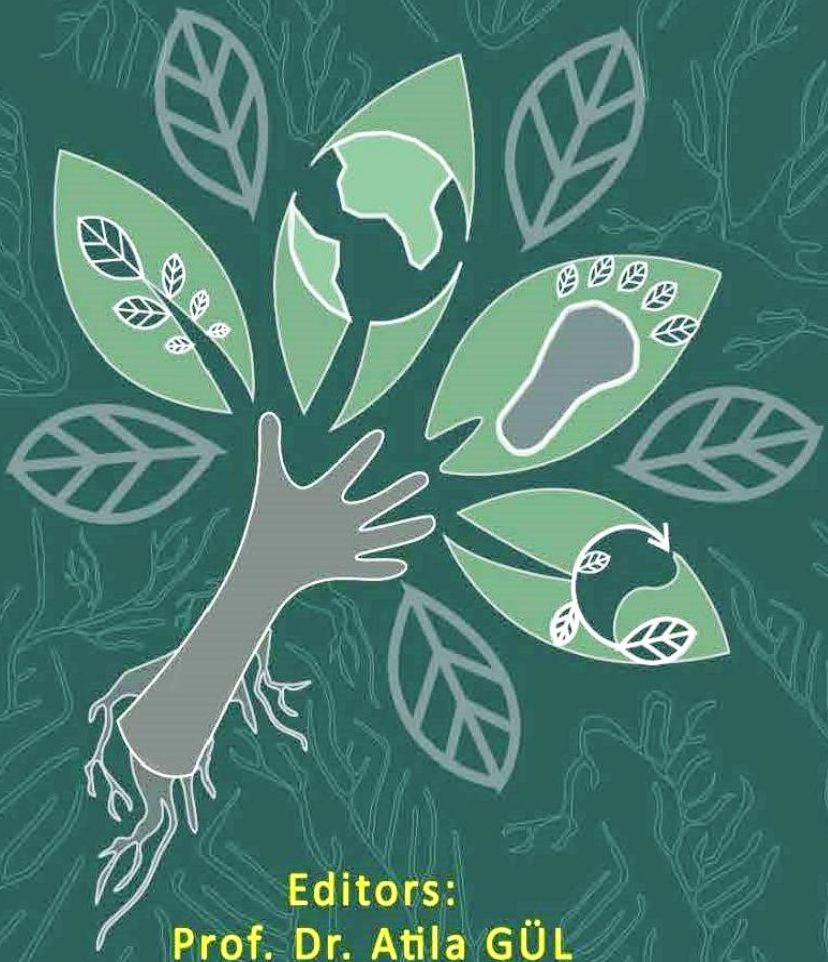
CLIMATIC CHANGE, CARBON MANAGEMENT AND GREEN SPACE SYSTEMS IN ARCHITECTURAL SCIENCES



Editors:
Prof. Dr. Atila GÜL
Prof. Dr. Öner DEMİREL
Dr. Sibel AKTEN

İKSAD Publishing House

October 1, 2024

Copyright © 2024 by İKSAD publishing house All rights reserved.

No part of this publication may be reproduced, distributed or transmitted in any form or by any means,

including photocopying, recording or other electronic or mechanical methods, without the prior written permission of the publisher, except in the case of brief quotations embodied in critical reviews and certain other noncommercial uses permitted by copyright law.

Institution of Economic Development and Social Researches

(The Licence Number of Publicator: 2014/31220)

TÜRKİYE TR: +90 342 606 06 75 USA: +1 631 685 0 853

E mail: iksadyayinevi@gmail.com

www.iksadyayinevi.com

It is responsibility of the author to abide by the publishing ethics rules.

Iksad Publications – 2024©

Climate Change, Carbon Management and Green Space Systems in Architectural Sciences

ISBN: 978-625-367-856-2

https://doi.org/10.5281/zenodo.13883127

Cover Design:
Hatice Eda GÜL

October 01, 2024
Ankara / Türkiye
Size = 16x24 cm

PREFACE

In the history of humanity, especially in the last few years, the pressure and intervention of humankind on natural resources has gradually increased. Primarily, due to urbanization, industrialization, and technological and digital developments, the gradual increase and diversification of production and consumption activities focused on economic growth has brought multifaceted problems and negativities. In this context, human beings have exploited, changed, shaped, and destroyed nature as a unilateral commodity in line with their needs and demands. Capitalist approaches in the pursuit of 'maximum profit' in economic production and consumption relations and implementing activities/investments that are incompatible with natural (ecological) systems constitute the basis of the problems.

It was widely accepted that the leading cause of climate change and its adverse effects, which is dictated as a global problem today, is the carbon cycle disruption due to multifaceted and excessive human production and consumption activities.

It is possible to say that sustainability, which is the balance between meeting the needs of humanity today while meeting the needs of future generations, is at the center of the conflict between ecology and economy. Since human beings, as a component of nature, will co-exist with nature, they should be in harmony with nature, have an ecology-centered perspective, and reflect it in their attitudes and behaviors by considering nature as a goal rather than a tool.

To mitigate the negative consequences of climate change on a global scale and for the adaptation process, the protection of natural resources and ensuring sustainability, the transformation of nature/ecological and science-based spatial use decisions and policies into action, and the dissemination of interdisciplinary joint studies in the spatial planning, design, and management process should be the primary goal.

In this context, there is an absolute need for communication and cooperation between the disciplines of Architectural Sciences in solving global problems.

The editors of this book believe that a more livable and sustainable world can be created by carrying out interdisciplinary studies of spatial planning and design disciplines together under the roof of ***Architectural Sciences***.

In this context, '***The Journal of Architectural Sciences and Applications (JASA)***,' which pioneered the collective work of related disciplines, was first published in 2016. Subsequently, JASA Editors have made significant contributions to creating various books containing original studies and bringing the latest developments in the field to the reader. This book, titled Climate Change, Carbon Management and Green Space Systems in Architectural Science, contains 16 chapters and covers precious topics.

The authors of the chapters are solely responsible for the copyrights of the figures, pictures and visuals in the book chapters, their content, the accuracy of references and citations, the proposed ideas and compliance with all the rules of publication ethics.

We want to thank the authors, the referees with their valuable contributions, İKSAD Publishing House, and Professor Atila GÜL, General Coordinator of the Architectural Sciences book series, who contributed to the completion of this book.

We hope that our book '***Climate Change, Carbon Management and Green Space Systems in Architectural Science'*** will be helpful to the readers.

Best regards.

01.10.2024

EDITORS

Prof. Dr. Atila GÜL
Prof. Dr. Öner DEMİREL
Dr. Sibel AKTEN

EDITORS
Prof. Dr. Atila GÜL
Prof. Dr. Öner DEMİREL
Dr. Sibel AKTEN
AUTHORS
The authors were listed in alphabetical order
Ali Erdem ÖZÇELİK
Arzu ÇAHANTİMUR
Atila GÜL
Ayça İNCİ
Aylin ŞENTÜRK
Cansu ÖZTEKİN KARA
Çağla AYDEMİR
Erdi EKREN
Feran AŞUR
Filiz TAVŞAN
Filiz YÜKSEK
Gökhan AYDIN
Hakan LEVENTOĞLU
İnci GÜVEN
Kübra İlkiz KURT
Mahmut TUĞLUER
Mehmet Bayram KİRAZLI
Murat AKTEN
Mükerrem ARSLAN
Nigar ALLAHVERDİYEVA
Nilgün GÖRER TAMER
Ömer ATABEYOĞLU
Ömer Lütfü ÇORBACI
Rengin BECEREN ÖZTÜRK
Sibel AKTEN
Sinan KORDON
Turan YÜKSEK
Yasemin BAL

REVIEWER LIST	
The reviewers were listed in alphabetical order	
Arzu ALTUNTAŞ	Siirt University
Ayşe KOPUZ	Tekirdağ Namık Kemal University
Ayşe Duygu KAÇAR	Eskişehir Osmangazi University
Berk TÜRKER	Uşak University
Cengiz YÜCEDAĞ	Burdur Mehmet Akif Ersoy University
Demet MUTMAN ULUENGİN	Özyeğin University
Emel BAYLAN	Trakya University
F. Demet AYKAL	Dicle University
Gülcay ERCAN OĞUZTÜRK	Recep Tayyip Erdoğan University
Günay ERPUL	Ankara University
Hakan OĞUZ	Kahramanmaraş Sütçü İmam University
H. Hale KOZLU	Erciyes University
Leyla SURİ	İstanbul Ticaret University
Meliha AKLIBAŞINDA	Nevşehir Hacı Bektaş Veli University
Mert ÇAKIR	Süleyman Demirel University
Murat ÖZYAVUZ	Tekirdağ Namık Kemal Üniversity
Pelin KARAÇAR	İstanbul Medipol University
Okan YELER	Van Yüzüncü Yıl University
Özden GÖRÜCÜ	Kahramanmaraş Sütçü İmam University
Sertaç GÜNGÖR	Selçuk University
Seyithan SEYDOŞOĞLU	Siirt University
Sultan Filiz GÜÇLÜ	Isparta University of Applied Sciences
Sultan Sevinç KURT KONAKOĞLU	Amasya University
Şirin Gülcen EREN	Süleyman Demirel University
Şule KAZANCI KISAKÜREK	Kahramanmaraş Sütçü İmam University
Tendü Hilal GÖKTUĞ	Aydın Adnan Menderes University
Ümit T. ARPACIOĞLU	Mimar Sinan Fine Arts University
Zehra BABALIK	Isparta University of Applied Sciences
Zümrüt ÖZBAHAR	Republic of Türkiye Ministry of Environment, Urbanization and Climate Change

CONTENTS	Pages
CHAPTER 1	
Examining Sustainability Concepts Through LEED Platinum Certified Libraries	
Prof. Dr. Filiz TAVŞAN, Kübra İlkiz KURT	**1-32**
CHAPTER 2	
A Bio-Cultural Architectural Approach for the Sustainability of Mediterranean Coasts	**33-66**
MSc. Yasemin BAL, Prof. Dr. Arzu ÇAHANTİMUR, Prof. Dr. Rengin BECEREN ÖZTÜRK	
CHAPTER 3	
Afforestation and Reforestation (AR) Project Design Stages for Carbon Storage, Carbon Calculation Methods and Estimation	**67-109**
Prof. Dr. Atila GÜL, Dr. Sibel AKTEN, Dr. Hakan LEVENTOĞLU	
CHAPTER 4	
The Contribution of Street Trees to Climate Resilient Cities in the Context of Ecosystem Services: The Case of Bahçelievler, Ankara	**110-148**
Prof. Dr. Nilgün GÖRER TAMER, Ayça İNCİ	
CHAPTER 5	
The Role of Urban Green Spaces in Achieving the Net-Zero Carbon Target	**149-169**
Asst. Prof. Dr. Mahmut TUĞLUER, Nigar ALLAHVERDİYEVA	

CHAPTER 6

Using Biodiversity and Some Ecological Parameters for Sustainability of Protected Areas **170-193**

Prof. Dr. Gökhan AYDIN

CHAPTER 7

Testing Chemical and Organic Fertilizers in the Maize-Growing Lands in Türkiye **194-214**

Dr. Hakan LEVENTOĞLU

CHAPTER 8

World Heritage List Candidate Assos Ancient City-Cultural Sustainability **215-240**

Assist. Prof. Dr. Aylin ŞENTÜRK

CHAPTER 9

Sustainable Agriculture Alternatives in Urban Areas: Hydroponic Agriculture **241-280**

Prof. Dr. Murat AKTEN

CHAPTER 10

Strategies and Actions for Village Design Guides in the Global Climate Change Process **281-311**

Dr. Çağla AYDEMİR, Prof. Dr. Atila GÜL

CHAPTER 11

Design Proposals for The Greenway Multipurpose Trail **312-339**

Asst. Prof. Dr. Erdi EKREN, Prof. Dr. Mükerrem ARSLAN

Climate Change, Carbon Management and Green Space Systems in Architectural Sciences
Chapter 10

Strategies and Actions for Village Design Guides in the Global Climate Change Process

Dr. Çağla AYDEMİR [1]

[1] Süleyman Demirel University, Faculty of Architecture, Department of Architecture, Planning and Design, West Campus, Isparta/Türkiye
ORCID: 0000-0003-3575-8957
E-mail: caglabostan15@gmail.com

Prof. Dr. Atila GÜL [2]

[2] Süleyman Demirel University, Faculty of Architecture, Department of Landscape Architecture, West Campus, Isparta/Türkiye
ORCID: 0000-0001-9517-5388
E-mail: atilagul@sdu.edu.tr

Citation: Aydemir, Ç. & Gül, A. (2024). Strategies and Actions for Village Design Guides in the Global Climate Change Process. Gül, A., Demirel, Ö. & Akten, S. (Eds.). ***Climate Change, Carbon Management and Green Space Systems in Architectural Sciences.*** 2024, Chapter:10, 281-311. ISBN: 978-625-367-856-2. Iksad Publications.

DOI: https://doi.org/10.5281/zenodo.13882357

1. Introduction

Climate change emerges as one of the biggest environmental problems today. This problem is a global situation that affects not only the individual and the country but also our world, which is our common home (İklim Değişikliği Başkanlığı, 2024a). The possibility of climate change due to changes in carbon dioxide (CO_2) accumulation in the atmosphere was first predicted in 1896 by Nobel Prize reward S. Arrhenius (Arat et al., 2023). Until the mid-20th century, most atmospheric scientists assumed that climate changes were caused only by natural factors. However, after the 1960s, the idea that various human activities in addition to natural causes could also have effects on the climate system became dominant (Hekimoğlu & Altındeğer, 2008).

The clear observation of climate change due to the accumulation of carbon dioxide (CO_2) in the atmosphere dates back to the Industrial Revolution. Developing technology with the Industrial Revolution has caused the increased use of fossil fuels and the rapid increase in greenhouse gas emissions (İklim Değişikliği Başkanlığı, 2024a).

The current level of CO_2 accumulation in the atmosphere is well above the natural CO_2 accumulation changes in the record of approximately 700 thousand years (ranging between approximately 180-300 ppmv). This situation weakens the cooling efficiency of the earth, causing positive radiative forcing to occur. It means strengthening the natural greenhouse effect (Türkeş, 2021a).

The important consequence of the greenhouse effect, which has been strengthened as a result of the rapid increase in the accumulation of

greenhouse gases in the atmosphere, has caused the world climate to become hotter, drier, and more variable in some regions. At the First World Climate Conference, *"If society's long-term dependence on fossil fuels as an energy source and deforestation continues in the future, the accumulation of CO_2 in the atmosphere is likely to increase significantly. It shows that this increase in CO_2 accumulation may lead to significant and possibly long-term changes in the global climate. The removal of CO_2 from the atmosphere by human activities is a slowly developing process, so the climatic consequences of CO_2 accumulation are effective for a long time*" (Türkeş, 2021b).

Today, the main concrete observable issues of climate change are developments such as increasing temperatures, decrease in potable and irrigation water, regional and urban air pollution, decrease in biodiversity, deterioration of soil quality, etc. (Kızmaz, 2021).

International studies and agreements have begun to be made against all these negative effects. The United Nations Framework Convention on Climate Change (UNFCCC) was signed for the first time in 1992. The greenhouse gas reduction obligations of the countries that are parties to this agreement have remained inadequate over time. By signing the Kyoto Protocol in 1997, it was aimed to reduce greenhouse gas emissions through legally binding regulations. With the Paris Agreement in 2015, for the first time, all countries were obliged to reduce greenhouse gas emissions (T.C Dışişleri Bakanlığı, 2024).

Türkiye signed the Paris Agreement in 2016 with representatives of 175 countries at the High-Level Signing Ceremony held in New York. In line with the Paris Agreement, we set out with the "Net Zero Emission

Target" until 2053 (T.C. Dışişleri Bakanlığı, 2024). In this direction, preparations for the Climate Change Mitigation Strategy and Action Plan (2024-2030) have started (İklim Değişikliği Başkanlığı, 2024a).

Today, greenhouse gas emissions are mostly seen in urban settlements, and the majority of solution-oriented actions cover these settlements. However, rural settlements are a very sensitive point in the climate change process due to reasons such as laws and policies, as well as a lack of spatial infrastructure and superstructure. In this study, spatial strategies and action suggestions were developed based on the problem of how Village Design Guides (KyTR), which are an important tool for rural settlements in the process of climate change, can be adapted to the "Net Zero Emission Target" in line with the Paris Agreement.

1.1. Global Climate Change and Causes

The global climate has shown significant changes and changes in all space and time scales, from the formation of our Earth, which is approximately 4.6 billion years old, to the present day (Türkeş, 2021a). Climate has been observed to change continuously over time according to the movements of the earth and the atmospheric layer surrounding it (Topcuoğlu & Doğan, 2011).

Climate change, regardless of the cause, is a long, continuous, and slowly developing change in climatic conditions that has global and local effects (Türkeş et al., 2000). The fact that this change began to be observed by human beings dates back to the Industrial Revolution and its aftermath. Especially with the development of the rapidly developing industrial sector in the 18th and 19th centuries, the change in nature's dynamics was accelerated by human intervention.

Air is a part of the atmosphere that tends to heat up more due to the accumulation of greenhouse gases such as carbon dioxide (CO_2), water vapor (H_2O), nitrogen monoxide (N_2O), methane (CH_4), various suspended particles and ozone (O_3), variable gases and aerosols in the atmosphere. The formation of positive radiative forcing was observed. The positive contribution to the energy balance of the atmospheric common system is called the strengthened greenhouse effect (Türkeş, 2021a). The positive force of greenhouse gases, which started to accelerate with the Industrial Revolution, is shown among the main reasons for climate change (Topcuoğlu & Doğan, 2011).

Many scientists say that in the last 150 years, the positive force of carbon dioxide (CO_2) concentration in the atmosphere has increased by 35% (to 378 ppm), from 280 parts per million before the industrial revolution, as a result of human activities, causing the average global warming to increase (Justus & Fletcher, 2006).

In the report of the International Panel on Climate Change (IPCC), it is stated that the main actor of climate change belongs to human activities (Kızmaz, 2021). It is claimed that the impact of human activities on the occurrence of climate change is strengthened in a positive direction by 95% (Erk, 2017). The reasons for the increase in carbon dioxide (CO_2) concentration and other atmospheric gases are due to human activities, such as fossil fuel use, deforestation, industrialization, increase in human population, and change in land cover (Justus & Fletcher, 2006).

In the Climate Change Mitigation Strategy and Action Plan report, it is mentioned that global warming has increased by 1.1°C from 1850 to 2020 as a result of the increase in CO_2 and other gases in the atmosphere

and that this rate will inevitably reach 3°C in the future (Climate Change Presidency, 2024a).

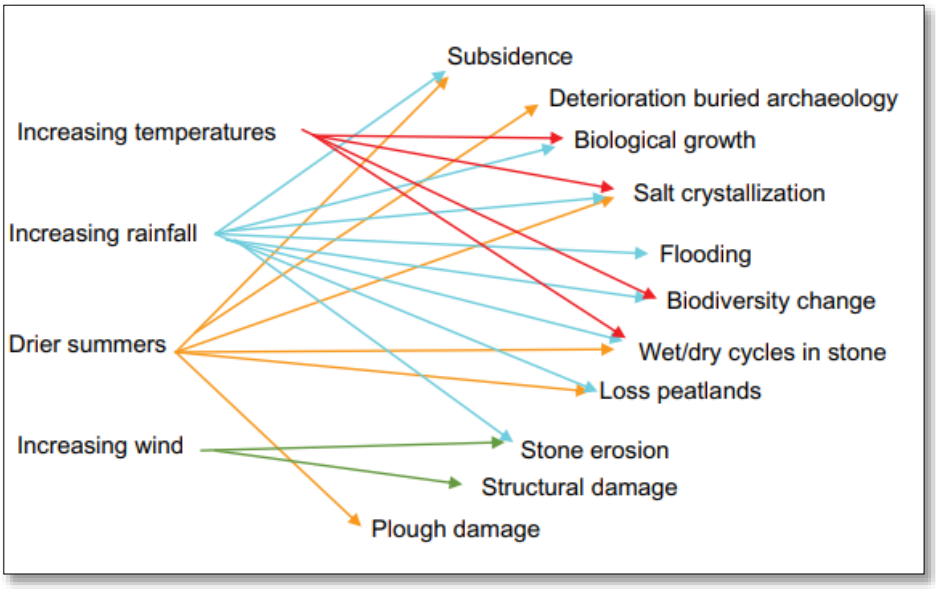


Figure 1. Climate change factors and impacts (Daly, 2014)

Nowadays, increasingly frequent heat waves along with droughts, melting glaciers and permafrost, heavy rains and floods, hurricanes, etc. are seen as an inevitable end of climate change (Somuncu, 2021).

Our natural resources such as surface and underground water resources, marine systems, soil, biodiversity, ecosystems, and forests are affected by sudden weather events seen in climate change. In particular, the seasonal distribution and amount of precipitation and the change in the average annual precipitation flow cause changes and decreases in surface and underground water resources and marine ecosystems, and scarcity of usable water. Sudden heat waves and droughts decrease biodiversity, change ecosystems, decrease fertile soils, and forest fires. Severe weather

events such as sudden winds, tornadoes, and hurricanes cause loss of fertile soil through erosion, changes in biodiversity and ecosystems, etc. (Figure 1).

1.2. Global Climate Change Challenge and Climate Agreements

In 1988, the First Assessment Report of the IPCC dated 1990 was prepared by the World Meteorological Organization and the UN Environment Program for the development of scientific evaluation and combat strategies regarding the effects of climate change. According to the report, it was determined that the amount of gases in the atmosphere has changed significantly as a result of human activities (İklim Değişikliği Başkanlığı, 2024a).

Preventing, adapting to, and mitigating the effects of climate change caused by human activities has become a duty for people. Many studies have been carried out to raise environmental and climate awareness around the world. In addition, states have determined many agreements and policies to fulfill their responsibilities (Selçuk, 2023; Akten & Akyol, 2018).

In 1992, the United Nations Framework Convention on Climate Change (UNFCCC) was signed by 194 countries for the first time in Rio de Janeiro to solve the climate change problem (Selçuk, 2023).

This agreement has brought different obligations to countries to minimize the negative effects of climate change. However, the obligations are not legally binding (Türkeş & Kılıç, 2004).

The contract has been discussed based on four principles. These principles;

• The principle of equality,

• The principle of common but differentiated responsibilities,

• The principle of precaution,

• The right and obligation to support sustainable development (Talu & Kocaman, 2018).

The UNFCCC divided the parties into three different groups, based especially on the principles of equality and common but differentiated responsibilities and powers according to countries. These are countries in the Annex-I list, countries in the Annex-II list, and non-Annex-I countries. Annex-I includes European Union (EU) member countries, Organization for Economic Development and Cooperation (OECD) member countries, and Countries in the Transition Process to a Market Economy (Eastern Bloc Countries). Annex II consists of EU countries and OECD members. Non-Annex I countries are underdeveloped countries and are the countries that have been and will suffer the most from climate change (Türkeş, 2001; Selçuk, 2023).

The UNFCCC stipulates 3 conditions regarding the goal of stopping greenhouse gas emissions in the atmosphere at a certain level;

• Ecosystems naturally adapt to climate change,

• Food production is not threatened,

• The existence of a period sufficient to allow economic development to be carried out sustainably (Türkeş, 2021b).

The fact that countries fall behind their greenhouse gas reduction obligations and put their financial interests ahead of global problems has made the fight against climate change very weak. The UNFCCC has been found insufficient to meet greenhouse gas reduction targets because it is not legally binding and does not set clear obligations (Selçuk, 2023).

The Kyoto Protocol is the first international agreement signed on 11 December 1997 (United Nations Environmental Convention on Climate Change (UNFCCC) to determine and reduce the greenhouse gas emissions of major industrial countries with legally binding rules (Fletcher, 2006). This agreement was the first to specify a quantified emission reduction target for Annex-I parties (Climate Change Presidency, 2024b). It was made suitable for the approval of the parties at its conference in 2001 was accepted and approved by the Russian Federation in 2004 and entered into force on February 16, 2005 (Kartal & Akıllı, 2018).

The Kyoto Protocol is an important step for member countries to combat climate change, embodied by the numerical limit. The fact that the USA, which is the first country with the highest greenhouse gas emissions, was excluded from the agreement in its second responsibility period (USA President G. W. Bush period), and the second country, China, and the fifth country, India, did not sign the protocol, caused a big problem. In addition, developing countries have argued that greenhouse gas emission reduction obligations should be undertaken by countries with historical responsibility, and have not taken the mitigation obligation because it would negatively affect the development processes of their economies (Selçuk, 2023).

The Paris Agreement is an important turning point in the climate change process. This Agreement covers all countries for the first time and brings them together to combat climate change and adapt to its current impacts. Under the agreement, countries must work on a five-year climate action cycle called a National Declaration of Contribution (NDC). Parties are

obliged to submit their NDCs to the UNFCCC Secretariat every five years. Each NDC submitted to the UNFCCC Secretariat is intended to reflect a higher degree of ambition compared to the previous NDC (İklim Değişikliği Başkanlığı, 2024a).

1.3. Türkiye's Climate Change Struggle and Studies

Türkiye became a Party to the Kyoto Protocol on 26 August 2009, following the Council of Ministers Decision No. 2009/14979. Türkiye which is not a party to the UNFCCC, is not included in the ANNEX-B (list of developed countries) list of the Protocol, where the quantified greenhouse gas emission limitations or reduction obligations of ANNEX-I Parties are defined. The Doha Amendment, which was adopted for the reduction in the second obligation period of the Kyoto Protocol (2012-2020) (The Doha Amendment includes changes or regulations for the second period of the Kyoto Protocol, but has not entered into force) does not impose an obligation on Türkiye (İklim Değişikliği Başkanlığı, 2024b).

The Paris Agreement has accelerated Türkiye's climate change efforts. Türkiye's first Climate Council was held on 21-25 February 2022. At this meeting, 217 recommendations were adopted to create a vision for Türkiye's 2053 Net Zero Emission Target, and 76 of them were prioritized. These decisions formed the basis for the preparations of the Climate Law, NDC, Climate Change Mitigation and Adaptation Action Plans and Long-Term Climate Change Strategy (İklim Değişikliği Başkanlığı, 2024a, İklim Değişikliği Başkanlığı, 2024c).

The most distinctive feature of the Paris Agreement compared to the UNFCCC is that it envisages a system that will be based on the

contributions of all countries. The agreement is based on the understanding that developed/developing countries assume responsibility in the fight against climate change in line with the principle of "common but differentiated responsibilities and relative capabilities" of all countries (T.C Dışişleri Bakanlığı, 2024).

In Türkiye; Dated 29/10/2021, the duties of "determining policies, strategies, and actions at national and international levels within the scope of Türkiye's fight against and adaptation to climate change, carrying out negotiation processes, ensuring coordination with institutions and organizations" were given to the Presidency of Climate Change (İklim Değişikliği Başkanlığı, 2024a).

Preparatory work for the Climate Change Mitigation Strategy and Action Plan (2024-2030) has been initiated within the framework of the Climate Council Decisions, the 12th Development Plan, and the MTP 2024-2026. Action plan; It is structured on seven main mitigation sectors, namely "Energy, Industry, Buildings, Transportation, Waste, Agriculture and Land Use, Land Use Change and Forestry (LULUCF)", defined as the basic mitigation sectors, and 2 horizontally cutting theme areas: "Just Transition and Carbon Pricing Mechanisms" yapılandırılmıştır (İklim Değişikliği Başkanlığı, 2024a).

2. Material and Method

In this study, firstly, national and international literature research was conducted on the subject of the study, such as books, articles, theses, internet sources, official institution reports and sites, etc. The causes of global climate change, international and national studies against global

climate change, and the problems experienced by rural settlements due to global climate change are discussed.

In the second stage, it tried to reveal the importance of the Village Design Guide, which is an important tool for rural settlements, and its importance in the fight against global climate change. In this regard, suggestions for spatial strategies and actions have been developed for the Village Design Guide in line with climate change, taking into account the findings of official institution reports and theses, articles, etc. literature. It is thought that the proposed strategies and actions will be guiding for decision-makers and practitioners by integrating the suggestions presented in climate change mitigation and adaptation processes

3. Findings

3.1. Rural Settlements and Climate Change

The phenomenon of settlement consists of two basic approaches: rural and urban. Rural settlements appear as settlements where natural and environmental areas come to the fore and are the main centers of agriculture and animal production (Yenigül, 2017). If we give a more detailed definition of rural settlements, they are settlement areas that differ from urban settlements in many aspects, such as population density, economic resources, social and cultural structure features, relationship with the environment, etc. (Aydemir & Gül, 2023). It stands out by being distinguished from urban settlements, especially with its natural and cultural landscape values (Gül et al., 2019).

Today, urban settlements are responsible for 75% of global greenhouse gas emissions with their production and consumption rate, structural mass increase, human-induced activity intensity, transportation,

buildings, and energy sectors (UNEP 2019). Although cities, directly and indirectly, increase the effects of climate change, greenhouse gas emission rates vary depending on the size of cities, planning dynamics, lifestyle of the population, and energy consumption (Aşıcı, 2023).

Urban settlements are the main spatial areas in the emergence of climate change. Rural settlements are places that are more affected by climate change than urban areas and face many problems. According to IPCC Rural Areas reports, rural settlements stated that they face certain vulnerabilities to climate change due to their relative deficiencies in investment, service access, management, etc. compared to urban settlements (Table 1) (Morton et al., 2014). Reasons why rural settlements are vulnerable compared to urban areas:

• Even though there is an increase in migration from rural settlements to urban settlements, 3.3 billion people still live in rural areas. This accounts for almost half (47.9%) of the world's total population (UN DESA Population Division, 2013).

• The majority of the world's rural population (3.1 billion people or 91.7% of the rural population or 44% of the world's total population) lives in less developed countries (UN DESA Population Division, 2013).

Table1. Poverty indicator in rural areas of developing countries. (IFAD, 2010; Morton et al., 2014).

	Incidence of proverty (%)		Incidence of rural proverty (%)		Incidence of extreme proverty (%)		Incidence of extreme rural proverty (%)		Rural people as % of those in extreme poverty	
Developing world	1988	2008	1988	2008	1988	2008	1988	2008	1988	2008
	69.1	51.2	83.2	60.9	45.1	27.0	54.0	34.2	80.5	71.6

• Rural people make up approximately 70% of the world's poor people. IFAD (2010) stated that approximately 70% of the extremely poor in developing countries lived in rural areas in 2005 (Morton et al., 2014).

• Rural areas are associated with specific patterns of human activity, but today they are spatial settlements where these relationships are subject to constant change (Morton et al., 2014).

• Rural areas are defined with their differences compared to urban areas, but these differences are seen more as problems today (Morton et al., 2014).

• The rural population has various sources of income, including animal husbandry, farming, and agriculture. Today, although income sources originating from natural resources are privileged, they are the non-dominant source of income in the world (Morton et al., 2014).

Observing the effects of climate change on rural settlements includes basic questions regarding documentation, detection, and attribution. The main reasons for this situation are the numerical abundance and spatial dispersion of rural settlements, low education level, small number of young population, etc. causes (Aydemir, 2022). This situation strengthens the rural community's access to infrastructure and superstructure opportunities and makes public investments difficult (Erdem, 2012; T.C Kalkınma Bakanlığı, 2018).

In rural settlements, the effects of climate change on the structure of settlements, livelihoods, and incomes will be the result of multi-step causal impact chains. These chains will typically be of two types. The first of these will include extreme events such as floods, storms, and droughts that affect rural infrastructure and directly cause loss of life.

The other type would involve impacts on ecosystems on which agriculture or rural people depend (Morton et al., 2014).

The category of extreme events that negatively affect rural settlements includes storms, floods, and drought. Saldaña-Zorrilla, (2008) Hurricane Stan flash floods and river floods in October 2005 affected approximately 600,000 people along the Chiapas coast. Drought, decreased employment and migration also cause serious economic consequences for rural settlements (Gray & Mueller, 2012). Ericksen et al. (2013) investigate various animal mortality rates due to drought in Africa. The number of livestock deaths has increased by 80% since 2009.

3.2. Climate Change Adaptation Strategies and Actions of the Village Design Guide

Design policies are a tool that regulates the justifications of designs and the content of applications and sanctions. Design guides are special application tools that contain the goals and objectives of design policies (Eminağaoğlu & Çevik, 2007).

Design guides protect natural and cultural landscape values, highlight the socio-cultural values of local life, guide development, determine spatial and functional usage diversity, adopt visions and strategies that protect locality but adapt to the future, offer strategic solutions to problems in the field, are flexible, adaptable to change. and are tools open to development (Gül & Bostan, 2018).

Today, compared to urban settlements where similar and monotonous structures are seen, rural settlements have cultural and natural landscape values, ecosystems, biodiversity, social values, etc. They are settlements with rich features and unique values. However, the fact that the current

laws and regulations for rural settlements cannot meet today's needs and are insufficient and complex in terms of content is an alarming situation (Aydemir & Gül, 2023). With the Law No. 6360 of 2012, the legal personality of village and town municipalities within the territorial borders of the districts of 30 provinces was abolished, the villages turned into neighborhoods, and the municipalities joined the municipalities to which they were affiliated under the name of town (Eroğlu, 2013). Rural settlements have become an important issue that requires a separate planning and design approach from urban development plan policies. In our country, Village Design Guides (KyTR) entered the legislation with an article added to Zoning Law No. 3194 in 2013 (Aydemir, 2022). In the current legislation, the content, details, and relationship of KyTR with planning have not yet been defined and there is no regulation or directive. Rural settlements are in a much more fragile position than urban settlements due to deficiencies and inadequacies in many areas such as laws and policies, economy and development, infrastructure and superstructure, etc. This situation is getting even worse, especially with the many problems caused by global climate change today.

Türkiye has entered a period of combating climate change. Rural settlements and the climate change adaptation process, which are handled only in the field of agriculture and animal husbandry in terms of rural development, are very inadequate. In this respect, the fight against climate change can be addressed with spatial analyses and this scope can be expanded by taking advantage of the local, flexible, and open-to-development structure of village design guides. The starting point was the question of what should be the strategic action plans for rural

settlements in line with Türkiye's Net Zero Emission Target with the Paris Agreement and what role KyTR should play in this study. The strategies and action recommendations that should be included in the KyTRs of rural settlements regarding the fight against climate change are given in Table 2.

Table 2. Recommended strategies and actions for KyTR in the fight against climate change (adapted from the study of Aydemir, 2022)

Strategies	
Actions	**General information**
S.1. Expanding the use of renewable energy resources	
S.E.1.1. Expansion of renewable energy systems in small settlements	-To identify lands that are not used for agriculture and settlement purposes. To make these lands available for renewable energy systems (solar energy, wind energy, etc.). -Encouraging solar energy production in residences. - Identifying the hydroelectric potential in water resources and making the necessary investments. -Carrying out geothermal energy potential determination studies in the settlement.
S.2. Development of physical ınfrastructure	
S.E.2.1. Establishment or maintenance and repair of the drinking water infrastructure in the settlement.	-Improvement of existing infrastructure. Carrying out necessary maintenance and repair work. -Carrying out necessary infrastructure repair and maintenance works to ensure healthier, more hygienic, and sufficient water access. -Supporting the necessary work to prevent clean water leaks- Raise awareness of local people through training programs.
S.E.2.2 Establishing the sewer network or carrying out maintenance and repairs.	-Preventing the mixing of wastewater with clean water and soil and supporting the necessary infrastructure works. - Ensuring the connection of wastewater treatment plants and the sewerage network. - Establishment of sustainable wastewater management should be supported. - Improvement of existing infrastructure. Supporting maintenance and repair works of buildings in poor condition.
S.E.2.3. Establishing electrical infrastructure or carrying out maintenance and repairs.	- Improvement of power lines. Carrying out necessary maintenance and repair work. - Awareness should be increased about energy efficiency in electricity use.
S.E.2.4. Supporting clean-emission energy infrastructure.	-Conducting the necessary feasibility studies and creating the required infrastructure for transmission and distribution through natural gas pipelines. -Using fuels with high sulfur content, such as coal, dung, etc., should be prevented, and using clean fuels such as natural gas should be encouraged. -Solar and wind energy systems should be supported and their usage areas in residences should be increased.

Table 2. Recommended strategies and actions for KyTR in the fight against climate change (adapted from the study of Aydemir, 2022) (continued)

S.E.2.5. Improving existing transportation systems and accessibility.	- Renewal and improvement of the existing transportation network, carrying out necessary repairs and maintenance works. - Public transportation should be expanded between urban and rural settlements. -Smart card systems that allow fare collection/charging to encourage the use of public transportation should be expanded. -Micromobility/walking options should be strengthened. More reliable walking networks should be created for individuals. - The use of low/zero emission vehicles should be supported in public transportation or individual vehicle use. -Planning and development of charging station infrastructure in the required number and location in the transportation network should be supported for the widespread use of electric vehicles.
S.E.3. Making risk planning for natural disasters	
S.E.3.1. Conducting earthquake risk analysis and determining the necessary measures.	- Providing first aid and civil defense basic training to individuals in the settlement. -Identification studies of buildings at risk of earthquake and collapse in the settlement -Carrying out structural strengthening, maintenance, and repair works of buildings at risk of collapse. -Designing first response areas in the settlement (emergency meeting areas, etc.)
S.E.3.2. Conducting flood and erosion risk analysis and taking necessary precautions.	- Individuals in the settlement should be given first aid and intervention training in case of flood and erosion. -Determining residential areas that will be affected by natural disasters such as floods and landslides and taking the necessary precautions. Supporting the relocation of structures in identified dangerous areas to different areas.
S.E.3.3. Conducting risk analyses for weather events such as high winds, tornadoes, etc., and taking necessary precautions	- In sudden and severe weather events, local people should be given first aid and intervention training. - Spatial organization studies should be carried out to minimize loss of life and property.

Table 2. Recommended strategies and actions for KyTR in the fight against climate change (adapted from the study of Aydemir, 2022) (continued)

S.E.4. Protecting and ensuring the sustainability of traditional civil structures against the risk of climate change.	
S.E.4.1. Determination of typologies and preparation of surveys of traditional civil architectural structures.	-Conducting and supporting building typology studies of local architecture. -Preventing the construction of new and modern buildings other than local architectural structures in the settlement. - Building approach zones (ecological sensitivity buffer zones) to forest, agriculture, and water resources should be created and the construction of new buildings should be prevented. -Carrying out an inventory of local materials used in the building. Its use in new buildings should be encouraged.
S.E.4.2. Supporting and encouraging maintenance, repair, renovation, and restoration of traditional and idle buildings against climate change.	-Carrying out maintenance, repair, and restoration works for the protection and sustainability of registered buildings, if any, in the settlement. Typological studies of the buildings should be carried out. - Maintenance and repair works of idle, damaged, and about to collapse houses in the settlement should be supported.
S.E.4.3. Training masters and apprentices for local architecture, and providing support and encouragement for training and practice.	- Organizing training, courses, etc. workshops on building materials, maintenance, and repair specific to the location of the settlement. -Supporting the training of craftsmen who know the local materials and carry out the necessary maintenance, repair, and renovation works.
S.E.5. Making a zoning plan to protect against the risk of climate change	
S.E.6. Establishment of the Advisory Board to combat climate change.	
S.E.6.1. Establishing an Advisory Board for permission, approval, monitoring and control for every activity to be carried out in the village.	-Establishing an Advisory Board to perform duties such as permission, approval, monitoring, control, etc. for all kinds of activities to be carried out in the settlement.

Table 2. Recommended strategies and actions for KyTR in the fight against climate change (adapted from the study of Aydemir, 2022) (continued)

S.E.7. Reducing the use of chemical fertilizers, pesticides, and anti-microbials.	
S.E.7.1. Preventing excessive use of chemical fertilizers, especially nitrogenous fertilizers, to reduce carbon emissions from agricultural soils.	-Establishment of inspection and monitoring systems for the use and application of fertilizers and pesticides after existing agricultural activities in the settlement. -Local people should be made aware of the conscious use of pesticides and fertilizers and training programs should be provided. - The use of organic, organomineral, compost, green manure, etc. alternative fertilizers to chemical fertilizers should be supported. - The use of pesticides and anti-microbials should be reduced, and the use of registered and licensed alternative products should be supported. - Dissemination of biological control. Establishing institutions related to biological control and providing support to farmers.
S.E.7.2. Supporting organic agriculture.	-Ensuring the promotion of organic agriculture and food production. Providing farmers with financial support for organic agriculture. -Providing farmers with a training, consultation, and monitoring-evaluation system by authorized units and institutions on organic agriculture. -Establishing cooperatives in organic production and food settlement and supporting farmers.
S.E.7.3. Supporting the use of local seeds.	-Supporting and encouraging the use of local seeds. -Supporting the creation of local seed banks specific to the settlement. - Establishing local seed cooperatives and supporting farmers.
S.E.8. To support the conservation of agricultural areas for environmental purposes (ÇATAK) project.	
S.E.8.1. To support the ÇATAK project in the fight against climate change.	"ÇATAK project, protecting soil and water quality, sustainability of natural resources, preventing erosion and reducing the negative effects of agriculture". - Minimum tillage in agricultural practices, protecting soil and water structure, preventing erosion, and supporting environmentally friendly agricultural technical and cultural practices.

Table 2. Recommended strategies and actions for KyTR in the fight against climate change (adapted from the study of Aydemir, 2022) (continued)

S.E.9. To enable land and soil management.	
S.E.9.1. Supporting and encouraging land consolidation.	- Integration of scattered small pieces of land in the settlement, which are very fragmented, dispersed, and distorted.
S.E.10. Reducing methane emissions from livestock.	
S.E.10.1. Increasing studies on genetic-based animal breeding that takes methane emissions into account.	- Planting forage crops to ensure the sustainability of meadow-pasture areas. -Meadow-pasture areas should be left fallow periodically for their sustainability.
S.E.10.2. Supporting meadow-pasture forage plant production.	- Encouraging the production of forage plants that will increase the quality of animal feed, meat, and milk production and quality.
S.E.10.3. Supporting the protection and development of meadow-pasture areas.	- Carrying out and supporting the necessary procedures and studies to protect the soil from erosion and increase soil fertility.
S.E.11.To ensure the protection and sustainability of water resources.	
S.E.11.1. Determination of ecological protection buffer areas for water resources protection and conservation.	- Creating a protection buffer zone for water resources in the settlement and prohibiting activities such as human intervention, construction, mining, etc. within this buffer zone.
S.E.11.2. Maintenance and repair of the water network and prevention of water leaks.	- Carrying out necessary maintenance and repair works to prevent water leaks in water networks connected to water sources in the settlement.
S.E.11.3. Supporting innovative approaches to agricultural irrigation systems and carrying out existing maintenance, repair or renewal works.	- Encouraging drip irrigation or sprinkler irrigation systems instead of traditional flood irrigation in agricultural lands. - Promoting innovative approaches in agricultural irrigation and supporting the creation of cooperatives.
S.E.11.4. Detection and protection of underground and surface water resources.	- Determining the quality and capacity of the settlement's underground and surface water resources and controlling their use.

4. Conclusion and Suggestions

Rural settlements are places where cultural and social values are in harmony with all aspects of nature and need to be protected and developed with their natural attractions, unique settlement styles, and unique identity values (Aydemir, 2022). Reasons such as the conceptual confusion seen in our country in this field, deficiencies, gaps, and lack of up-to-dateness in the planning hierarchy and current legal dimension have left rural settlements facing multifaceted problems. The main factors of global climate change are the negative effects of anthropocentric approaches on the environment/nature. Industrialization, urbanization, industrial agriculture-food systems, and increasing human-effect greenhouse gas emissions are among the most obvious reasons (Hazar Kalonya, 2022). In addition to these problems observed in rural settlements, these settlements are going to a more serious point with many problems created by global climate change today.

Village design guides (KyTR) are guides that define and analyze the natural, cultural, ecology, and biodiversity of rural settlements and local identity and create a holistic and systematic spatial organization of common and private spaces for the future, where actions and options for conservation and use are created.

KyTR is not a single content but is an innovative tool that sustainably provides optimal use opportunities, taking into account the demands and needs of the people living there for each settlement, and enables joint decision-making by ensuring the cooperation of all actors and participating stakeholders when necessary (Aydemir, 2022). In addition, village design guides are not only a tool for organizing space but also

have a structure that provides social equality and justice for every individual living in rural settlements, sustains economic vitality, expands awareness of environmental responsibility, addresses rural policies as a whole, and turns them into action.

KyTR, an important tool for rural settlements, is a very new concept, and studies were first started in 2015 with the example of Kastamonu Küre Ersizlerdere Village Design Guide (Demirel et al., 2020). Ensuring sustainability, protecting, repairing, developing, and developing rural settlements, which have been neglected until now, with the aim of "Rural settlements are the insurance of today and the future" is an issue that should be given importance and priority.

The climate change problem requires necessary studies and investments in rural settlements. KyTR can offer spatial analyses and more detailed solution suggestions in the fight against climate change. It enables the creation of more detailed strategies and actions on many issues such as the local architecture of the settlement, public spaces, agricultural activities, animal husbandry, economic production, ecological and biodiversity, etc. It should not be forgotten that KyTR is an important tool in the fight against global climate change, and it should take its place in the planning hierarchy in our country and be included in a regulation or a directive as soon as possible.

Acknowledgments and Information Note

The article complies with national and international research and publication ethics. Ethics Committee approval was not required for the study.

Author Contribution and Conflict of Interest Declaration Information

All authors contributed equally to the article. There is no conflict of interest.

References

Akten, M. & Akyol, A. (2018). Determination of environmental perceptions and awareness towards reducing carbon footprint. *Applied Ecology and Environmental Research*, vol.16, no.4, pp.5249-5267.

Arat, G., Türkeş, M., & Saner, E. (2023). Uluslararası sözleşmeler ön rapor. *G. Arat, & M. Türkeş içinde, Vizyon*.

Aşıcı, G. (2023). Kır-kent çeperinin iklim değişikliği perspektifinden incelenmesi: Denizli örneği. *Yüksek Lisans Tezi, Pamukkale Üniversitesi, Fen Bilimleri Enstitüsü, Şehir ve Bölge Planlama Anabilim Dalı, Denizli*.

Aydemir, Ç. (2022). *Sürdürülebilir Köy Tasarım Rehberi Modeli; Hisarardı Köyü Örneği. Doktora Tezi, Süleyman Demirel Üniversitesi, Fen Bilimleri Enstitüsü, Mimarlık, Planlama ve Tasarım ABD., Isparta.*

Aydemir, Ç. & Gül, A. (2023). Köylerin mekânsal planlama ve tasarım süreçlerinin mevcut mevzuata göre irdelenmesi. *Planlama Dergisi. 33*(2), 205-217.

Daly, C. (2014). A framework for assessing the vulnerability of archaeological sites to climate change: theory, development, and application. *Conservation and Management of Archaeological sites*, *16*(3), 268-282.

Demirel, Ö., Gül, A. & Aydemir, Ç. (2020). Kır/Köy Kültürel-Turizm Bağlamında Köy Tasarım Rehberi. *Kültürel Miras Değeri, Yerel*

Kimliği ve Köy Planlaması &Tasarımı Açısından İslamköy'ün Mevcut Durumu ve Geleceği. Astana Yayınları. Bölüm 13, s:377-390. ISBN: 978-625-7890-27-4. Ankara.

Eminağaoğlu, Z., & Çevik, S. (2007). Kırsal yerleşmelere ilişkin tasarım politikaları ve araçlar. *Gazi Üniversitesi Mühendislik-Mimarlık Fakültesi Dergisi*, 22(1).

Erdem, M. (2012). *Kırsal Yerleşim Peyzaj Kimlik Özelliklerinin Tespiti, Korunması ve Geliştirilmesine Yönelik Değerlendirme Matrisi Önerisi. Doktora Tezi, İstanbul Teknik Üniversitesi, Fen Bilimleri Enstitüsü, İstanbul.*

Ericksen, P., de Leeuw, J., Thornton, P., Said, M., Herrero, M., & Notenbaert, A. (2013). Climate change in sub-Saharan Africa. *Pastoralism and development in Africa: Dynamic change at the margins*, 71.

Erk, N. (2017). İklim değişikliği ve tarımsal üretim üzerine etkileri. *Küresel Isınma İklim Değişikliği ve Sosyo-Ekonomik Özellikleri. Nobel Yayınevi: Ankara*.

Eroğlu, T. (2013). Yerel yönetimlerde reform ve 6360 Sayılı Kanun üzerine bir değerlendirme. *Düşünce Dünyasında Türkiz Siyaset ve Kültür Dergisi, 4*(21), 69-80.

Fletcher, S. R. (2006). *Global climate change*. Washington.

Gray, C., & Mueller, V. (2012). Drought and population mobility in rural Ethiopia. *World development*, *40*(1), 134-145.

Gül, A. & Bostan, Ç. (2018). Kentsel Tasarım Çalışmalarında İnterdisiplinler Arası İşbirliği. Uluslararası Kentleşme ve Çevre Sorunları Sempozyumu, Eskişehir.

Gül, A., Cesur, B. & Bostan, Ç. (2019). Kültürel turizm kapsamında yerel kimlik oluşturma yöntem yaklaşımı. *Eurasian Education Literature Journal, (3),* ISSN: 2149-3510, 461-476, 2019.

Hazar Kalonya, D. (2022). İklim değişikliği azaltım ve uyum süreçlerinde mera alanlarının önemi. *Çevre, Şehir ve İklim Dergisi*. Yıl: 1. Sayı: 1. ss. 128-157.

Hekimoğlu, B., & Altındeğer, M. (2008). Küresel Isinma ve İklim Değişikliği. *Samsun Valiliği İl Tarım Müdürlüğü*, 1-79.

IFAD. (2010). Rural Poverty Report 2011. New Realities, New Challenges: New Opportunities For Tomorrow's Generation. The International Fund for Agricultural Development (IFAD), IFAD, Rome, Italy, 319 pp.

İklim Değişikliği Başkanlığı. (2024a). İklim Değişikliği Azaltım Stratejisi ve Eylem. Access Adress: (19.07.2024): https://iklim.gov.tr/2024-2030-iklim-degisikligi-azaltim-ve-uyum-strateji-ve-eylem-planlari-yayinlandi-haber-4239

İklim Değişikliği Başkanlığı. (2024b). Kyoto Protokolü. Access Adress: (22.07.2024): https://iklim.gov.tr/kyoto-protokolu-i-35#:~:text=Kyoto%20Protokolü%2C%20Ek-I%20taraflarına,Taraflar%20Konferansı%27nda%20kabul%20edilmiştir.

İklim Değişikliği Başkanlığı. (2024c). Paris Antlaşması. Access Adress: (23.07.2024): https://iklim.gov.tr/paris-anlasmasi-i-34

Justus, J. R., & Fletcher, S. R. (2006). *Global climate change*. Washington.

Kartal, T., & Akıllı, H. (2018). *Ulusaldan yerele Türkiye'de iklim değişikliği politikaları ve uygulamaları: Kayseri örneği* (Master's thesis, Nevşehir Hacı Bektaş Veli Üniversitesi).

Kızmaz, Z. (2021). İklim değişikliğinin kırsal alandaki etkisi ve alternatif arayışlar: Sosyolojik bir yaklaşım. *Fırat Üniversitesi Sosyal Bilimler Dergisi*, 31(1), 431-453.

Morton, D. Dodman, B. Karapinar, F. Meza, M.G. Rivera-Ferre, A. Toure Sarr, & K.E. Vincent, (2014). Rural areas. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 613-657.

Saldaña-Zorrilla, S. O. (2008). Stakeholders' views in reducing rural vulnerability to natural disasters in Southern Mexico: Hazard exposure and coping and adaptive capacity. *Global Environmental Change, 18*(4), 583-597.

Selçuk, S. F. (2023). Uluslararası iklim değişikliği anlaşmaları ve türkiye'nin tutumu. *Ulusal Çevre Bilimleri Araştırma Dergisi*, *6*(1), 9-19.

Somuncu, M. (2021). Dünya'da ve Türkiye'de İklim Değişikliğinin Sanayi Üretim Sektörüne Muhtemel Etkileri ve Riskler. İklim Değişikliğine Uyum Konusunda Kurumsal Kapasitenin Geliştirilmesi Eğitimi Projesi. MODÜL 1. 26-30 Nisan 2021. Access Adress (22.07.2024): https://iklimiduy.org/modul/iklimiduy_modul_1.pdf

Talu, N., & Kocaman, H. (2018). Türkiye'de İklim Değişikliği ile Mücadelede Politikalar, Yasal ve Kurumsal Yapı.

T.C. Dışişleri Bakanlığı. (2024). İklim değişikliği ile mücadele. Access Adress: (20.07.2024) https://www.mfa.gov.tr/sub.tr.mfa?6f41190c-6742-405a-9e5a-784385301607

T.C. Kalkınma Bakanlığı, (2018). On Birinci Kalkınma Planı (2019-2023) İşgücü Piyasası ve Genç İstihdamı Özel İhtisas Komisyonu Raporu.

Topcuoğlu, A., & Doğan, C. (2011). Çevre koşullarının kırsal kalkınma potansiyeli üzerine etkileri: iklim değişikliğinin Türk tarım sektörü üzerine etkilerine dair bir değerlendirme.

Türkeş, M. (2001). Küresel iklimin korunması, iklim değişikliği çerçeve sözleşmesi ve Türkiye. *Tesisat Mühendisliği, TMMOB Makina Mühendisleri Odası, Süreli Teknik Yayın, 61*, 14-29.

Türkeş, M. (2021a). İklim değişikliği bilimine giriş. *İklim Değişikliğine Uyum Konusunda Kurumsal Kapasitenin Geliştirilmesi Eğitimi Projesi. MODÜL 1.* 26-30 Nisan 2021. Access Adress (22.07.2024): https://iklimiduy.org/modul/iklimiduy_modul_1.pdf

Türkeş, M. (2021b). Uluslararası iklim antlaşmaları: birleşmiş milletler iklim değişikliği çevre sözleşmesi ve Kyoto protokolü. *İklim değişikliğine uyum eğitimi. MODÜL 2.* 26-30 Nisan 2021. Access

Adress (22.07.2024): https://iklimiduy.org/modul/iklimiduy_modul_2.pdf

Türkeş, M., & Kılıç, G. (2004). Avrupa Birliği'nin iklim değişikliği politikaları ve önlemleri. *Çevre Bilim ve Teknoloji Teknik Dergisi*, *2*, 35-52.

Türkeş, M., Sümer, U. M., & Çetiner, G. (2000). Küresel iklim değişikliği ve olası etkileri. *Çevre Bakanlığı, Birleşmiş Milletler İklim Değişikliği Çerçeve Sözleşmesi Seminer Notları (İstanbul, 13 Nisan 2000)*, 7-24.

UN DESA Population Division. (2013). World Population Prospects: The 2012 Revision, Highlights and Advance Tables. United Nations, Department of Economic and Social Affairs (UN DESA) Population Division Working Paper No. ESA/P/WP.228. UN DESA Population Division, New York, NY, USA, 94 pp.

UNEP. (2019). Climate and Trade Policies in a Post-2012 World. United Nations Environment Programme (UNEP), Geneva, Switzerland, 95 pp.

Yenigül, S. B. (2017). Kırsal kalkınma politikalarında yeni yaklaşımlar ve bu yaklaşımların Türkiye'nin kırsal kalkınma politikalarına etkisi. *Planlama Dergisi, 27*(1), 16-25.

Dr. Çağla AYDEMİR
E-mail: caglabostan15@gmail.com

Educational Status

Licence: Süleyman Demirel University, Faculty of Architecture, Landscape Architecture Department (2010-2015)

Degree: Süleyman Demirel University, Faculty of Architecture, Landscape Architecture Department (2015-2018)

Doctorate: Süleyman Demirel University, Faculty of Architecture, Architecture, Planning and Design Department (2018-2022)

Professional experiences: In 2014-15 (Undergraduate Period), she carried out studies with the support of TÜBİTAK 2209 University Students Domestic Research Projects Support Program. Then, in 2015-16 (Graduate Period), she worked as a TÜBİTAK 1001 project assistant. In 2016-17, she taught as a contracted lecturer at SDÜ Vocational School, SDÜ Faculty of Architecture, Department of Landscape Architecture. She completed her PhD in Architecture, Planning and Design at SDÜ. Between 2022-2024, she worked as a contracted lecturer at SDÜ Faculty of Architecture, Department of Landscape Architecture. She works as a SDÜ postdoctoral researcher (SDÜ DOSAP). She research interests are landscape planning and design, rural planning and design, climate change, land use/change, law and regulation.

Prof. Dr. Atila GÜL
E-mail: atilagul@sdu.edu.tr
Educational Status
Licence (1): Istanbul University, Faculty of Forestry Department of Forestry Engineering (1982-1986).
Licence (2): Anadolu University Education Faculty of Business Administration, Department of Business Administration (2016-2020).
Degree: Yıldız Technical University, Science Institute, Landscape Planning (1986- 1988).
Doctorate: Field Crops Ege University, Institute of Science, (1993-1998)
Professional experiences: Associate Professor: Landscape Architecture. Landscape Planning and Design Suleyman Demirel University Department of Landscape Architecture (2008-2013). Professor: Landscape Architecture. Landscape Planning and Design Suleyman Demirel University Department of Landscape Architecture (2013- is continuing). His research interests are Landscape Planning, Forest Recreation, Protected Natural Areas, Urban Forestry, Grass Field Techniques, and Vegetation Techniques.