities serving as a prominent example. This phase can be understood as a process of externalization. Second, the concept of nature was addressed, encompassing the recognition of nature's existence, its internalization, and efforts to promote its widespread acceptance. Finally, the project paves the way for future initiatives by expanding its scope to include health issues. This extends beyond human health to also encompass the well-being of animals and other living organisms. Viewed in this manner, a

consolidated approach emerges, allowing the project to evolve into a model for future endeavors.

For research on urban challenges, a deeper comprehension of territorial dynamics and experimental city initiatives and activities is necessary. Therefore, concepts derived from urban planning practice and academic data generation that can be successfully and purposefully positioned within this subject are equally responsible for the existence of urban planning (Pinson, 2004). In summary, the development of a concept with a strong conceptual and theoretical foundation is crucial for its integration into urban practice. As it finds opportunities to be applied across diverse scales and geographies, the feedback received from real-world implementations will contribute to its continuous refinement and evolution. A critical aspect of this process is the sustained engagement of various stakeholders in ongoing efforts. Leadership in these initiatives can be provided by academic circles, as exemplified by projects like Urban GreenUp, or through the guidance of other urban management entities. The essential point is that these diverse parties must collaborate throughout the process, working collectively towards solutions for urban challenges.

CHAPTER 5

CONCLUSION

In this final chapter of the thesis, an overall overarching summary of the research is provided first. Then, the reflections of the key findings are evaluated, and the connections are described. The limitations of the study are stated. Finally, further research areas are emphasized, and suggestions for further research are given.

5.1 The Summary of the Research

The study commenced by exploring the evolution of the meaning and theoretical frameworks of planning theory. How the concept of planning has transformed over time was investigated. Changes in both its basic principles and its practical applications were analyzed. Social, economic, and environmental changes experienced throughout the historical process have also affected the planning approach. The approach to planning is defined by the concepts of human scale, humanist philosophy, participatory planning, whole-society process, urban identity, cultural uniqueness, city of collective memory, urban diversity, integration, a mixing of land uses, compactness, interdisciplinary, and even transdisciplinary.

Due to the pressure created by Global Warming and the resulting Climate Change effects on cities, many studies are being conducted on the subject, especially in Europe. The planning studies in Türkiye are also affected by these changes. With the development of the concept of Sustainable Development, the value of ecological concepts in planning has increased. For cities to ensure their long-term sustainability and continued prosperity, it is crucial to adopt comprehensive approaches that go beyond focusing solely on economic growth. These approaches must also take into account the social well-being of their inhabitants, fostering inclusive and equitable communities, as well as the preservation and restoration of the natural environment.

A balanced consideration of these interconnected elements is necessary for cities to thrive in a way that is both resilient and harmonious with the broader ecological and societal context.

The disasters that cities and people experienced reveal the inadequacy of taking precautions in some issues, in this case, it has been understood that in addition to taking precautions, adapting to existing problems is also important. For the projects and their implementations to be successful and create realistic, permanent solutions, the role of local actors and city residents has become more important than ever. In this context, Sustainable Development, the European Green Deal, and Nudging Theories are included in the study.

The development of the nature-based solutions approach has been included. To be able to follow the implementation processes of nature-based solutions and to create a model, standards, and principles related to the concept have been investigated. It has been seen that concepts such as adaptive management approach, effectiveness and efficiency, multiple stakeholders, locally specific solutions, multiple benefits (ecological, social, economic), multi- and transdisciplinary knowledge, mutual learning, and innovative approaches have come to the fore. It is seen that these overlap with the concepts defining planning theory.

Before coming to the implementation studies of nature-based solutions, some cities that have adopted the Green City vision, which paves the way for the implementation of this concept, have been examined. Izmir, which has this vision from Türkiye, has been taken as an example. The Green City concept has been adopted in Izmir and many studies have been carried out in this direction. By briefly mentioning a few different cities, the basic approaches and characteristics of the Green city concept have been revealed.

Examples of projects based on nature-based solutions in different countries have been researched. These examples have been examined under the titles of population, area, aim, NbS approach, scale, scope, stakeholders, planning approach, importance

for the city, challenges, problems, solutions, and achievements. By examining different examples, the concept of nature-based solutions has been addressed through different examples under certain headings. The Urban GreenUp project, an example of nature-based solutions completed in Izmir, has been examined. Then, the general characteristics of the Urban GreenUp project and the works carried out such as the Mavişehir - Peynircioğlu stream restoration project, Sasalı Climate Sensitive Agriculture, Education and Research Institute, and Pocket parks were discussed. Thus, the Urban GreenUp project has been analyzed from multiple perspectives, allowing for a comparative analysis with other examples presented in the study. The common points of the Urban GreenUp (İzmir) and Yamuna Biodiversity Park (Delhi), Hatirijheel Area – Bejun Bari Canal (Dhaka), Spoorpark (Tilburg), EcoCity Augustenborg (Malmö), and Pocket Parks (Lalitpur) are revealed.

The study was conducted on how the conceptual changes in planning theory are reflected in the field of urban practice. This was achieved through the concept of nature-based solutions, with insights gained from the Urban GreenUp project. Subsequently, the study was comprehensively summarized, and an evaluation section was formulated. The importance of such studies for the city was discussed, emphasizing the contributions these initiatives make to the urban environment. Special attention was given to how these studies influence the development and implementation of strategies within the city. Additionally, the study examined the role of these efforts in fostering the creation of methodologies that can be applied to other regions, as well as their potential to address diverse urban challenges, thus providing valuable insights for future urban development projects.

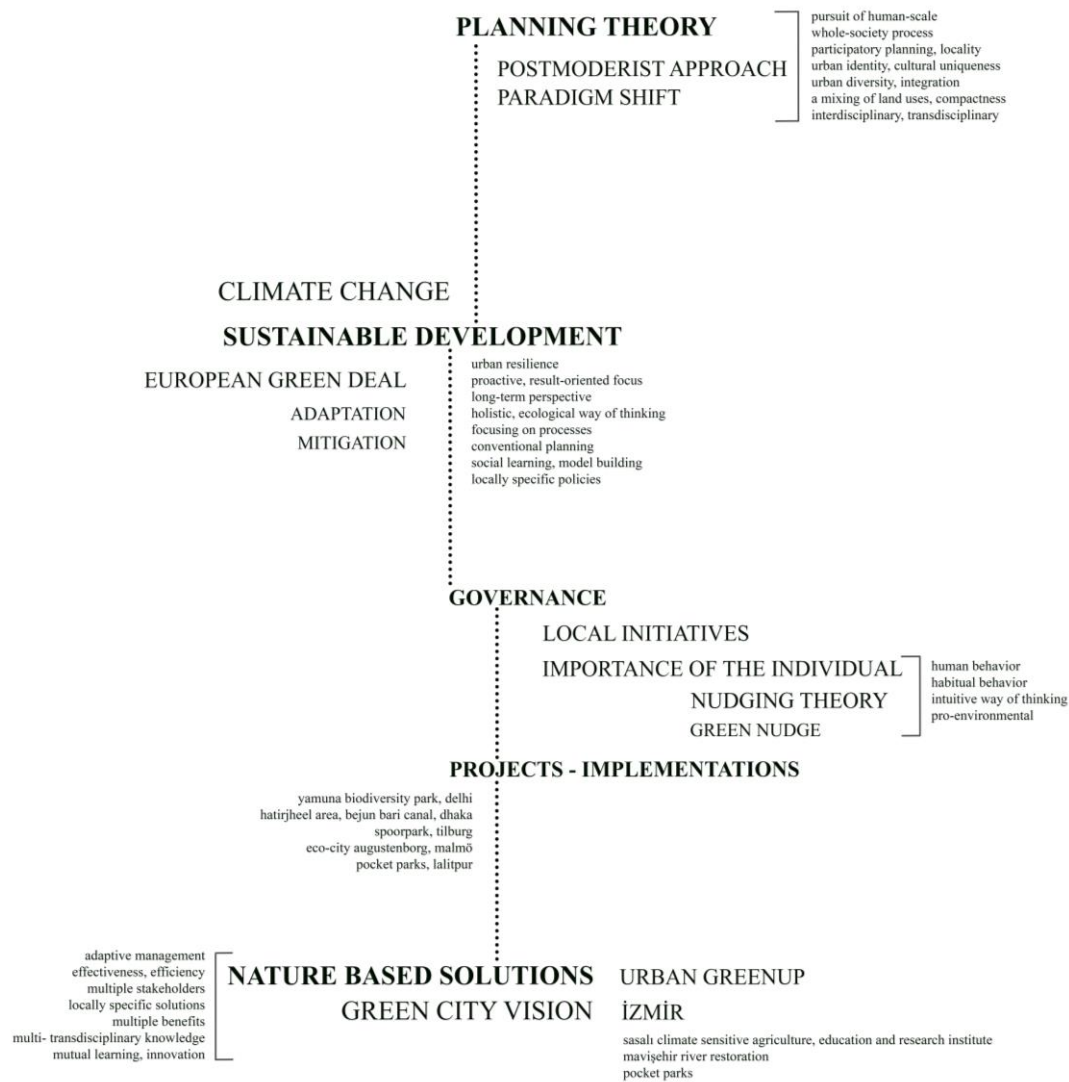


Figure 5.1. Summary of Study Through Core Keywords

5.2 Limitations of the Study

The effort to systematically address changes in planning theory can turn into a mess in itself. Because different urban development processes are experienced in different parts of the world, it is impossible to talk about a general and single-directional process. In this case, it is quite controversial to examine the relationship between changes in theory and changes in practice.

There are difficulties in studies conducted with the comparative method. It may not be possible to have information of equal value and direction regarding each example that is compared. It is crucial to compare studies in our country with examples from other countries. However, not having detailed information and experience about the development processes of these studies conducted in different parts of the world and evaluating them only through written sources that address them are also difficulties of the study. Another challenge was the lack of detailed and sufficient written studies regarding the post-implementation process of projects conducted specifically in Izmir and their effects on the city.

5.3 Further Studies

Understanding the theoretical basis of the implementations carried out in cities is effective in the success of the projects. In this direction, it is important to increase the studies that analyze theories and practices together in Türkiye. Evaluating the knowledge obtained and introducing local urban change patterns to the literature is crucial in terms of creating successful, guiding sample models for all cities.

In the case of Izmir-GreenUp, it is very significant to examine the implemented examples of the project, to consider their results objectively, and to present their effects on the whole city in a more systematic way. Observing the effects of the projects on the city after they are completed has the potential to guide the city in terms of what they have brought and what they can bring.

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