Systematic Approaches to Climate Change in Architectural Sciences



Editors
Asena SOYLUK
Atila GÜL

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PREFACE

Climate change refers to long-term changes resulting from the disruption of the natural balance in climate systems worldwide. The primary cause of these changes is the increase in greenhouse gases in the atmosphere due to human activities, which trap heat emitted from the Earth's surface, leading to a rise in global temperatures. Today, climate change has become one of the major global and environmental problems affecting not only specific regions but the entire world.

The effects of climate change have negative consequences on cities at the macro level, while at the micro level, they cause significant problems in the built environment and daily life. In this respect, climate change has become a disaster affecting all societies on a global scale. If necessary measures are not taken in the coming years, it is predicted that the ecological, sociological, cultural, and economic damage that may arise due to climate change could lead to serious disasters.

Therefore, there is a growing need for comprehensive and sustainable measures and actions that combine scientific knowledge with practice, local experience with academic expertise in spatial planning, design, and management processes within the scope of reducing the effects of climate change and the adaptation process.

This book has been prepared to contribute to the fight against climate change and the adaptation process by strengthening this common ground. The scientific book titled Systematic Approaches to Climate Change in Architectural Sciences contains 16 book chapters.

In this context, the book chapters prepared in collaboration with graduate students aim to serve as a scientific, original, comprehensive, and informative resource.

We would like to express our sincere gratitude to all the valuable chapter authors and reviewers who contributed to the preparation of this book. Their work not only contributes to the academic literature but also serves as an important

guide for the formation of new perspectives in the fight against climate change. We would like to thank Livre de Lyon Publication and the entire team for their support in publishing this book.

We hope this book will be useful to all stakeholders. Best regards.

April 24, 2026
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CHAPTER XVI

THE ROLE OF LANDSCAPE ARCHITECTURE (LA) IN MITIGATING CLIMATE CHANGE IMPACTS AND ADAPTATION PROCESSES

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1. Introduction

Since the beginning of the world, climate conditions have changed many times and will continue to change. However, in recent times, particularly over the last 50 years, the multifaceted increase in human activities and their impact on natural resources at both global and local scales has led to a significant increase in greenhouse gas and carbon emissions in the atmosphere. As a result, this has caused an increase in average global temperatures and an increase in the frequency and intensity of extreme weather events (drought, floods, storms). In this context, the negative consequences of climate change, such as damage to natural (ecological) systems, disruption of the natural balance, increased greenhouse gas emissions, increased environmental pollution, decreased biological diversity, drying up of wetlands, and decreased agricultural productivity, are increasing (Kazancı & Tezer, 2021; Gül et al., 2021; WMO, 2022; Akpınar Külekci, et al., 2022; Gül 2024b; Gül 2025).

Climate change is recognized as one of the most significant global challenges facing humanity today, encompassing environmental, ecological, social, cultural, economic, and technological dimensions (Intergovernmental Panel on Climate Change [IPCC], 2021). Climate change has become more than just a threat for the future; it is now a global problem requiring urgent action (UNEP, 2022). This situation is also a process that will negatively affect biodiversity, social welfare, cultural values, and economic sustainability (Gül 2025; Akten et al., 2025).

In the 21st century, where technological and digital processes are rapidly changing, despite the rapid growth of scientific knowledge, the diversification of production and consumption activities and the increase in demand for economic growth (profit-oriented) bring challenges and negative consequences every. The pursuit of “maximum profit” in current economic production and consumption relationships, land use practices incompatible with natural systems, and misguided investments form the basis of all local, national, and global problems. Consequently, countries and societies find themselves at the center of the conflict between “Sustainability”, “Ecology”, and “Economy” (Gül et al., 2024).

The fundamental cause of climate change and its adverse effects worldwide is humanity’s multifaceted production and consumption activities that are incompatible with nature, current profit-driven investment policies, the destruction of natural resources and ecosystems, excessive consumption of fossil fuels, improper and inappropriate land use, increasing urbanization and

construction, and the absence of responsibility and ethical approaches (Gül & Gül, 2024).

In this context, when the causes and consequences of climate change are assessed, it is evident that they are directly related to planning, design, use, and management of land (Akten et al., 2025). In particular, changes in land use in key sectors such as urbanization/settlement, energy, industry, mining, agriculture, forestry, and tourism are the most important processes determining ecosystem services and atmospheric carbon intensity (Lal, 2019; Turner et al., 2020; Akten et al., 2025).

In contrast, sustainable land planning and management, greenspace system applications, and the protection of natural sink areas are fundamental components of strategies for mitigating the effects of climate change and promoting adaptation (IPBES, 2021; IPCC, 2022; Akten et al., 2025).

This situation highlights the need for land use planning and management and climate policies to be assessed holistically rather than independently (UN-Habitat, 2020; OECD, 2020).

Climate change, increased carbon emissions, and environmental degradation are particularly evident in cities. Urban areas are responsible for 80% of global production and 70% of total greenhouse gas emissions. Cities are living spaces that can be intensely exposed to the effects of climate change, such as heat waves, the urban heat island effect, flooding, water scarcity, rising sea levels, food crises, and environmental pollution (The Global Commission on the Economy and Climate, 2014; Yeşil Düşünce Derneği, 2017).

Cities in Türkiye have a fragile structure in terms of climate change because of rapid growth and expansion. Urban areas are a high priority for combating and adapting to climate change and are at the center of adaptation policies (Akten & Gül, 2024). Cities are considered both the primary source of the problem and the target of climate disasters, and are also, the most important actor in the solution (Balaban, 2017; Akten et al., 2025).

Globally, the urgent actions required to combat and adapt to climate change involve significant economic costs. Among these urgent actions, increasing carbon sink areas in urban areas and ensuring their sustainable management are particularly important. The high density of the built environment in cities makes them vulnerable to the effects of climate change. It is possible to reduce the negative effects of sudden and unexpected weather events caused by global climate change and make cities resilient to these effects by protecting and/or increasing the benefits provided by ecosystems

(Reddy Appannagari, 2017; Coşkun Hepcan, 2019; Gül et al., 2021; Gül, 2024b; Gül, 2025).

The ecosystem services provided by integrated green space systems—comprising interconnected natural, semi-natural, and cultural green spaces that preserve ecosystem values and functions (high ecological quality) play a significant role in mitigating the effects of climate change (Coşkun Hepcan, 2019; Gül, 2024b; Akten et al., 2025). In this context, natural areas (e.g. forests, protected areas, pastures, woodlands, wetlands) and cultural green areas (e.g. parks, gardens, recreation areas, children's and sports playgrounds, green roofs, wetlands, road medians and verges) are considered a critical element in the urban planning, design, and sustainable management process (Demuzere, et al., 2014; Gül et al., 2020; Türker & Gül, 2022).

Ecological and green economic solutions that are in harmony with nature, sustainable, and low-carbon form the basis for creating a strong, resilient, healthy, and livable environment. In this context, interdisciplinary collaboration has made it imperative to develop solutions that are in harmony with nature.

The Landscape Architecture (LA) discipline is positioned as an actor that can provide significant services and contributions through sustainable nature (ecological) based solutions in the planning, design, management, rehabilitation, improvement, and development of natural and cultural spaces to mitigate and adapt to climate change impacts. This book chapter examines the duties, responsibilities, services, and contributions of the Landscape Architecture (LA) discipline in relation to this topic.

2. Factors and Effects Leading to Climate Change and Global Warming

Climate change involves long-term changes in temperature and weather conditions. These climate changes originate from both natural processes (such as changes in solar activity, the melting of frozen soils (permafrost) and large glaciers, major volcanic eruptions, and radiation) and multidimensional human activities (anthropogenic factors) (especially the burning of fossil fuels such as coal, oil, and natural gas, improper land use, and mining activities, etc.). The primary greenhouse gases causing climate change include carbon dioxide and methane. Changes in the concentration of greenhouse gases and aerosols in the atmosphere are cited as the primary causes of climate change (IPCC, 2007).

Climate scientists have stated that humans are responsible for almost all global warming. When the causes and consequences of the negative effects of climate change are evaluated, land use and land cover changes in key/sub-

sectors, primarily energy, industry, transportation, mining, construction, and urbanization, as well as the excessive use of fossil fuels, directly affect the structure of natural ecosystems and the carbon cycle (Lal, 2019; FAO, 2020; Turner et al., 2020; Akten et al., 2025).

The average temperature of the Earth's surface is approximately 1.42°C higher than it was in the late 1800s, before the industrial revolution, and warmer than any period in the last 100,000 years. The last decade (2015-2024) has been determined to be the hottest decade on record (United Nations, 2025).

Many people believe that climate change mainly refers to higher temperatures. However, rising temperatures are only the beginning of this story. Because the Earth is a holistic and interconnected closed system, changes in one region directly or indirectly affect all other regions through cause and effect (Ergüven, 2025).

Climate change is recognized as one of the most significant global challenges facing humanity today, with its environmental, social, cultural, and economic dimensions (IPCC, 2021).

Predictions, forecasts, criticisms, and proposed solutions regarding climate change and global warming may still seem confusing and complex; however, this issue remains a subject of ongoing debate. One of the most confusing aspects of climate change predictions is that they show significant differences at both the global and local scales. To mitigate the negative effects of global climate change and support the adaptation process, countries and governments, along with official institutions, non-governmental organizations (NGOs), professional disciplines, and the public are closely involved. In this context, various strategies, policies, and carbon pricing mechanisms are being implemented at the international and national levels. This new economic order is accepted as an ethical tool for the protection and sustainability of human health, natural ecosystems, and the cultural environment (Gül, 2024; Gül et al., 2023).

The consequences of climate change include severe droughts, water scarcity, forest fires, rising sea levels, floods, melting polar ice caps, destructive storms, and a decline in biodiversity. It is also noted that climate change will negatively affect human health, food production and security, housing conditions, safety, and working conditions (United Nations, 2025).

In contrast, climate change will have a decisive impact on agricultural productivity, water resource management, biodiversity, and the sustainability of settlement areas (IPCC, 2022).

The consequences and effects of climate change can be summarized as follows: (Suhrke, 1993; UNFCCC, 2007; Crichton & Fergus 2009; Tolunay, 2011; Manisalidis et al., 2020; OECD, 2020; Çetinkaya Çiftçioğlu & Alvan Bozdereli, 2020; United Nations, 2025; Göktuğ, 2025);

- Increases in temperature, humidity, and radiation levels in climate conditions,
- Increased emissions of carbon dioxide, methane, and nitrous oxide into the atmosphere
- Changes in precipitation patterns and deterioration in air quality
- Increased emissions of carbon dioxide and other gases into the atmosphere and oceans
- Changes in the depth and chemical composition of the oceans
- Changes in the shape and size of continents
- Increased solar flares and the effects of sunspots
- Melting of glaciers,
- Warming of the oceans,
- Rising sea levels
- Increase in the number of severe floods,
- Loss of fertile land
- Decline in food production and food security issues
- Increased risk of drought and desertification
- Increase in forest fires
- Changes in seasonal agricultural production patterns due to drought
- Changes in the hydrological cycle
- Increased water consumption and decrease in quality drinking water sources
- Increase in salt levels in groundwater sources
- Decrease or extinction of biological diversity, habitats, and certain species
- Increase in plant diseases
- Erosion of coastal ecosystems
- Change in landscape character
- Increase in the ‘heat island effect’ in cities
- Increase in epidemics and deterioration of public health
- Increase in destructive storms
- Relocation or migration of local communities, etc.

Emissions that cause climate change originate from all over the world and affect everyone. However, certain countries (China, the United States, India, the European Union, the Russian Federation, and Indonesia) and multinational corporations produce more than half of global greenhouse gas emissions and are at the root of the problem.

3. Combating Climate Change and International Agreements

The primary objective of the United Nations Framework Convention on Climate Change (UNFCCC) is to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. This stabilization is intended to be achieved within a timeframe that allows ecosystems to adapt naturally to climate change, food production to remain secure, and economic development to continue in a sustainable manner (IPCC 2023; iklim.gov.tr., 2024).

With the belief that climate change is primarily human-induced and that global adverse effects will occur if no action is taken, governments have signed international agreements to reduce greenhouse gas emissions, conduct research, collaborate on technology, and promote the protection of carbon sink areas. The most important of these are (Gül, 2024).

- 1992 - United Nations Framework Convention on Climate Change (UNFCCC)
- 1995 - COP 1, Berlin Summit, Germany
- 1996 - COP 2, Geneva, Switzerland
- 1997 - COP 3, Kyoto, Japan
- 1998 - COP 4, Buenos Aires
- 2013 – COP 19, Warsaw, Poland
- 2015 - COP 21, Paris, France
- 2021 - COP 26, Glasgow, Scotland
- 2022 – COP 27, Sharm El-Sheikh, Egypt
- 2023 - COP 28, Dubai, United Arab Emirates
- 2024 - COP 29, Baku, Azerbaijan
- 2025 - COP30, Belém, Brazil (November 10-21)

In accordance with the decisions made in these agreements, to ensure global zero-carbon security and keep the temperature at 1.5°C, it is projected

that emissions will be reduced by 43% by 2030 and 60% by 2035, reaching net zero by mid-century (IPCC, 2023).

According to the UK Climate Impacts Program (UKCIP), based on different future emission trends, the coming century will see hotter and drier summers, warmer and wetter winters, an increase in the frequency of some extreme weather events, changes in snow cover, rising sea levels, an increase in severe storm events, and longer wet and dry seasons; in addition, effects such as forest fires are predicted. In general, solutions to combat the negative effects of climate change are discussed under two broad headings: ***"mitigation"*** and ***"adaptation***." Countries, governments, institutions, organizations, and NGOs have begun to take on increasing responsibility for measures aimed at enhancing climate "resilience," particularly in urban areas (US Global Change Research Project, 2014; Public Health Institute, 2016).

The process of adapting to global climate change is one that occurs in response to the actual or expected effects of climate change on natural or cultural systems, thereby reducing its negative impacts and taking advantage of opportunities. Therefore, it is necessary to develop and implement strategic action plans to adapt to global, as well as regional and local, climate change.

Three broad categories of action are targeted in global frameworks and agreements that guide progress, such as the Sustainable Development Goals, the UN Framework Convention on Climate Change, and the Paris Agreement. These are **"reducing emissions**," **"adapting to climate impacts,**" and **"financing the necessary measures.**"

In contrast, sustainable and ecologically based land use and management, green infrastructure systems and their sustainability, the protection of natural and cultural sinks, nature-friendly agricultural activities, etc., are among the key components of climate change mitigation and adaptation strategies (IPBES, 2021; IPCC, 2022; Akten et al., 2025).

To achieve the goals of the Paris Agreement, reduce the city's vulnerability to climate change, address challenges, and prevent threats, strengthen the resilience of the local community, and provide more comfortable and safer living conditions in the city. In particular, nature-based solutions have begun to be seen as a tool (EC, 2021).

Nature-based solutions are a valuable tool used to develop solutions that enhance the resilience of ecosystems, protect biodiversity, and, in parallel, promote adaptation to climate change and reduce disaster risk, while being

effective and cost-efficient compared to gray solutions (Raymond et al., 2017; IUCN, 2020; Feyen et al., 2020; Gül et al., 2021; Coşkun Hepcan, 2022; Gül & Gül, 2022).

4. The 21st Century Vision of the Landscape Architecture (LA) Discipline

The term **landscape** is used in many different contexts and can therefore be understood in various directions. According to the definition of the Council of Europe Landscape Convention. "*Landscape means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors"* (ELC 2000, Article 1). *These spaces consist of natural, rural, urban and peri-urban areas. They include land, inland water, and marine areas. They concern landscapes that might be considered outstanding as well as everyday or degraded landscap*es (ELC 2000, Article 2). Public spaces, recreation/tourism spaces, all green areas, roads, streets, brownfield areas, forests, rivers, seashores and agricultural lands are all considered as parts of the landscape.

Landscape is a system in which natural and cultural spaces, -social, economic and cultural values of society and human land uses are constantly present and systemically interacting.

The concept of **"space"** can be defined as a physical environment that, to a certain extent, separates humans from their surroundings and is conducive to performing actions within it, with perceptible boundaries and limits. The concept of space is a phenomenon that exists with the common characteristics of the elements that define it and the definition of space. The concept of space can be explained as building space, landscape space (natural and cultural landscape space), and mixed (combined) space.

Landscape spaces refer to complex and dynamic systems formed as a result of the relationship and interaction between natural and cultural (human-made) physical spaces. Therefore, they can be classified as natural, semi-natural, and cultural landscapes.

"Spatial organization" involves relating, analyzing, interpreting, designing, and organizing all tangible and intangible components of the built environment within the scope of objectives/goals, means, and time, and seeking answers to the questions Who? What? Why? How? Where? When? How much? To whom? questions, encompassing discourse and action-oriented, multi-factor planning, design, repair, and management processes.

Currently, the increase and diversification of demand and needs in terms of the quality and quantity of spatial living areas, coupled with the rise in spatial (environmental) problems, has made it a priority to create multifaceted, nature-based solutions and high-quality spatial organizations.

While the ***discipline of landscape architecture*** was once defined as the design of gardens and parks, positive and rapid developments have occurred in their content and scope in line with social, economic, and environmental changes.

Today, ***"Landscape Architecture"*** **(LA)** encompasses the application of cultural and scientific knowledge (aimed at enhancing the functionality and quality of life of the physical environment to be created) on Earth, based on the protection and management of humans and their physical environment, natural and cultural resources. It is defined as the process of planning, designing, protecting, rehabilitating, and managing diverse natural and cultural landscape spaces that combine art, science, engineering, and technology in a harmonious manner (Gül, 2015).

The discipline of landscape architecture has become an important discipline that produces optimal and sustainable solutions within ecological, economic, social, historical, cultural, technological, and political contexts in spatial planning, design, rehabilitation, conservation, and management processes, appealing to a wide range of audiences.

Article 5(1) of the *TMMOB Landscape Architects Chamber's Regulation on the Application of Independent Landscape Architecture Consulting Services, Professional Supervision, Office Registration, and Minimum Fees* (March 21, 2006) defines Landscape Architecture Services as follows (TMMOB PMO, 2006).

Landscape Planning Services: Strategic landscape planning, Landscape planning for conservation purposes, Restoration – landscape planning for improvement and/or development purposes, Landscape planning for solid waste landfill sites, Landscape planning for transportation routes, Landscape planning for coastal and wetland areas, Landscape planning for tourism and/or recreation areas, Urban and rural landscape planning, Landscape management, Greenspace system planning and management

Landscape Design, Environmental Planning, and Project Services; Landscape design, environmental planning, and landscape project services for all open and/or green spaces during the construction process; landscape survey, restoration, and renovation services; open and green space furnishing project services; and indoor plant design services.

Landscape Architecture Implementation and Management Services; Professional supervision and technical implementation responsibility for open and/or green spaces, project management, site management, acceptance and handover of works etc.

Landscape Architecture Technical Consulting Services; Expert witness, arbitration, expert opinion, jury membership, reporting in landscape architecture services; Landscape project management, feasibility studies, program preparation, special research, work and process monitoring, measurement and discovery, tender file preparation, payment, final accounts, specification and contract preparation, etc.

Ornamental Plant Production: The production, cultivation, and marketing of plant material used in landscape design, environmental planning, project development, and landscape implementation.

Maintenance, Nature Conservation, and Landscape Repair (e.g., restoration, rehabilitation and reclamation) **Works in Landscape Implementation*;*** Services related to landscape implementation following landscape design, environmental planning, and project development, etc.

Other Scientific, Technical, and Artistic Works; Landscape design, environmental planning, and projects involving the selection of structural landscape fixtures, furniture, and materials; models, images, and animations; works of art, irrigation and drainage systems, etc.

In today's world, **landscape architecture (LA)** is recognized as the most important fundamental discipline in spatial planning/design, repair, and management. LA has the potential to collaborate and cooperate with fundamental disciplines related to space and the built environment (e.g., architecture, urban and regional planning, interior architecture, civil engineering) and other disciplines (e.g., forestry engineering, agricultural engineering, economics, business, tourism).

The discipline of **LA** has the role and mission of a 'planner and designer' across all scales, from the highest to the lowest, within the context of the spatial planning and design scales it works with. It is responsible for determining land use decisions at the upper scale, guiding implementation at the middle scale, and ensuring the interaction of structural and spatial design at the lower scale, as well as for implementation and sustainable management processes.

The landscape planning process is approached as a holistic planning approach and, within this scope, includes comprehensive assessments of all components that make up the ecosystem. Therefore, in holistic landscape

planning processes, all natural and cultural components of the landscape, including plants, water, soil, geomorphology, climate, and wildlife. It aims for an action-oriented approach that examines all natural and cultural components of the landscape in the planning process, is flexible, involves stakeholders in the process, prioritizes participation, communication, or negotiation at every stage, and achieves sustainable and ecologically based goals and decision-making processes.

The most important feature that distinguishes landscape architecture from other disciplines is organizing space in conjunction with living and non-living materials to identify the most suitable options and decisions for scientific, aesthetic, ecological, economic, social, and technical purposes, and to plan, design, rehabilitate, protect, and manage land in the context of organizing space with living and non-living materials. Organizing natural and cultural green space systems, which are considered carbon sink areas, and making effective use of plants, water, and soil are the most important ecological characteristics of this discipline.

The majority of the world's population lives in cities, and this proportion is steadily increasing. Cities are the places where the effects of climate change are felt most intensely and where carbon emissions are highest. In particular, human activities such as buildings, the intensive use of hard surfaces and construction materials, exhaust gases from transportation vehicles, heating, industrial activities, and air pollution increase the heat island effect in cities. This situation leads to the formation of heat waves and water shortages, changes in rainfall patterns, an increase in the number of dry days, and rainwater causing floods or flash floods (Çoşkun Hepcan, 2019).

LA has launched a 'resilient landscape' approach as part of joint efforts by international landscape architecture organizations (IFLA and ASLA) to reduce the carbon footprints. The resilient landscape approach is defined as the capacity of landscape systems to cope with and adapt to changes caused by global warming (Conrad, 2018; Sunderland, 2014; Minang et al., 2015; Scherr, 2013).

5. Services and Contributions of Landscape Architecture (LA) to the Climate Change Mitigation and Adaptation Process

Today, the global and local climate crisis cannot be solved by single discipline or strategic action alone. Today, states, governments, official institutions, the private sector, professional disciplines, citizens, etc. are taking on tasks and responsibilities and carrying out work to combat the climate

crisis. It is an urgent necessity for all stakeholders involved in the planning/design and management of the built environment and natural ecosystems to reduce the effects of climate change and ensure adaptation. The fundamental goal in combating global climate change is the 'zero carbon' or 'carbon neutral' approach. In this context, **LA,** which is fundamentally based on ecology, plays a crucial role in reducing the effects of climate change and adapting to it, offering multifaceted, effective, and action-oriented services and contributions.

Within this scope, the fundamental objective of the ***Climate Law*** in Türkiye (Dated 02/07/2025 and Numbered 7552) is to combat climate change in line with the green growth vision and net zero emissions target. In this context, **LA** should be positioned not only as supportive actors but also as guiding, supervising, and decision-making actors in the processes of designing, implementing, and monitoring the Climate Law (Ekren & Kordon, 2025).

In this context, the contributions and responsibilities of the discipline of LA to climate change and the adaptation process can be summarized as follows: (Figure 1).

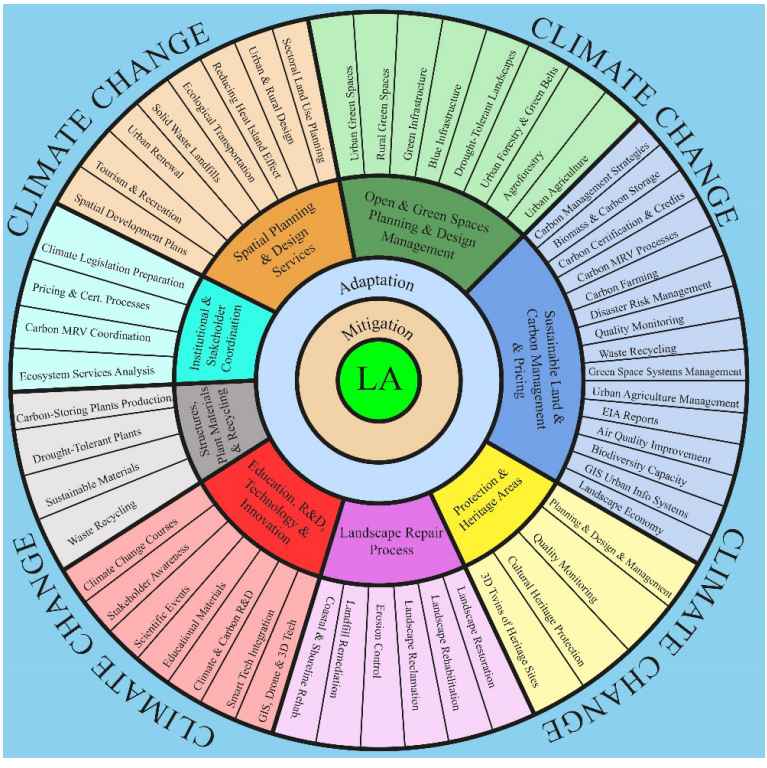


Figure 1. The contributions and responsibilities of the discipline of landscape architecture (LA) to climate change mitigation and the adaptation process (Created by the authors)

5.1. Services and Contributions to the Spatial Planning & Design Process

One of the most important factors in the emergence of the negative effects or problems of climate change is the result of land use and management that is inappropriate or misguided. Land is a specific part of the earth's surface where all human production and consumption activities take place, and which influences the current and future use of all sectors and subsectors related to land. Today, the demand for land use by primary/sub-sectors has increased and diversified. In this sense, it has become important to prioritize uses that are compatible with nature and appropriate for the purpose, according to the characteristics, capacity, and capabilities of the land.

The discipline of **LA** is mentioned in all planning levels in our country, particularly in the "Spatial Plans Preparation Regulation" (Date: June 14, 2014, and numbered: 29030), which refers to the processes of *"Regional Plan, Spatial Strategy Plan, Environmental Planning, Urban Development Plan, Implementation Development Plan, Conservation-Oriented Development Plan, Integrated Coastal Zone Plan, Urban Design,* and *Urban Renewal*" processes, by taking scientific, technical, and ecological parameters into account and being effective in the inventory, analysis, and decision-making processes.

Greenhouse gas emissions and removals at both global and local scales occur in managed landscapes where human activities are concentrated, encompassing all human-induced impacts. The landscape planning approach will contribute to the sustainable conservation and management of natural and cultural ecosystems and spaces by collaborating across disciplines using a holistic approach that integrates ecological, scientific, technical, social, economic, and artistic methods, taking into account sectoral land uses (e.g., settlements, industry, energy, mining, transportation) (FAO, 2013).

Ensuring that land, or in other words soil, is used in a manner appropriate to its purpose and structure is of great importance, as it will reduce carbon emissions and minimize the effects of climate change. In particular, using gently sloping Class I, II, and III land solely for agricultural purposes and protecting it will be an important solution in terms of reducing the effects of climate change and ensuring food security.

LA will play a pioneering role in adopting a holistic approach through its ecological landscape design applications in both public and privately owned areas.

LA will significantly reduce carbon emissions and fossil fuel consumption by designing an ecological and comprehensive transportation system for both intra-city and inter-city travel, constructing bicycle lanes to reduce vehicle traffic, and creating public transportation alternatives, among other options.

LA will make significant contributions to wildlife and natural plant species by constructing ecological bridges and passages on highways within cities, around cities, and between cities. This will enable the protection of biological diversity.

LA will ensure the creation of high-quality, healthy, and sustainable spaces through active and effective participation in interdisciplinary and multidisciplinary teamwork within the processes of natural and cultural space planning, design, and management.

LA discipline will make significant contributions to reducing the effects of climate change and the adaptation process through ecologically based solutions in the planning, design, implementation, and management processes of all types of natural and cultural sites (natural and cultural protected areas, landscape repair works, solid waste landfill sites, transportation routes, coastal and wetland areas, tourism/ recreation areas, etc.)

Establishing balance in the interaction between nature and humans in landscape planning/design and management processes, disaster risk reduction and resilience, supported by infrastructure and energy systems, and by measuring "spatial ecological and quality performance indicators" from the building scale to the parcel, block, neighborhood, and city scales, it is possible to create comprehensive and sustainable urban management policies. Thus, it will be possible to determine solution-oriented actions for the local climate change adaptation process based on the deficiencies or weaknesses identified as a result of determining, evaluating, and monitoring the quality performance criteria of urban and rural landscape spaces.

The discipline of **LA** can play a significant role in all stages of the smart city planning process, from design and implementation to management, in terms of determining strategic actions, bringing projects to life, monitoring, evaluating, and reporting on activities carried out on behalf of the smart city.

LA will make significant contributions not only to urban spaces but also to the creation of ecological planning/design and management strategies for rural settlements and villages, as well as to the process of mitigating and adapting to the effects of climate change (Misiaszek et al., 2019).

5.2. Planning/Design and Management of Open and Greenspace Systems

The overall character of a city emerges from the relationship and interaction between structures (buildings), open and green spaces, and transportation areas. Open and green spaces in urban areas and their peripheries are the most important fundamental component that balances the disrupted relationship between humans and nature and improves urban living conditions, integrating and balancing all land uses in the city. The capacity of green spaces in terms of quality and quantity, their balanced spatial distribution, and their accessibility to city dwellers are directly proportional to a city's level of development and quality of life. Urban green spaces are public, semi-private, or private physical spaces covered with natural and cultivated plants that provide multifaceted biological, climatic, physical, social, psychological, economic, and aesthetic services and contributions to the city's ecosystem and its inhabitants within and around the city. They are organized according to different green space typologies at the level of the city unit they serve (Gül & Küçük, 2001; Gezer & Gül, 2009; Gül et al., 2020).

Urban and suburban green space network; natural and semi-natural ecosystems (e.g. forests, scrublands, wetlands, river corridors,) and cultural green spaces (e.g. parks, sports and playgrounds, school gardens, campuses, private and institutional gardens, roof gardens, vertical gardens, road medians and verges, zoos, botanical gardens, agricultural land, cemeteries, and planted roads) (Gül et al., 2020). In this context, green space systems are defined as a network of interconnected natural, semi-natural, and cultural green spaces that provide and protect multifaceted ecosystem services and contributions (Benedict, 2000; European Commission, 2023; Gül, 2025).

Today, human-induced urbanization trends, structures that grow and change in horizontal/vertical dimensions, and urban form and functions have altered the city's climatic processes, increased the urban heat island (UHI) effect, and made urban daily life more negatively affected (Oke et al., 2017; Kazancı & Tezer, 2021; Gül & Gül, 2022).

The urban heat island effect occurs because residential areas are covered with hard surfaces that absorb heat, causing them to become hotter than the surrounding rural areas and resulting in higher ambient temperatures. In this context, green spaces mitigate the urban heat island effect by creating shade and lowering air temperature through evaporation, which is the combination of water evaporation from the soil and plant transpiration (cooling effect). Thus,

green spaces are considered an important strategic action to increase urban resilience against climate change (Shih, 2017; Yu et al., 2017).

At the global and local levels, the urgent actions envisaged to combat and adapt to climate change involve significant economic costs. Among these urgent actions, the foremost are increasing low-cost carbon sink areas (natural and cultural green spaces) in urban areas and ensuring their sustainable management.

Natural and cultural green spaces that perform carbon sequestration and storage functions are the most important component of the spatial planning/design and management process. Protecting urban green space ecosystems, improving ecosystem services, and increasing the number of green spaces will make cities resilient and resistant to sudden and unexpected climate change impacts.

Earth's reservoirs or storage areas for CO_2 are the atmosphere, oceans, and terrestrial biosphere environments. A significant portion of the terrestrial biosphere consists of natural areas (forests, protected areas, scrublands, etc.) and cultural green spaces (Gül et al., 2021). Green areas enable this carbon to be retained and stored in plants, dead cover, and soil. In terrestrial ecosystems around the world, 19% of carbon is stored in plants and 81% in soil. In forests, approximately 31% of carbon is stored in biomass and 69% in soil. In tropical forests, approximately 50% of carbon is stored in biomass and 50% in soil. Urban green spaces can sequester between 1.2 and 1.6 tons of carbon per hectare per year, depending on the type of vegetation and management practices (IPCC, 2000).

The carbon dioxide storage rate of urban trees is influenced by tree species, height, age, leaf surface area, trunk diameter at breast height, tree density, existing canopy cover, and growing conditions, and can vary in proportion to their biomass (Gül, 2024b; Gül et al., 2024; Gül, 2025).

The ecosystem services and contributions provided by the green space system vary depending on factors such as the location, size, distribution, plant species, density, and composition of the areas, as well as their organic connection with other green spaces (Gül, 2024b).

In this context, general recommendations for the **LA** discipline to play a significant role in mitigating the effects of climate change on natural and cultural green space systems within and around cities:

● In our country, municipalities are responsible for the management of public green spaces under the provisions of the Metropolitan Municipality Law

No. 5216 and the Municipality Law No. 5393. In this context, the effective and competent employment of Landscape Architects in municipalities will create significant added value in terms of climate change.

● Organizing urban green spaces in a balanced, equitable, and accessible manner at the neighborhood and city levels according to their typologies, enhancing their quality and quantity, and implementing sustainable and holistic planning, design, and management will play a significant role in mitigating the effects of climate change.

● The inventory, analysis, database creation, and updating of urban open and green spaces according to their types in CBS will greatly facilitate sustainable green space management efforts (location, age, height, and general condition of trees and other plants, maintenance, pruning, renewal, etc.). In particular, creating an urban tree information system will enable ecosystem and economic analyses, such as determining the biomass and carbon storage capacity of urban trees, carbon accounting, improving the city's air quality, building energy savings, and economic analyses, as well as making projections for the future (Gezer & Gül, 2009; Gül, 2024).

● **LA** discipline can play an important role in integrating green-blue infrastructure systems by linking green space systems in all settlement areas (from residential to urban scale) with the city's water resources (existing streams, rivers, etc.) and drainage systems. This will help prevent flooding, control erosion, and ensure the rational use of water.

● In large-capacity green areas planned for residential areas (city parks, public gardens, recreation areas, etc.), rainwater can be collected, stored, and used for various purposes by creating biological ponds at the lowest elevation and on flat terrain.

● In planning and design for large green spaces within and around cities (city parks, public gardens, recreation areas), multifaceted services and contributions can be provided that encompass the processes before, during, and after disasters.

● The use of smart technologies in urban green spaces will provide significant benefits in areas such as smart water and electricity usage, energy, early warning, emergency response, and security. Thus, solutions aimed at reducing water and electricity consumption can help reduce the carbon footprint.

● Urban green spaces can play a role in meeting local needs through options such as renewable energy and food production (e.g., urban agriculture, urban agroforestry, carbon farming).

● By using compost fertilizers made from organic waste and residues instead of chemical fertilizers used in green spaces and agricultural activities, fossil fuel consumption and greenhouse gas emissions will decrease. Additionally, the amount of carbon stored in the soil, the soil's nutrient capacity, and its water retention capacity will increase.

● The xeriscape approach aims to minimize water consumption, relies on local plant species that are resistant to drought, salinity, and heat, reduces maintenance and energy inputs, and represents a holistic approach that provides a strong scientific framework for effective landscape planning and management that is adaptable to climate change and water-efficient landscape planning and management (Yazgan & Özyavuz, 2008; Çorbacı et al., 2017; Çorbacı & Özyavuz, 2024).

● The production, cultivation, and use of native plant species should be prioritized in natural and cultural green spaces at the regional and local levels. This is because native species will be more advantageous than exotic species against drought, heat, and insect/fungal pests, which are expected to increase due to the effects of climate change.

● Prioritizing plants with high carbon sequestration and storage capacity and shade-providing effects in green spaces will be highly beneficial.

● Calculating the carbon sequestration and storage of fixtures, materials, soil, and plants used in landscape design implementation projects and determining their carbon footprint will significantly contribute to the management process.

● In landscape areas where grass use is mandatory or necessary, grass types suitable for the purpose, resistant to drought and heat, and appropriate for the region's climatic conditions must be selected, and maintenance work must be carried out according to the appropriate technique. In areas where grass cannot be planted, the use of organic mulch materials together with other ground cover plants suitable for the purpose will be beneficial.

● The irrigation needs of landscape areas should be met primarily from treated wastewater or non-traditional water sources, not from the drinking water network.

● Building facades, balconies, terraces, and rooftop gardens (extensive or intensive) provide aesthetic and functional contributions through appropriate landscaping and play a significant role in cooling buildings during summer and heating them during winter through their insulation effect.

● Hobby gardens, recognized as a type of green space in urban areas, can provide economic, social, psychological, recreational, and other benefits to city dwellers, as well as contribute to the city's food production.

● Green belt projects (windbreaks, noise barriers, etc.) to be implemented within and around the city will provide aesthetic and functional services and contributions (particularly in creating microclimates, etc.).

5.3. Sustainable Land Management (SLM), Carbon Management & Carbon Pricing

The foremost strategic emergency actions for the global climate change adaptation process include sustainable land planning/management, landscape restoration (improvement) works, practices that consider carbon sequestration/storage functions, calculation of the amount of carbon sequestered, monitoring of changes in carbon stocks, nature-based solutions, etc. (Gül, 2024b).

Sustainable Land Management (SLM) approaches are divided into four main categories based on their ability to provide comprehensive solutions for increasing land productivity, storing carbon, reducing land degradation, improving and protecting ecosystem services, reducing erosion severity.

● *Administrative measures:* Guide land use through legal regulations and strategic plans.

● *Cultural measures:* Include the adoption of sustainable techniques in agricultural and forestry practices.

● *Plant measures*: Manage and develop vegetation cover.

● *Structural measures*: Cover physical infrastructure projects such as terracing and water harvesting.

Carbon farming involves practices that increase carbon sequestration and storage in rural and urban areas or reduce greenhouse gas emissions from soils. The Carbon Removal and Carbon Farming (CRCF) Regulation (EU/2024/3012) proposes the following practices (Official Journal of the European Union, 2024);

✓ **Agricultural Forestry (Mixed) Farming**: Within the scope of carbon farming, the aim is to use agricultural forestry systems on land, combining trees, shrubs and herbaceous plants in different patterns. These systems aim to produce multiple products per unit area, generate multifunctional ecosystem services, capture and store carbon, support biodiversity, and mitigate the adverse effects of climate change.

✓ **Sustainable Soil Management Practices**: These are projects that aim to increase carbon storage in the soil, reduce nitrous oxide emissions, and

increase fertilizer use efficiency through sustainable practices in agriculture and techniques for soil improvement and protection, using methods such as cover crops, grassland and pasture planting.

✓ **Afforestation/Reforestation Projects**: These are initiatives that promote carbon sequestration and enhance ecosystem services by planting new trees on land or reforesting damaged forest areas, thereby supporting biodiversity and sustainable forest management.

✓ **Forest Protection Projects (REDD+):** These are initiatives undertaken to protect existing forests, ensure their sustainable management, prevent deforestation, reduce carbon emissions, and ensure the sustainability of forest ecosystem services.

✓ **Sustainable Water Management Practices**: These are practices for the protection, rehabilitation and improvement of water resources, wetlands, peatlands and degraded areas.

LA discipline can play a significant role in all processes related to project design, implementation, and management in "sustainable land management" and "carbon farming", including carbon accounting, carbon pricing, carbon certification, carbon crediting, monitoring, reporting, and verification.

Climate change mitigation and adaptation processes have brought to the forefront the need for environmental and carbon pricing, including determining, implementing, monitoring, and enforcing carbon costs for actions to reduce greenhouse gases (especially carbon), potential financial consequences for businesses, buying and selling credits and certificates related to emission reductions, and carbon taxation (Karataş Aracı et al., 2020).

Today, carbon pricing initiatives aimed at mitigating climate change have grown into a multi-billion-dollar industry. Quantitative measurements of carbon stocks form the foundation for carbon trading and the carbon economy. An increase in the biomass value of a tree's leaves directly correlates with an increase in its carbon storage capacity. Leaf biomass is directly proportional to a tree's foliage rate, crown width, and age. An increase in a tree's biomass directly affects the amount of carbon it contains (Gül et al., 2021).

An increase in the leaf biomass value of a tree also increases the amount of carbon stored to that extent. Leaf biomass is directly proportional to the tree's foliation rate, crown width, and age. An increase in a tree's biomass directly affects the amount of carbon it contains (Gül et al., 2021).

There are various approaches to calculating and measuring carbon storage in vegetation. Carbon accounting methodologies are largely scientifically

standardized. This allows for globally comparable accounting and trading by utilizing allometric and biomass equations supported by internationally consolidated and standardized systems (IPCC 2000, 2003; McPherson & Kendall 2014; Nowak et al., 2002). (Pearson et al., 2007; Stoffberg et al., 2004; Stoffberg & Van Rooyen, 2012).

The development of green space systems, which are frequently emphasized in the green and circular economic order envisaged as a target in international approaches such as the European Green Deal and climate change mitigation and adaptation, and strategic actions such as increasing the number and surface area of trees/forests, highlight that landscape architects will have an active role and responsibility. Landscape planning and design projects at both macro and micro scales offer significant opportunities not only for ecosystem services but also for enhancing and sustaining biodiversity.

Today, to determine the amount of carbon emitted and stored by cities, it is necessary to create an inventory based on green space typologies (type, tree breast height diameter, crown width, height, etc.) and to calculate the biomass and carbon content of trees, shrubs, and ground cover plants.

Today, **LA** discipline can play a significant role in all processes related to open and green spaces and carbon farming practices in the fight against global and local climate change, including calculations of plant biomass and carbon sequestration/storage, carbon pricing, carbon certification, carbon crediting, monitoring, reporting, and verification (MRV).

In our country, "*Strategic Environmental Impact Assessment (SEIA*)"(a high-level preventive management tool that integrates the negative environmental impacts of plans and programs energy, transportation, tourism, etc. into the decision-making process), and *"Environmental Impact Assessment (EIA)*", (a process that identifies the significant environmental impacts of a specific project or activity to be implemented), defined in legislation only for specific land-use activities are actually important instruments in the decision-making process for political, strategic, sustainable development and activity-oriented preventive decisions and in the fight against climate change. However, for these instruments to be more effective and rational, they should be applied to all types of land-use activities. The preparation of SEIA and EIA reports, the prevention of environmental pollution and improvement of environmental quality, and the monitoring and control processes should involve landscape architects, thus enabling more rational and ecologically focused land use.

Identifying, protecting, and enhancing urban biodiversity in urban environments is crucial for the integrity of urban ecosystems (Çakır & Gül, 2024). Therefore, landscape architecture can play a significant role in identifying, monitoring, and evaluating the biodiversity potential and performance of urban areas in Türkiye, contributing to their conservation and sustainability.

Today, concepts such as green/circular economy or carbon economy are beginning to come to the forefront, replacing the existing traditional and wild economy approach. In this context, the OECD, the World Bank, and the EU have begun to develop green growth strategies (EEA, 2021). The landscape economy aims for robust and efficient financial investments and practices such as resilient, nature-based solutions and biodiversity, based on an approach that integrates and harmonizes land resources and sectoral use activities with ecological, social, and economic systems, creating an economic system that does not consume or pollute more resources. In this context, LA's work within the scope of landscape economy and policies is directly related to climate change.

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5.4. Landscape/Environmental Protection, Protected Areas and Historical & Cultural Heritage Areas

LA discipline can undertake actions aimed at the sustainable preservation of existing and potential natural and cultural landscape values and characteristics, either In-Situ or Ex Situ. It plays a particularly important role in the planning/design (Development Plan, Master Plan, Management Plans) and management process of existing and potential protected areas with ecologically based solutions. Furthermore, they can contribute to increasing the resilience of cities and mitigating the effects of climate change by effectively protecting, identifying changes in, assessing the sensitivity of, improving, and managing sensitive, rare, and fragile ecosystems, habitats, and biodiversity in urban and rural areas.

It can play an important role in determining the capacity of urban biodiversity and developing strategic actions.

LA discipline can play an important role in determining the planning, design, and change of cultural and historical landscape areas within the scope of climate change, protecting and ensuring the sustainability of materials, fixtures, and plant species in landscape spaces aimed at mitigation, monitoring change and threats, determining quality performance, and preparing revised plans. It can also contribute to the creation of visual materials by producing 3D digital twins of historical and cultural landscape areas.

5.5. Landscape Repair Process

Landscape repair is the planning, design, and management of spatial organization involving the renewal *(restoration)*, improvement *(rehabilitation)*, development of different types of use *(reclamation)*, and protection of landscape areas (e.g. mining areas, stone and marble quarries, landfill sites, eroded areas and polluted water sources) that have been damaged or destroyed by human activities or natural causes, using biological and technical methods based on environmental, social, and economic conditions.

The primary objective of landscape repair work is to rehabilitate and develop degraded and damaged areas in an environmentally compatible, sustainable manner, at minimal cost, restoring and enhancing their ecological, socio-economic, and visual values.

In this context, **LA** discipline can provide multifaceted ecosystem services and contributions such as carbon sequestration and storage, protection of soil and water resources, enhancement of biodiversity, improvement of microclimate, and recreation through the revegetation and ecological rehabilitation of degraded and damaged areas. It can also create social and economic added value.

5.6. Production and Use of Structures and Plants Materials in Landscape Areas & Recycling

● The plant species and compositions used in landscape areas, in accordance with the purpose and design technique, will provide the most important services and contributions as carbon sinks in terms of mitigating and adapting to the effects of climate change. In particular, the production, cultivation, and use of drought, salinity and heat-resistant, carbon-storing plant landscape elements with low water requirements and suitable for the local climate and natural vegetation will play a significant role in landscape design.

The majority of materials used in structural elements within landscape space organization (e.g., cafés, tea gardens, snack bars, restrooms, sales stands, pergolas, gazebos, children's play equipment, sports equipment, flooring) are produced using fossil fuels (e.g., PVC, plastic, concrete, aluminum, glass, cement). For example, using aluminum as a building material requires 126 times more fossil energy than wood, and using steel requires 24 times more fossil energy.

In this context, less fossil fuel consumption and reduced carbon emissions can be achieved by designing and producing recycled structures, fittings, and materials from natural materials or organic and inorganic waste and residues. Structures, fittings, and materials made from wood or organic materials in particular can consume less energy and store carbon. This is because approximately half of the dry weight of wood is carbon. In other words, one ton of wood stores 0.5 tons of carbon.

Renewable energy options (solar panels, wind turbines) can be created for lighting in landscape spaces. Solar panel lighting elements can be used as a priority. Electricity can be generated using embedded piezoelectric generators on surfaces with heavy pedestrian or vehicle traffic in urban areas. Creating a digital monitoring and control system with the help of multi-purpose sensors can make significant contributions to creating smart parks.

Materials commonly used in urban spaces, such as processed plastic, steel, and concrete, have a high carbon footprint. The carbon footprint can be reduced by decreasing the use of these materials in urban spaces and replacing them with recyclable, natural, and composite materials. The design, production, and use of landscape fixtures, furniture, and materials made from organic waste and residues will provide significant benefits in the fight against climate change.

5.7. Education, R&D, Technology Activities, and Innovation

LA discipline will increase specialization and its sphere of influence by offering undergraduate and graduate-level courses and thesis topics within the scope of mitigating the effects of climate change and the adaptation process. Furthermore, conducting R&D studies on topics such as carbon pricing, carbon accounting, carbon farming projects, artificial intelligence software, designing and producing ecological and sustainable landscape furniture, fixtures, and materials, and generating added value from waste and residues will make significant contributions.

Disciplines of architectural sciences can develop a culture of collaboration in the processes of spatial planning and design within higher education and professional practice, and where opportunities for dialogue and cooperation can be implemented (Demirel et al., 2023).

LA play a crucial role in creating an environment that provides the most suitable conditions in terms of spatial, physiological, and psychological aspects for students and users in harmony with nature, within the landscape areas of educational institutions (e.g., kindergartens, primary schools, secondary schools, high schools, universities) (Akten & Gül, 2025a; Akten & Gül, 2025b).

Supporting R&D and innovation in the overlap of landscape architecture and carbon/green economy should be among the priorities, for healthy and sustainable landscapes.

Technological and digital developments, which have gained momentum in the 21st century, have led to fundamental changes in the practice and education of Landscape Architecture, as in every discipline.

Today, landscape planning, design, and management processes are carried out in a multifaceted and data-driven structure where spatial, ecological, socio-cultural, and economic data are carefully processed. The sustainability of a landscape area is possible through the correct use, analysis, and transfer of data to the decision-making process and sustainable management. In the holistic process, GIS, Remote Sensing, CAD (Computer-Aided Design), BIM (Building Information Modeling), LIM (Landscape Information Modeling), Unmanned Aerial Vehicles (UAV), photogrammetric methods (LIDAR, Mobile LIDAR, etc.), Internet of Things (IoT) technology, and the widespread use of 3D software will play an active role in the holistic and successful execution of landscape design, modeling, implementation, quality monitoring, management, maintenance, and repair phases.

In this context, the **LA** discipline, thanks to its capacity to use digital technology in a multifaceted way, is becoming a multidimensional technical actor that designs resilient and sustainable living spaces in response to the climate crisis, produces strategic decisions by planning areas at macro and micro scales, and creates data-driven designs based on these analyses.

5.8. Institutional and Stakeholder Coordination Process

LA will play a significant role in mitigating the effects of climate change and adapting to them, as well as in establishing cooperation and joint projects among relevant stakeholders (e.g., official institutions and organizations,

local governments, NGOs, universities, and the private sector). For example, landscape architects in municipalities will be able to play an important role in the creation and use of the mandatory Urban Information Systems database (e.g., green space systems, transportation, sectoral land use, tree database) thanks to their ability to use technologies such as Geographic Information Systems, Remote Sensing, Computer-Aided Design and modeling.

6. Conclusions and Recommendations

Today, the new "low-carbon economic" or "green and circular economic" order that has evolved from the existing traditional economic order is primarily accepted as an ethical tool for the protection and sustainability of human health, natural ecosystems, and the cultural environment.

Adaptation to climate change at the global and local levels is a process that occurs in natural or human systems in response to the actual or expected effects of climate change, aiming to reduce its negative impacts and take advantage of opportunities. Therefore, there is a need to develop and implement an action plan for adapting to climate change in each region.

Ultimately, climate change is intrinsically linked to land/spatial planning, design, repair, conservation, and management. This situation highlights the need for land/spatial planning and climate policies to be evaluated holistically, rather than independently (UN-Habitat, 2020). In this context, the integration of adaptation and mitigation strategies with land/spatial use will make significant contributions to sustainable development goals in terms of protecting carbon sink areas, promoting energy-efficient settlement patterns, and strengthening ecosystem services (OECD, 2020).

According to the IPCC-LXIII-6 Panel decision, current actions include afforestation /reforestation, soil carbon sequestration, improvement of agricultural lands and pastures, peatlands and coastal wetlands, agroforestry, improved forest management, biochar inputs, and carbon capture and storage from process gases (IPCC, 2025).

IFLA Adaptation for a Changing World (2019) process, it has been stated that higher education in the built environment professions, through collaborative partnerships, should play a role in establishing standards in education, scientific research, and professional practice, and should take on a leadership and management role in all aspects of the climate change adaptation process (International Federation of Landscape Architects, IFLA, 2019).

The European Landscape Convention (ELC) was signed on October 20, 2000, ratified by the Grand National Assembly of Türkiye with Law No. 4881 dated June 10, 2003, and entered into force on July 17, 2003. According to the ELC, landscapes are a vital part of quality of life, constituting resources for social, cultural, ecological, and economic purposes and playing a significant public benefit role. It states that the quality and diversity of all natural and cultural landscape areas must be sustainably protected, planned, and managed based on a balanced and harmonious relationship between social, environmental, and economic activities; that the natural and cultural heritage of the landscape is a fundamental component for strengthening human well-being and local identity; and that the restoration and transformation of damaged landscape areas into habitable spaces constitutes a public resource in terms of the protection and sustainability of natural and cultural heritage sites (ELC, 2000).

Landscape Architects plan, design and manage natural, rural, urban and built environments applying scientific and aesthetic principles to address the sustainability, quality and health of landscapes, collective memory, heritage and culture, and territorial justice. It is important to realise that as landscape architects we don't just individually deal with built environments and their aesthetic but have an inclusive vision to produce and build on behalf of the inhabitants They achieve this through the design processes and the management of the various ecologies according to scientific and social principles (IFLA, 2021).

Landscape Architecture (LA) integrates nature and culture to reduce the effects of climate change and develop adaptation policies, strengthen the resilience of ecosystems and cities, protecting biodiversity, and, in parallel, producing sustainable and nature-based solutions that are effective and cost-appropriate compared to gray solutions for climate change adaptation and disaster risk reduction.

LA is primarily responsible for urban cultural and natural green space systems that can reduce the urban heat island effect, create a cooling effect, and serve as carbon sinks. In the fight against climate change, protecting existing and potential green spaces and increasing the quantity and quality of green spaces in a balanced and equitable manner at the urban scale is considered the most important priority action.

LA can play a significant role in mitigating climate-related risks, increasing adaptation capacity within the climate-health relationship, reducing greenhouse gas emissions, in land-use planning and management decisions, increasing ecosystem resilience, conserving biodiversity, improving environmental quality, etc., through Nature-Based Solutions (NbS).

In the **LA** vision, the protection of biological diversity, water resource management, strengthening community relations, and the planning, design, repair and sustainable management of high-quality, livable, and nature-compatible natural and cultural spaces are fundamental approaches.

Comprehensive planning, design, and management aimed at increasing the quantity and quality of green spaces, recognized as the most important action in mitigating climate change impacts and adapting to them, has become imperative. Open and green space systems in the Urban Development Plans and Implementation Development Plans must be organized to form a balanced, equitable, accessible, and comprehensive green network system at the city and neighborhood scales. An organic connection must be established between urban cultural green spaces and natural green spaces outside the city through ecological corridors.

While **LA** is utilized as a key discipline in spatial planning and design on the international platform, in our country, it is either overlooked or faces problems in terms of professional recognition or acceptability by institutions, legal entities, and other professions. Therefore, the legal and administrative authority and responsibilities of **LA** should be increased, and professional employment and recognition should be widespread. It has become necessary to employ landscape architects effectively and competently, especially in local administrations (e.g., Governorates, Special Provincial Administrations, Municipalities), official institutions and organizations, and NGOs.

However, especially in the spatial planning and design processes defined in the legislation (e.g. *Regional Plan, Spatial Strategy Plan, Environmental Planning Plan, Urban Development Plan, Implementation Development Plan, Conservation Development Plan, Integrated Coastal Zone Plan, Urban Design, Urban Transformatio*n) and decision-making processes.

An "**Open and Green Space Law or Regulation**" must be enacted in our country. This should be linked to the existing relevant laws and regulations. Urban and non-urban open and greenspace typologies and standards should be defined.

In urban and rural areas, it has become imperative that spatial planning/design and management policies and practices for nature-based actions aimed at mitigating the effects of climate change and adapting to it be carried out holistically through interdisciplinary and multidisciplinary collaborative efforts, rather than through individual approaches. To this end, it would be highly beneficial for the disciplines of spatial planning and design (architects, landscape

architects, urban planners, civil engineers, etc.) to gain a culture and experience of working together during higher education and in the built environment sector.

The Climate Law (No. 7552, which came into effect in 2025), reveals the 21st-century vision, professional identity, and role of the discipline of Landscape Architecture in many areas specified as legal obligations. In this context, **LA** can play an important role in the implementation and sustainability of *the Climate Law* by being active as guides, supervisors, and decision-makers in the "Provincial Climate Change Coordination Councils," "local climate change action plans," and "carbon pricing and crediting" processes mentioned in the Climate Law.

Finally, policies and actions aimed at mitigating the effects of climate change and adapting to them must be approached not with profit-driven, singular, and populist approaches, but with a scientific, technical, fair, ecological, participatory, and holistic approach that includes all stakeholders.

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