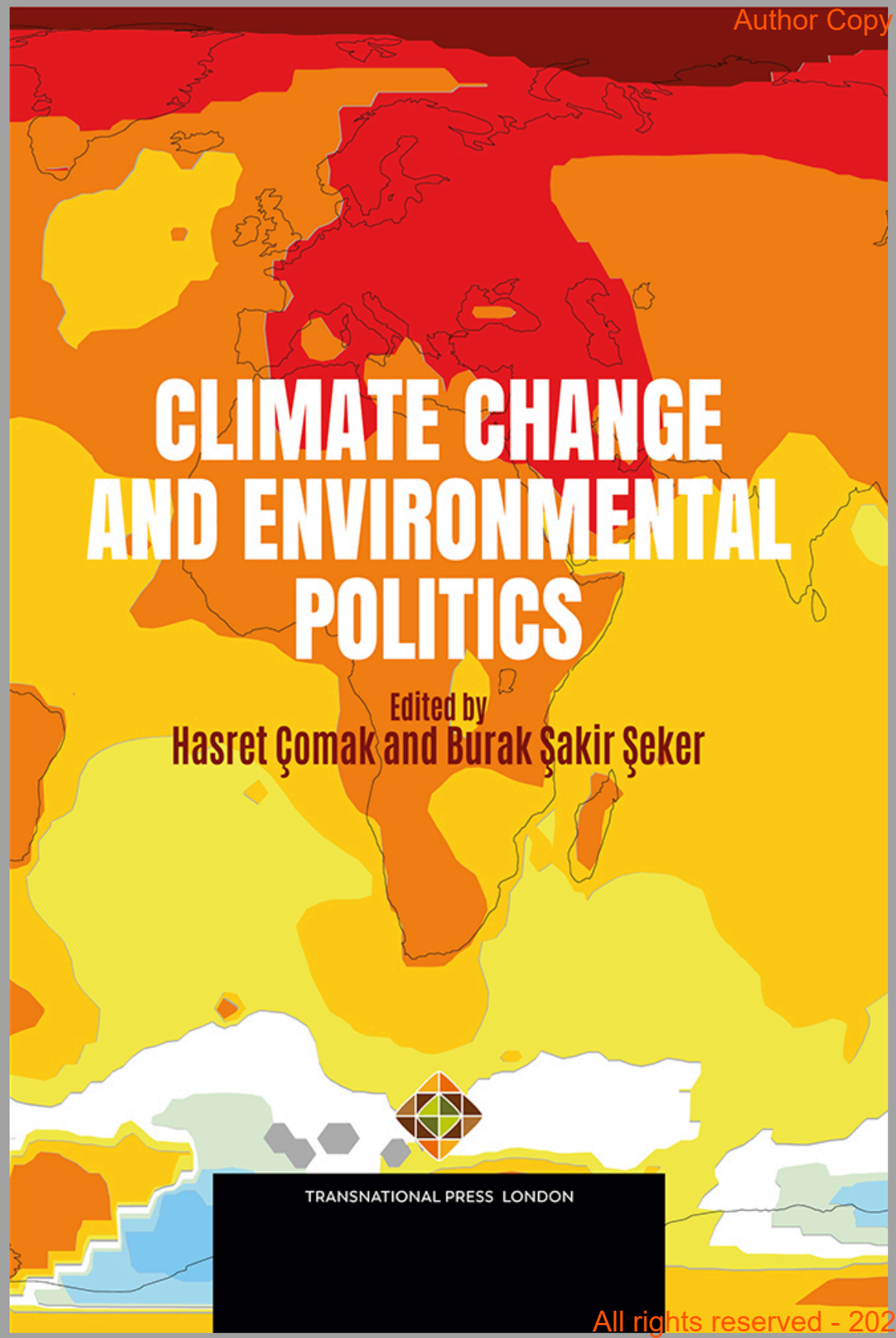

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Edited by Hasret Çomak and Burak Şakir Şeker

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CLIMATE CHANGE AND ENVIRONMENTAL POLITICS

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CONTENTS

PREFACE

Global climate change has brought forth significant challenges for our world. To this end, there is an ever-growing demand for all-encompassing comprehension, innovative solutions, and cooperative work. Analyzing the complexities of climate change and its multifaceted impacts on the planet is crucial.

Environmental, social, and economic ramifications have arisen through the combustion of fossil fuels, deforestation, and industrial processes that cause climate change. Climate change has a wide range of repercussions, such as melting glaciers, severe weather, rising temperatures, and loss of biodiversity.

Today, thanks to interdisciplinary research, cutting-edge instruments, and collaborative efforts, scientists are beginning to comprehend the complexities of climate systems and offered suggestions for advancing political action and developing long-term solutions. Climate change, the primary cause of many global challenges like the environment, migration, water, food, and energy, has enlarged the perspective on international policy and UN initiatives clearly demonstrate it.

In light of this, the United Nations (UN) has acted as the focal point of a global campaign against climate change since 1990. Analyzing the UN's attempts to address climate change involves looking at four key approaches.

The initial phase encompasses the 1972 Stockholm Conference, which marked a turning point in the global endeavor to find a resolution to the issue of climate change. It is frequently regarded as an important turning point for the incorporation of environmental issues in international law that the environment was brought up as a significant subject at the first global conference.

The 1992 Rio Conference gave rise to the United Nations Framework Convention on Climate Change (UNFCCC), which is a component of the second phase.

The Paris Climate Agreement was adopted at the 21st Conference of the Parties (COP 21) to the United Nations Framework Convention on Climate Change (UNFCCC) held in Paris in 2015. This development has been the most important step taken against the effects of global warming, which forms the basis for future international agreements.

The third step was the signing of the Kyoto Protocol during the third Conference of Parties in 1997. The Paris Agreement, which emerged at COP 21 and officially came into force in 2016, can be described as the fourth phase

of this struggle. In general, the UN Framework Convention on Climate Change (UNFCCC), which is led by the UN, is the most concrete development demonstrating the UN's understanding of this issue.

Over the next few years, the UN demonstrated that it was taking a decisive approach to this issue by holding annual conferences that eventually became customary. The Kyoto Protocol and the Paris Climate Agreement are the results of these initiatives and efforts.

Attending the COP 28 conference, which took place in the United Arab Emirates from November 30, 2023, to December 12, 2023, Turkey announced a goal of zero net emissions by 2053.

Today, it is essential to navigate the complexity of climate change and map out the way to a more sustainable future. The primary goals of this century include mitigating the consequences of climate change, safeguarding national and international health, and guaranteeing a sustainable future for next generations.

This book enables a multifaceted examination of climate change, revealing the power of scientific research and disseminating knowledge.

We express our gratitude to our colleagues who served as chapter authors for our book. We would like to express our gratitude to Transnational Press London Chief Editor Prof. Dr. İbrahim Sirkeci and Nihal Yazgan for enabling this work to be published.

Prof. Dr. Hasret Çomak

Assoc. Prof. Burak Şakir Şeker

September / 2024

PART I.

INTERNATIONAL ORGANIZATIONS AND REGULATIONS ON THE ENVIRONMENTAL POLICIES

ANALYSIS OF THE UN EFFORTS TO COMBAT THE CLIMATE CHANGE

Burak Şakir Şeker*

Introduction

As it is known, the security concept has been reshaped more comprehensively after the Cold War ended and since the 1990s. Global-scale issues such as the environment, migration, water and food safety, and energy have gained importance during these years. Global climate change is another issue that has gained importance within the framework of the new security understanding. The expansion of the understanding of international security, including climate change, has also been reflected in the United Nations (UN) and its activities. In this context, since 1990, there has been a global struggle under the UN framework to combat global climate change. The UN's combat against climate change can be examined in four fundamental processes. The first stage includes the Stockholm Conference in 1972[1], which is one of the first steps in the search for a solution to climate change problems in the international arena. It was the first time that the environment was brought up as a major issue at a global conference, and it is often regarded as the turning point of environmental issues to take place in international law. The second phase covers the United Nations Framework Convention on Climate Change (UNFCCC), which emerged as a result of the Rio Conference in 1992.[2] It was the most important step to address the impact of global warming, which also forms the basis for future international climate conventions. While the Kyoto Protocol, which was signed in 1997 at the 3rd COP (Conference of the Parties)[3], constitutes the third stage; The Paris Agreement, which emerged at COP21 and entered into force in 2016, can be stated as the fourth stage of this struggle.[4] In a general framework, it can be said that the most concrete development that shows the awareness of the UN on this issue is the Framework Convention on Climate Change, which was carried out under its leadership. In the next period, the UN has shown that it

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[1] UN, United Nations Conference on the Human Environment, 1972 https://documents.un.org/doc/undoc/gen/nl7/300/05/pdf/nl730005.pdf?token=T1FhXrRF8YaC04mnL4&fe=truehttps://documents.un.org/doc/undoc/gen/nl7/300/05/pdf/nl730005.pdf?token=T1FhXrRF8YaC04mnL4&fe=true (Retrieved:19.12.2023)

[2] UN, UNFCCC, 1992 https://unfccc.int/files/essential_background/background_ publications_ htmlpdf/ application/pdf/conveng.pdf (Retrieved:17.12.2023)

[3] UN, Kyoto Protocol to the United Nations Framework Convention on Climate Change, 1997 https://unfccc.int/resource/docs/convkp/kpeng.pdf (Retrieved:22.12.2023)

[4] UN, Paris Agreement, 2015 https://unfccc.int/sites/default/files/english_paris_agreement.pdf (Retrieved:16.12.2023)

approaches this problem with determination with the COPs, which are held per year and thus have become routine, and it has begun to reap the fruits of these initiatives and efforts relatively with the Kyoto Protocol and the Paris Climate Agreement.

First World Conference on the Environment: Stockholm Conference

Environmental problems that have increased their visibility after the 1970s and climate change that has affected the sustainability of human life have moved the search of states and international organizations for solutions to this problem and have made it necessary to cooperate in this field. The severe climate-related events and their devastating consequences during the 1960s and 1970s demonstrated the fragility of the world food production and trade system linked to the climate structure. In response to these events, the First World Climate Conference was met in Geneva in 1979 by World Meteorological Organization (WMO), UN Environment Programme (UNEP), Food and Agriculture Organization of the United Nations (FAO), the United Nations Educational, Scientific and Cultural Organization (UNESCO), and World Health Organization (WHO). The conference aimed to explain the effects of climate change and how it will affect people's lives by presenting climate information. This conference was held following a series of events organized by the UN.[5]

Additionally, in 1972 The Stockholm Conference[6] is considered a turning point in this sense in terms of drawing attention to environmental problems.[7] At the end of the conference, 26 non-binding general principles and 109 special recommendations were adopted. These general principles include the protection of all-natural resources, the development of the earth's capacity to produce renewable energy, the establishment of institutions to manage environmental resources and improve environmental quality, the use of science and technology to avoid environmental risks, and the elimination of nuclear and mass destruction weapons. Although these principles are not binding, they have started to be evaluated in international law over time and to be considered as the basis of international environmental law. For example, Article 21 of the Stockholm Declaration states "Governments have the legal authority to use their natural resources per their environmental policy, in line with the UN Charter and international law. On the other hand, they have the responsibility of not causing damage to the environment of other countries or places beyond the borders of their sovereignty by these activities within their sphere of sovereignty or control" has become a binding

[5] Information Unit for Conventions (IUC), Climate Change Information Sheet 17. https://unfccc.int/ cop3/ fccc/ climate/fact17.htm (Retrieved: 09.01.2024)
[6] United Nations Conference on the Human Environment
[7] IUC, *Ibid.*

law (hard law) over time. In addition, the most effectively applied rule of the Stockholm Declaration is Article 7, which includes: "To prevent the seas from being polluted with substances that may endanger human life, to prevent the pollution of the seas in a way that will harm living life, spoil their beauty, or adversely affect other legal uses of the seas"[8].

UNEP was another important result of the conference, which is a program to be affiliated with the UN, with the UN General Assembly resolution 2997[9]. It was established in 1972 after the requirement for an inclusive organization liable for the environment came to the fore at the Stockholm Conference. Kenya, Nairobi was chosen as the organization's center after the disagreement between developed and underdeveloped countries. The choice of Nairobi as the headquarters for UNEP had a symbolic meaning. At first glance, this decision, which can be considered positive because it allows the organization to see the problems of the poor world more closely, may cause criticism because it creates a situation that limits the power of UNEP over time. The organization's remoteness from institutions and mechanisms, where high-level political and economic decisions are made, international treaties are discussed, and the direction of global environmental policy is determined, has brought many problems. The inability to meet with experts from other international organizations, the trouble effectively contributing to the process of drafting environmental treaties, and the difficulty of finding qualified specialists to work in Nairobi have been among the main ones.[10]

It was designed as a guiding, coordinating, public opinion, and policy-making organization, and it was not assigned an investment or practical function. In general, UNEP's mission is to bring environmental issues to the attention of the UN, to continually assess the condition of the environment on a global scale, to bring the international community's awareness to environmental problems, and to provide the expansion of national and international environmental law and policy. UNEP raises awareness and advocates for effective environmental action, particularly through World Environment Day. UNEP classifies its work into seven broad thematic areas. These can be specified as global climate change, chemicals, junk and resource efficiency, disasters, etc. Also, one of the most significant accomplishments

[8] UNEP, Stockholm Declaration, 1997. https://wedocs.unep.org/bitstream/ handle/20.500. 11822/ 29567/ ELGP1StockD.pdf (Retrieved:22.12.2023)
[9] UN, Resolution 2997 (XXVII). Institutional and financial arrangements for international environmental cooperation,1972.https://documents.un.org/doc/resolution/gen/nr0/270/27/pdf/nr027027.pdf?token=jgkAqed9HO9nQ0UXqh&fe=true (Retrieved:09.12.2023)
[10] Maria Ivanova. Location Effects of the UN Environment Program (UNEP) in Nairobi Kenya: Challenges and Opportunities. 2023. https://damore-mckim.northeastern.edu/news/location-effects-of-unep-in-nairobi-kenya/ (Retrieved:07.12.2023)

of UNEP is its contribution to international environmental law. It performs this by participating in creating and executing all kinds of international agreements, flexible legal documents, and action plans. For instance, UNEP has undertaken the task of the secretariat of the Vienna Convention and Montreal Protocol (Protection of Ozone Layer)[11], CITES and Bonn Conventions (Wildlife Protection)[12], Convention on Biological Diversity[13], Basel Convention (Hazardous Waste)[14], and Rotterdam Convention (Hazardous Chemicals)[15]. Research and monitoring activities in the field of the environment also occupy an important place in the work of UNEP. "The Global Environmental Outlook – GEO", the publication of UNEP, which is home to numerous research centers, is recognized as one of the respected environmental outlook reports.[16]

Today, the UN tries to carry out its environmental activities to a large extent with UNEP. On the one hand, specialized institutions such as UNESCO, WHO, FAO, and auxiliary units such as the Commission on Sustainable Development (CSD), and the UN Development Program - UNDP have undertaken important functions related to environmental problems. On the other hand, issues that UNEP is inadequate, and possible reforms are also discussed. These inadequacy criticisms are that although the UN has a unit that will deal with environmental problems on its own, such as UNEP, because of the complex feature of environmental problems, authorities, and duties are dispersed among many institutions. While it is a problem that some tasks fall under the mandate of more than one organization, another problem is that, on the contrary, none of the duties fall within the jurisdiction of any of them. An organization such as UNEP, which is expected to be a center in the field of environmental problems, cannot provide coordination and cooperation between deep-rooted and powerful organizations from time to time. Similarly, UNEP does not have any authority regarding the damage caused to the environment by large multinational companies, which are among those responsible for the ecological crisis. UNEP began to lose power during the 1980s, especially after

[11] UN, Ozone Treaties, 2019. https://ozone.unep.org/sites/default/files/2019-12/The%20Ozone%20Treaties %20EN%20-%20WEB_final.pdf (Retrieved:15.12.2023)
[12] UN, CITES, Convention on International Trade in Endangered Species of Wild Fauna and Flora. https://cites.org/sites/default/files/eng/disc/CITES-Convention-EN.pdf (Retrieved:16.12.2023)
[13] UN, Convention on Biological Diversity, 2011. https://www.cbd.int/doc/legal/cbd-en.pdf (Retrieved:14.12.2023)
[14] UNEP, Basel Convention on The Control of Transboundary Movements of Hazardous Wastes and Their Disposal. https://www.basel.int/Portals/4/Basel%20Convention/docs/text/Basel Convention Text-e.pdf (Retrieved:18.12.2023)
[15] UNEP, Rotterdam Convention on The Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, 2017. https://www.pic.int/ Portals/5/Convention Text/UNEP-FAO-RC-CONVTEXT-2017.English.pdf (Retrieved:18.12.2023)
[16] UNEP, The Global Environmental Outlook – GEO. https://www.unep.org/geo/(Retrieved: 22.12.2023)

the World Commission on Environment and Development[17] was established. For example, the appointment of Maurice Strong as the Secretary of the 1992 Rio Conference instead of M. Tolba, the head of UNEP at that time, is considered one of the indicators of this. It is thought that the establishment of the Global Environment Facility (GEF) in 1991 to provide financial resources for global environmental problems and the "Commission for Sustainable Development" in 1992 to monitor, coordinate and implement Agenda 21, pushed UNEP into the background. Even though the treaties were initiated with the initiative of UNEP, many treaties, especially on climate change, establish their own secretariats and working styles and continue to function independently of UNEP. In addition, the inadequacy of UNEP as a global environmental organization is due to its inability to be structured as a specialized agency within the UN, its lack of a strong financial and managerial position, and, as mentioned, the fact that Africa was chosen as the center which creates additional difficulties due to the distance to the epicenters[18].

United Nations Framework Convention on Climate Change (UNFCCC)

Earth Summit, also named the United Nations Conference on Environment and Development/UNCED, was met in Rio, in 1992. The conference is known as the largest organization ever to bring together world leaders in the fight against climate change. One of the most important results of the conference is the adoption of the Framework Convention on Climate Change, in addition to the Rio Declaration, the Convention on Biological Diversity, the Principles of Forestry, and Agenda 21. The UNFCCC agreement can be considered one of the first important international texts to emerge in climate negotiations. According to many authors, it is a milestone in the combat against climate change on a global scale[19].

The purpose of the Convention is to prevent anthropogenic greenhouse gas accumulations in the atmosphere from reaching dangerous levels on the climate system and to succeed in stopping this at a certain level. This is subject to three conditions: the natural adaptation of the ecosystem to climate change, ensuring that food production is not damaged and that it allows for the continuation of economic development in a sustainable manner. In addition, the convention has stipulated some principles and obligations for the contracting countries. These can be listed as the 'common but differentiated responsibilities and respective capabilities' principle, the Prevention Principle, the Precautionary Principle, the Sustainable

[17] Later on, Brundtland Commission.
[18] Barnaby, Frank. "Our Common Future: The 'Brundtland Commission' Report." Ambio, vol. 16, no. 4, 1987, pp. 217–18.
[19] Piggot, Georgia, et al. Addressing Fossil Fuel Production under the UNFCCC: Paris and Beyond. Stockholm Environment Institute, 2017.

Development Principle, and the Cooperation Principle[20]. The principle of differentiated responsibilities and respective capabilities is based on the assumption that some countries have a greater responsibility than others since they have emitted more greenhouse gases since the Industrial Revolution. Therefore, each party's burden varies depending on the degree of their development and historical responsibilities for greenhouse gas emissions Article 5 of the Convention divides countries into three groups with different obligations. In this respect, the Convention divides the parties into three groups annex-I, annex-II, and non-annex- I countries/ or developing countries.[21]

Parties in Annex-1 list are compulsory to limit their greenhouse gas emissions, develop and protect their greenhouse gas sinks, and inform the measurements they take and the policies they pursue to prevent climate change. The Annex- I group categorizes economies in transition and industrialized countries. So, it consists of two clusters of countries. The first group includes countries that are members of the OECD as of 1992, also the EU is in this group. The Convention allows for "some flexibility" in meeting obligations, considering the economic and political challenges faced by Parties to the Economies in Transition (EIT) after regime change. Some countries have benefited from using a different base year, considering recent changes in the economy, leading to a large spontaneous reduction in greenhouse gas emissions. In the second group, there are countries in the process of transition to a market economy. In addition to the obligations they have undertaken in the first group, Annex II countries are obliged to transfer environmentally friendly technologies to developing party countries and to encourage, facilitate, and finance these technologies. So, this category includes developed countries. Non-Annex I, or developing countries, are encouraged to reduce their greenhouse gas emissions, cooperate in research and technology transfer, and protect their greenhouse gas sinks, but they are not under any specific obligations. Non-Annex I countries, on the other hand, vary widely from developing countries such as Brazil and Singapore to OECD countries such as Mexico and the Republic of Korea and include 155 countries. Considering the common but different responsibilities in the Convention, all Parties have compulsory to reduce human-induced greenhouse gas emissions, prevent climate change, and reduce its effects. The categorization of countries in this way has also brought about some debates. Some opponents of the UNFCCC argue that it is unfair to distinguish between Annex I and developing countries and believe that both developed

[20] UN, United Nations Framework Convention on Climate Change, 1992. https://unfccc.int/files/essential_ background/background_publications_htmlpdf/application/pdf/conveng.pdf (Retrieved: 02.01.2024)
[21] *Ibid.*

and developing countries should reduce their emissions.[22]

Despite its flaws, the International Climate Policy Convention garners necessary support from countries due to its consensus nature. By making concessions in favor of developed or developing countries, binding emission reductions were abandoned, and a soft approach was adopted to persuade countries with different interests. The success and effectiveness of the Convention, which was criticized for not making binding provisions, was seen as dependent on the end of the conflict between the North and the South and the establishment of a fair climate policy. The persistence of poverty and visible injustice in the Global South has never elevated environmental protection to the same level of concern as in the Global North. In other words, because the primary focus in underdeveloped countries is economic development, finding solutions to climate change is often relegated to a lower priority. For this reason, developing countries state that the industrialized countries, which are most responsible for human-induced greenhouse gas emissions, should assume the main responsibility, and the view that the right to development cannot be taken from them becomes a constantly debated issue. The challenge of combating climate change is made tougher by the fact that the People's Republic of China (PRC), Brazil, and India are currently the top emitters of greenhouse gases, while developed countries like the United States of America (USA) do not make long-term stable commitments. Furthermore, only a handful of countries have put into effect the decisions made in the convention and have synchronized their national laws with it. Even when certain countries enact legislative changes to safeguard their forests and conserve energy, since these policies are primarily motivated by reasons other than climate change, it wouldn't be accurate to regard these legal regulations within the scope of climate change. States that do not hesitate to sign an important framework agreement such as the UNFCCC have not acted equally eagerly when it comes to implementation. Therefore, although the UNFCCC is a historical step in the fight against climate change, it is clear that more binding international agreements are needed due to the deficiencies in implementation. The Conferences of the Parties continued without interruption, paving the way for the Kyoto Protocol, which was the outcome of the 3rd COP.[23]

Conference of the Parties (COP)

The Conference of the Parties, called COP, is the Convention's highest decision-making body and is the organization where all parties to the

[22] Breidenich, Clare, et al. "The Kyoto Protocol to the United Nations Framework Convention on Climate Change." The American Journal of International Law, vol. 92, no. 2, 1998, pp. 315–31.
[23] Demaze, Moïse Tsayem. "The Obscure Future of the Kyoto Protocol." L'Espace Géographique (English Edition), vol. 41, no. 4, 2012, pp. 346–51.

UNFCCC are represented. The implementation of the UNFCCC and all the measures taken for more effective implementation of the contract are evaluated. At the same time, it also started to fulfill the same task as the Kyoto Protocol. These conferences are held annually unless the members decide otherwise for necessary reasons. Its presidency is held alternately by the countries within the 5 recognized United Nations regions[24]. The first Conference of the Parties, COP1, met in Berlin in 1995, and the last Conference of the Parties, COP28, convened in Dubai, UAE on 30 November 2023. COP3 was held in Japan in 1997, and it is important in terms of the adoption of the Kyoto Protocol, which will be discussed in more detail below. The fourth Conference was held in Argentina, Buenos Aires, with the agenda of determining the details of the execution of the Kyoto Protocol.[25]

Buenos Aires Plan of Action emerged at the end of the 4th Conference of the Parties (COP4). The proposal of some developing countries such as Argentina and Kazakhstan to make reductions voluntarily, and even Argentina's desire to include it in the official agenda of the meetings, proved inconclusive as other developing countries strongly opposed this view. When it was stated at the conference that the Kyoto Protocol did not provide a clear understanding of how to design and implement flexible mechanisms, these mechanisms began to be discussed. These issues are covered in more detail in the Buenos Aires Action Plan. Other issues that are fundamentally addressed in the Action Plan can be specified as fiscal mechanisms, policies, and measures, development and transfer of climate-friendly technologies, consideration of the concerns and needs of countries affected by climate change and the economic consequences of countermeasures, and the work program on Kyoto regulations.[26]

COP6 was held in The Hague and Bonn in two phases, and the concrete output of this conference was the Bonn Agreement, in which the parties agreed on the controversial aspects of the Buenos Aires Action Plan.[27]

COP7 was held in the city of Marrakesh, Morocco. The parties took more comprehensive decisions based on the Bonn Agreement at the conference, and in the end, the document known as the Marrakech Agreement emerged. The Marrakesh Agreement envisaged the establishment of three funds to

[24] Africa, Asia, Latin America and the Caribbean, Central and Eastern Europe, Western Europe and Others
[25] McKibbin, Warwick J., and Peter J. Wilcoxen. "The Role of Economics in Climate Change Policy." The Journal of Economic Perspectives, vol. 16, no. 2, 2002, pp. 107–29.
[26] UNOSSC, Buenos Aires Plan of Action, 1978. https://unsouthsouth.org/bapa40/documents/buenos-aires-plan-of-action/ (Retrieved: 11.01.2024)
[27] UNFCCC, Bonn Agreement, 2001. https://unfccc.int/resource/docs/cop6secpart/05.pdf (Retrieved: 13.01.2024)

implement the decisions taken.[28]

COP13 was held on Bali Island in 2007 and a series of decisions called the Bali Action Plan were taken at the end of the Conference.[29] COP15 was held in Denmark, Copenhagen. This conference is designed as the endpoint of Bali Roadmap, and the new commitment period after 2012 under the Kyoto Protocol. Copenhagen Consensus is a political declaration on climate change and includes the main issues raised in the negotiations under the UNFCCC since 2005. In addition to being a political guide, the Copenhagen Accord also guided the ongoing negotiations within the framework of the UNFCCC and the Kyoto Protocol. The Copenhagen Conference has gone down in history as the climate summit where the most intense discussions on climate change arose and the negotiations reached a breaking point many times. Mistrust between the parties and diplomatic mismanagement led to the conference reaching an inclusive but opaque agreement at the last minute. This political agreement, known as the Copenhagen Accord, has guided subsequent summits on the challenge of climate negotiations.[30]

The key outcome of the COP16, that held in the city of Cancun, was the adoption of decisions known as the Cancun Agreements.[31] At COP19 held in Warsaw, some texts on loss and damage mechanisms and finance were revealed, it was decided to continue the pre-Paris negotiations and the Adaptation Fund (100 million dollars) was collected.[32] COP21, which was held in Paris in 2015, is important because of the adoption of the Paris Agreement. The Paris Agreement and COP21, which will be discussed in more detail below, gained importance with the expectation that an agreement will emerge that will shape the post-Kyoto Protocol period[33].

COP26, COP27, and COP28 were held in Scotland in 2021, in Egypt in 2022, and in UAE in 2023 relatively. COP26 is one of the most recent developments in the UN's search for solutions to global climate change by constantly emphasizing the purpose of maintaining global warming at 1.5 degrees. The summit included agenda topics such as making new decisions by countries, the implementation rates of the commitments specified in the Paris Climate Agreement, and the transition to clean energy. When compared

[28] UNFCCC, The Marrakesh Accords, 2002. https://unfccc.int/cop7/documents/accords_draft.pdf (Retrieved: 15.01.2024)
[29] UNFCCC, Bali Action Plan, 2007. https://unfccc.int/files/meetings/cop_13/application pdf/cp_bali_action.pdf (Retrieved: 16.01.2024)
[30] UNFCCC, Copenhagen Accord, 2009. https://unfccc.int/resource/docs/2009/cop15/eng/l07.pdf (Retrieved: 16.01.2024)
[31] UNFCCC, The Cancun Agreements, 2010. https://unfccc.int/tools/cancun/cancun-agreements/main-objectives-of-the-agreements/index.html#c33 (Retrieved: 17.01.2024)
[32] Adaptation Fund, 2013. https://www.adaptation-fund.org/the-adaptation-fund-surpasses-100-million-fundraising-target-at-cop19/ (Retrieved: 17.01.2024)
[33] UNFCCC, The Paris Agreement. https://unfccc.int/process-and-meetings/the-paris-agreement (Retrieved: 18.01.2024)

to the COP21 (Paris Agreement), countries submitted more ambitious climate commitments and National Statement of Contribution. Large-scale arrangements such as weaning off fossil fuels, strengthening the Marrakesh Partnership level, India's net-zero commitment, and the PRC-U.S. agreement can now be seen in the countries' renewed Nationally Determined Contributions (NDCs).[34]

One of the positive developments was the signing of the "Glasgow Leaders' Declaration on Forests and Land Use". Thus, countries declared that they would cooperate to promote rural transformation, reduce forest losses, and increase forest assets.[35]

Last, but not least, another achievement was the "Beyond Oil and Gas Alliance". With this alliance established under the leadership of Costa Rica and Denmark, countries aim to gradually limit the exploration and production of fossil fuels.[36]

The positive atmosphere of the conference was also reflected in the PRC-US relations. They declared a joint statement that they will combat climate change jointly by protecting forest assets, using coal, and combating methane. Also, the signing of an agreement to phase out gasoline and diesel-powered vehicles and replace them with zero-emission vehicles until 2035 at the latest was another success of the Conference. On the other hand, it is a fact that issues such as the goal of keeping global warming at 1.5 degrees, green energy, and reducing carbon emissions have not gone beyond being a target for years. As a result of mutual negotiations, it is observed that a consensus has been reached with the USA pointing out the year 2035 as the date of exit from coal in energy production and the PRC stating that it will increase its efforts to reduce emission rates. In their joint statement, the two countries state that the targets of the Paris Climate Agreement are falling behind, but that the shortcoming should be corrected as soon as possible. It was observed that the intention to maintain cooperation and solidarity was emphasized during the formation and implementation phases of action plans on the themes of reducing the use of coal and preventing global warming. Another important issue that attracted attention at the summit was India's approach to the "carbon zero" target. It has become clear that India will not have an effective stance on reducing coal use in the short term. It has been stated that the country planning for the targets explained with concepts such as carbon zero and carbon neutral in 2070. Since India is a country with high emission rates,

[34] UNFCCC, Nationally Determined Contributions (NDCs). https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs (Retrieved: 19.01.2024)
[35] UNCCD, Glasgow Leaders' Declaration on Forests and Land Use. https://www.unccd.int/news-stories/statements/glasgow-leaders-declaration-forests-and-land-use (Retrieved: 19.01.2024)
[36] BOGA, 2024. https://beyondoilandgasalliance.org/ (Retrieved: 20.01.2024)

this attitude is another important issue that draws attention[37].

In COP27, the Loss and Damage Fund was established to help developing countries cope with the losses and damage caused by climate change. This is a historic step and recognizes the disproportionate impact of climate change on the most vulnerable groups. A commitment was also made to provide $100 billion per year to developing countries to support climate action.[38]

In COP28, the commitment to meet the 1.5°C target was reaffirmed. This is vital to prevent the devastating effects of global warming. A target of tripling renewable energy capacity by 2030 was set which would accelerate the transition to clean energy. A call was made to phase out coal use because of its key role in reducing greenhouse gas emissions.[39]

In conclusion, it can be stated that with COPs, carbon-zero discourses, and coal exit plans have come to the fore so effectively for the first time. However, when we look at the world emission rates, the size of the USA, PRC, and India's participation in the summit can naturally be made a subject of discussion.

First of all, after the carbon zero discourse, it is seen that the concepts of reducing coal over time and carbon neutrality come to the fore. This shows that countries will not attempt to completely abandon their carbon emissions, especially shortly. In other words, the process leading to the implementation of carbon zero, which is known by all and can be considered as the most effective argument to prevent global warming, faces the risk of spreading over many years. The main factor here is directly related to economic and political interests. The concept of power, which shapes almost every issue in today's international conditions, also shows itself in climate change.

COPs have made good progress in reviewing climate agreements and have promised that countries will implement them through collaboration. However, simply gathering countries to make joint decisions does not guarantee success. It's important to question whether sufficient and comprehensive choices have been made to reduce the effects of global warming and whether countries are actually meeting the targets and commitments they have made.

[37] UNFCCC, Glasgow Climate Pact, 2021. https://unfccc.int/sites/default/files/resource cop26_auv_2f_ cover_decision.pdf and https://unfccc.int/sites/default/files/resource/cop26_auv_3b_Glasgow_WP.pdf (Retrieved: 22.01.2024)
[38] Global Climate Action, Summary of Global Climate Action at COP 27. https://unfccc.int/sites/default/files/resource/GCA_COP27_Summary_of_Global_Climate_Action_at_COP_27_1711.pdf (Retrieved: 20.01.2024)
[39] Global Climate Action, Summary of Global Climate Action at COP 28. https://unfccc.int/sites/default/files/resource/Summary_GCA_COP28.pdf (Retrieved: 20.01.2024)

Figure 1. CO2 emissions.[40]

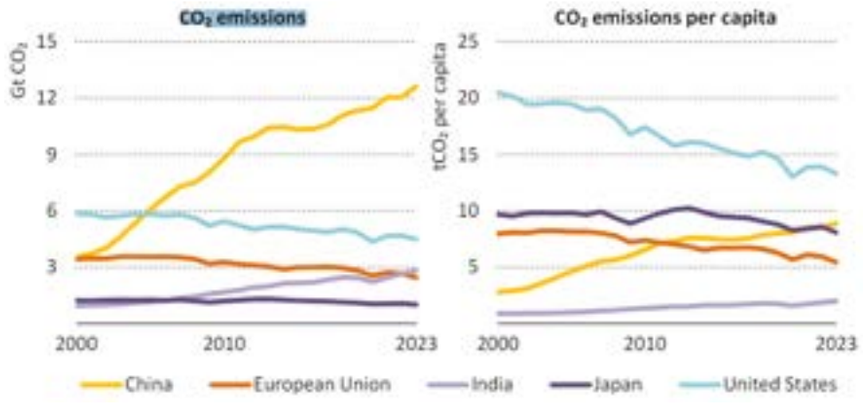
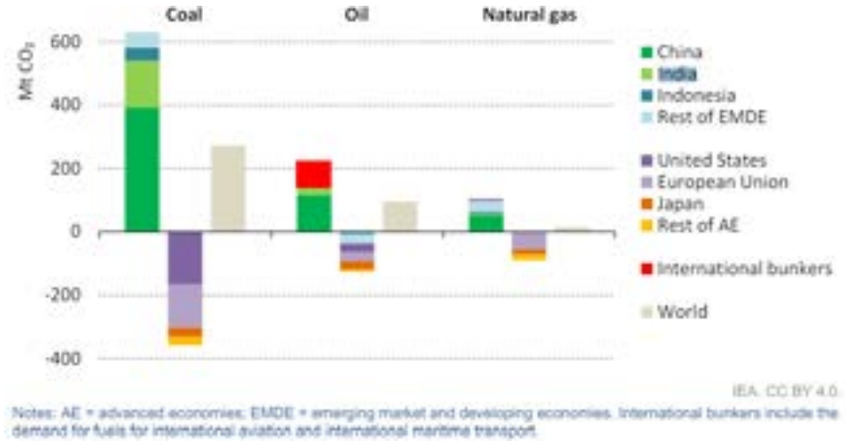


Figure 2. Change in CO2 emissions from combustion by fuel and region, 2022-2023.[41]



Kyoto Protocol

UNFCCC was drafted to fight climate change and sought to keep greenhouse gas emissions at the 1990 level. Despite this, since the expected and aimed global decrease in greenhouse gas emissions has not been reached, the idea of strengthening the missing parts of the contract is strengthened.

As clearly stated, the UNFCCC is a declaration that has set some targets and obligations to combat human-induced climate change. However,

[40] IEA, CO2 Emissions in 2023. https://iea.blob.core.windows.net/assets/33e2badc-b839-4c18-84ce-f6387 b3 c 00 8 f/CO2Emissionsin2023.pdf (Retrieved: 01.04.2024)
[41] IEA, CO2 Emissions in 2023. https://iea.blob.core.windows.net/assets/33e2badc-b839-4c18-84ce-f6387b3c008f/ CO2Emissionsin2023.pdf (Retrieved: 01.04.2024)

although this convention imposes some obligations on the parties, it has been criticized for not clarifying these obligations and not determining a country-based figure for the greenhouse gas emissions that are aimed to be reduced. As a result of these views, the process leading to the Kyoto Protocol was formed to strengthen the obligations of Annex-I parties. The third Conference of the Parties was held in 1997 in Kyoto, Japan. The point that made the related conference important was the adoption of the Kyoto Protocol, which was binding for the first time and set a numerical target for reducing emissions. The Kyoto Protocol is also seen as the continuation of the UNFCCC.[42]

On the other hand, the Kyoto Protocol shares the same foundations and ultimate goal with the UNFCCC which divides the countries into groups as Annex-I, Annex-II, and Non-Annex-I Parties and works with the same auxiliary bodies and secretariat. These two conditions have been determined for the Kyoto Protocol to come into force: the protocol must be ratified by 55 countries including Annex-I countries responsible for at least 55% of the total CO2 emissions calculated in 1990[43].

The Kyoto Protocol includes additional lists, such as Annex A and Annex B, which supplement the UNFCCC. The Annex A list specifies 6 greenhouse gases that contribute to the greenhouse gas effect and need to be reduced, along with the main and sub-sectors responsible for emitting these gases. The Annex B list includes countries that are part of the Annex -I list of UNFCCC and their respective greenhouse gas reduction targets. According to the Protocol, the countries included in Annex-I are obliged to reduce the total emissions of greenhouse gases equivalent to carbon dioxide listed in Annex-A to at least 5% below the 1990 level in the period covering the years 2008-2012. It is seen that the emission reduction commitments are differentiated according to the countries. For example, the EU has 8-9% emission reduction targets, the USA 7%, Canada and Japan 5-6% emission reduction targets. The EU has been given the right to share its target within its union. It is seen that countries such as the PRC and India do not undertake any obligations. Considering that a significant part of the greenhouse gases emitted into the atmosphere come from these large countries, the exclusion of these countries is one of the criticized aspects of the protocol[44].

The conservative role of the USA in the Kyoto Conference both hinders the successful implementation of the protocol and limits the desire of other

[42] Aichele, Rahel, and Gabriel Felbermayr. "The Effect of the Kyoto Protocol on Carbon Emissions." Journal of Policy Analysis and Management, vol. 32, no. 4, 2013, pp. 731–57.
[43] Inside EPA's Clean Air Report, "INC-11 Sets Stage For Stronger Greenhouse Gas Reduction Commitments", vol. 6, no. 4, 1995, pp. 23–24.
[44] UNFCCC, Kyoto Protocol to The United Nations Framework Convention on Climate Change. https://unfccc.int/resource/docs/convkp/kpeng.pdf (Retrieved: 21.01.2024)

countries to achieve their goals. The USA, which previously supported the equal reduction of industrialized countries, agreed on differentiated commitments considering that equal reductions on certain countries would bring excessive economic burden. However, the US delegates insisted that developing countries formally take control of their emissions and they would not commit to any reductions before this happened. The USA, which signed the Protocol during the Clinton administration under public pressure, stated that it refused to ratify the protocol in 2001 after the Bush administration took office. George W. Bush stated the reasons for his opposition to the Protocol, stating that the Protocol brought exemptions to countries with large populations, such as the PRC and India, that it would cause great damage to the US economy, and that scientific information on global warming was not certain. With the Bush administration's withdrawal from the agreement in 2001, the Kyoto Protocol took a major hit. The USA opposed setting specific targets for countries in the Protocol and stated that developing clean energy sources would be a more appropriate target instead.[45]

After the USA announced that it would not ratify the Protocol, attention shifted to the Russian Federation (RF). President Putin promised this at the Marrakesh Conference and reiterated this issue in the European Union (EU)-RF talks in 2002. At the World Sustainable Development Summit in Johannesburg in 2002, Russian Prime Minister Mikhail Kasyonov stated that RF signed the Kyoto Protocol and that necessary preparations were made to ratify it soon. It has been stated that RF needs to increase energy efficiency, so RF will be able to make investments in this field by using the flexible mechanisms defined by the Kyoto Protocol, and energy efficiency will increase the economic competitiveness of RF industries.[46] With the ratification of the Protocol by RF, the condition of ratification by 55 countries, including the parties in Annex-I, which corresponds to at least 55% of the total carbon dioxide emissions in 1990 specified in Article 25, was fulfilled and the Protocol entered into force on 16 February 2005.[47]

The flexible mechanisms mentioned above are another important feature of the Protocol. The protocol has taken into account the objections that may arise while setting these targets for the developed countries and has thought to overcome these objections with some flexible mechanisms. In the Kyoto Protocol, three mechanisms, also known as "flexible mechanisms", have been developed for the parties to fulfill their obligations. Some mechanisms are applied by the parties to reduce the greenhouse gas emissions caused by

[45] Nair, Samiksha. "U.S. Climate Change Policy: A New Chance for Leadership." Connections, vol. 8, no. 4, 2009, pp. 11–38.
[46] Jacqueline Karas, Russia and the Kyoto Protocol: Political Challenges, Royal Institute of International Affairs, RIIA Paper March 2004.
[47] UNFCCC, The Kyoto Protocol - Status of Ratification. https://unfccc.int/process/the-kyoto-protocol/status-of-ratification (Retrieved: 22.01.2024)

human activities with the least cost. While the unit cost of greenhouse gas emission reduction is low in some countries, it is beneficial to reduce emissions in countries where the cost is low, since it is high in some countries. These mechanisms mentioned in the Kyoto Protocol are of 3 types: Clean Development Mechanism (CDM), Joint Implementation Mechanism (JIM), and Emission Trading Scheme (ETS). Flexible mechanisms are one of the distinguishing features of the Kyoto Protocol in that they are not included in other environmental conventions. These flexible mechanisms are also called "carbon markets", so countries can reach their targets with the lowest costs. The flexible mechanisms provided by Kyoto have divided climate writers into two. In particular, the fact that these flexible mechanisms, which make emissions trading possible, include some benefits, but also risks. For instance, the Adaptation Fund to fight climate change-the first international fund dedicated to adaptation-as an important gift from Kyoto. On the other hand, agreements will be jeopardized if legally binding quantitative commitments are imposed on countries to tackle climate change. Perhaps this is why flexible mechanisms like those in Kyoto play an important role in meeting legally binding commitments.[48]

Paris Climate Agreement

The 21st session of Conferences was met in Paris and gained importance with the signing of the Paris Agreement, which shaped the post-Kyoto Protocol period. The agreement was signed in December 2015 and entered into force in November 2016. Important points of the Paris Agreement can be stated under 4 fundamental headings.[49]

Firstly, while the emission reduction target was determined in the Kyoto Protocol, the global temperature target was envisaged in the Paris Agreement. Accordingly, countries will try to keep the global temperature increase below 2 ℃, if possible, at 1.5 ℃ until 2100. Secondly, different from the Kyoto Protocol, the Paris Agreement ascribes responsibilities to all parties and countries. The most basic feature that distinguishes the Paris Climate Agreement from the Kyoto Protocol is that it moves away from the principle of common but differentiated responsibilities and adopts the principle of equal responsibility for all countries. The Paris Agreement is based on Intended Nationally Determined Contributions (INDC), which countries will declare voluntarily to reduce emissions. In addition, the concepts of 'carbon budget', 'green climate fund', and 'sustainable goal developments' are also important points that can be addressed within the framework of the Paris

[48] Van Hecke, Karel. "The Flexible Mechanisms Under The Kyoto Protocol." Studia Diplomatica, vol. 61, no. 1, 2008, pp. 149–75.
[49] UNFCCC, The Paris Agreement. https://unfccc.int/process-and-meetings/the-paris-agreement (Retrieved: 23.01.2024)

Agreement.[50]

The concept of the Carbon Budget, which is not included in the Kyoto Protocol, is included in the Paris Agreement. The carbon budget, as advocated by the Paris Agreement, is the amount of CO2 that humanity can emit while it has a good chance of keeping global warming within 1.5 degrees Celsius compared to pre-industrial levels. Accordingly, two-thirds of the world's carbon budget has been used, and countries are expected to use the remaining one-third of the budget until 2050 and reduce emissions after reaching peak values.[51]

In addition, with the Paris Agreement, the creation of a fund to be used in the fight against climate change has become a necessity. In the new climate regime framed by the Paris Agreement, the Green Climate Fund is important as the main pool of financial support to be provided by developed countries to developing countries and the main use mechanism of this resource. It is envisaged that the fund will provide an annual budget of $100 billion from 2020 and be used by adjusting it according to needs from 2025[52].

The agreement is also a critical chance within the framework of the 2030 Sustainable Development Goals (SDGs).[53] Among them, the 13th goal, Climate Action, includes compulsory action to fight against climate change and its effects. For sustainable economic growth, the world must transition to a low-carbon economy. Goal 13 calls for pressing activity not as it were to combat climate alter and its impacts but moreover to construct versatility against common disasters and related risks such as the food and water emergency that will happen as a result of climate change. Under the framework of the Paris Agreement, the Carbon Budget, the Green Climate Fund, and the Sustainable Development Goals are important steps in the UN's fight against global climate change.[54]

It should be noted that the outlook for the conference was initially rather bleak at first. Only limited progress has been made in the grueling and incessant meetings held at the Durban Platform to prepare the text of the Paris Agreement. While no serious progress has been made in the negotiations, the acceptance of a new climate agreement on 12 December

[50] Daniel Bodansky. "The Paris Climate Change Agreement: A New Hope?" The American Journal of International Law, vol. 110, no. 2, 2016, pp. 288–319.
[51] Centre for Science and Environment. "Carbon Budget: Unfair Share." The Numbers Behind Climate Change: The Imperative of Equity for Urgent and Bold Action on Combatting Catastrophic Climate Change, Centre for Science and Environment, 2021, pp. 22–28.
[52] SSendi, Lucy, and Neha Rai. "What Is the Green Climate Fund?" Eight Things to Know about Green Climate Fund, International Institute for Environment and Development, 2016, p. 4
[53] United Nations set 17 goals in 2015, which are planned to be implemented by 2030.
[54] Marquardt, Jens, and Miranda Schreurs. "Governing the Climate Crisis: Three Challenges for SDG 13." The Environment in Global Sustainability Governance: Perceptions, Actors, Innovations, edited by Lena Partzsch, 1st ed., Bristol University Press, 2024, pp. 21–46.

2015 at the Paris Conference is an important success. The issue blocking the negotiations is the desire of more states to reduce their emissions than envisaged in the Kyoto Protocol. This means that countries take more drastic measures. As a matter of fact, in 2007, the UNFCCC Parties negotiated to further the goals of the Kyoto Protocol, but during these negotiations, serious disagreements arose between the countries, and the Protocol almost escaped the danger of collapse during the Copenhagen Conference in 2009. From time to time, despair dominated the Paris Conference, as the difficulties before the Paris Climate Change Conference reminded all participants of the difficult negotiations held during the Copenhagen Climate Change Conference in 2009. Especially the difference of opinion between the EU and the US showed that a difficult process awaits the delegates. Because, while the EU insists that the Kyoto Protocol should be taken as a basis in the fight against climate change, this proposal for the USA, which is not a party to the Kyoto Protocol, means that the doors will be closed to itself in Paris. At the Paris Climate Change Conference, the demands of the USA, which opposed the use of the Kyoto Protocol, were taken into account more than the demands of the EU. The "Paris Agreement" was signed exactly 18 years after the Kyoto Protocol, when the idea that negotiations, conferences, and meetings held to achieve a new global agreement should be brought to an end. Since the Kyoto Protocol would expire in 2020, the urgent need for a new international climate agreement has facilitated the signing of the Paris Agreement. In this way, a vacuum in the fight against climate change was prevented after the Kyoto Protocol[55].

The agreement, which will determine the new climate regime for the post-2020 period, when the commitment period of the Kyoto Protocol will expire, indicates a period based on the commitments (volunteering) of the countries rather than the rate of jointly developed responsibilities. It is argued that this less binding agreement also does not make a clear distinction between developing and developed countries in reducing greenhouse gas emissions, unlike the previous ones. Within the framework of this voluntary agreement, the PRC has committed to maintain the increase in greenhouse gas emissions until 2030, but then to reduce it clearly, in the "nationally determined intent of contribution" it submitted to the UN on the way to Paris. The EU has committed to reduce greenhouse gas emissions by 40% compared to the 1990 level by 2030, the USA by 28% compared to the 2005 level by 2025, and Turkey by a total of 21% in 2030.[56]

[55] Kienast, Andrea N. "Consensus Behind Action: The Fate of the Paris Agreement in the United States of America." Carbon & Climate Law Review, vol. 9, no. 4, 2015, pp. 314–27.
[56] UNFCCC, The Paris Agreement. https://unfccc.int/process-and-meetings/the-paris-agreement (Retrieved: 23.01.2024)

Conclusion

The possible consequences of climate change are wide-ranging and impactful. They include rising global temperatures, which can lead to more frequent and severe heatwaves, as well as changes in precipitation patterns, potentially causing droughts in some areas and flooding in others. Sea levels are also rising due to the melting of polar ice caps and glaciers, leading to coastal erosion and the inundation of low-lying areas. Climate change may also affect ecosystems and biodiversity, leading to the extinction of certain species and the disruption of food chains. Additionally, extreme weather events such as hurricanes, typhoons, and cyclones may become more intense and frequent, posing a threat to human lives and infrastructure. Finally, climate change can also impact human health, through the spread of vector-borne diseases and the degradation of air and water quality.

In the last 30 years, the UN has made significant efforts to combat climate change through various initiatives and agreements. It all began with the Stockholm Conference in 1972, which marked the first major step in addressing environmental issues on a global scale. Subsequently, the UNFCCC emerged from the Rio Conference in 1992, laying the groundwork for future international climate conventions. The adoption of the Kyoto Protocol in 1997 and the Paris Agreement in 2016 further demonstrated the UN's commitment to addressing global warming and its impacts. These efforts, along with the annual COP meetings, reflect the UN's determination to tackle climate change and have yielded significant results in the form of international agreements and protocols.

While the United Nations (UN) has made significant efforts in combating climate change, there have also been challenges and criticisms. Some critiques of the UN's approach to fighting climate change include instances where international agreements have been viewed as inadequate or lacking enforceability. Additionally, there have been concerns raised about the slow progress in achieving emissions reduction targets and limitations in coordinating global responses to climate change. Despite these challenges, the UN continues to work towards addressing these issues and improving international collaboration in the fight against climate change.

Of course, from the UNFCCC to the Kyoto Protocol and then to the Paris (Climate) Agreement, each of them shows that there is an advanced stage in the fight against climate change and that the international community, especially within the UN, acts responsibly in the fight against this problem However, in dealing with this urgent issue, it's crucial for the international community to act without succumbing to the "climate paradox." This is especially pertinent for public opinion in the most polluting countries including the PRC, USA, EU, India, and RF. Furthermore, the Paris

Agreement, as a key initiative to tackle climate change, should prioritize those nations that have the most significant environmental impact. The commitment of the USA, RF, and PRC to this agreement will notably impact its success or failure.

PRESERVING SKIES: DESTRUCTIVE ASAT TESTS, SPACE DEBRIS AND PRINCIPLES OF ENVIRONMENTAL LAW

Nebile Pelin Manti*

Introduction

While the Russian aggression against Ukraine continues, the Russian military-related satellite launches at the beginning of the February 2024, have escalated space security discussions, and in mid-February, possibility of Russia launch a nuclear ASAT capability caused concerns. After the matter was leaked by House Intelligence Agency[1], Committee Representative Mike Turner has been unwilling to clearly define whether this new Russian capability is in fact a nuclear weapon in orbit, or possibly a nuclear-powered space-based electronic warfare capability[2].

The exponential growth of the debris in Earth orbit poses serious threats to satellites and space environment, but also to space missions with humans on board and on Earth. While on the one hand, decades of human activities in space have created an ever-increasing amount of space debris in Earth orbit, destructive ASAT tests generate thousands of debris objects that spread across vast distances on the other.

Destructive ASAT tests generate thousands of debris objects that spread across vast distances. which travels with high speed especially in Low-Earth Orbit (LEO), where there are millions of human-made objects gravitating at high speeds, polluting space environment, and increasing the chance of collision with satellites and other spacecrafts, which causes great concern for the security and safety of space missions, also endangers the sustainability of outer space.

This study aims to provide an assessment on (1) whether the concepts and principles of international environmental law can help develop a regulatory framework to address space debris. Secondly, (2) in order to ensure sustainable development and environmental protection in outer space, is it possible to reformulate or interpret existing norms regulating space activities and the removal of space debris, or (3) is it necessary to formulate new

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[1] Official X account of House Intelligence Committee, by Mike Turner, February 14, 2024. (Available at: https://x.com/HouseIntel/status/1757805804885823775).

[2] Tom Rogan, "US fears Russia preparing to put nuclear weapons in space", in Washington Examiner, February 14, 2024, (Available at: https://www.washingtonexaminer.com/policy/defense/2856704/us-fears-russia-preparing-to-put-nuclear-weapons-in-space/)

principles for effective implementation and reinforce existing mitigation guidelines to preserve and protect space environment?

Defining the Terms of Discussion

Humans' impact on the environment is not just limited to the lands, rivers and air, human activities also have enormous influence beyond planet Earth[3]. Space debris has become a major concern not only for space faring states, but also for the rest of the nations, which require immediate and efficient response from all stakeholders, in order to manage the effects of debris population, to fight against the space pollution and ensure the continuity of space activities and for the preservation of the outer space environment.

The new destructive ASAT capabilities developed and tested, dramatically increases the problem of space pollution, and significantly raising the likelihood of cascading collisions, which may ultimately render LEOs unusable (and result a scenario commonly known as "Kessler Syndrome").

A Review of ASAT Weapon Systems

ASAT weapon systems can be defined as "weapon systems designed to destroy or limit satellites for military purposes, such as undermining the command-and-control centres of an adversary's military[4]". Today, there are many types of ASAT systems, from kinetic kill vehicles, which physically collide with a satellite to destroy it, to electronic or cyber weapons, that can disrupt or disable a satellite's communication or navigation systems[5]. ASATs can be launched from different platforms according to their types from ground-based platforms, from aircraft or missiles or they can be space-based.

An Anti-Satellite (A-SAT) weapon system can be defined as '*…space weapons designed to incapacitate/destroy satellites for strategic/ tactical purposes.*', '*…of or relating to a system, to destroy satellites in orbit*[6]*', in order* to deny an enemy use of satellite-based communication, navigation, and intelligence-gathering capabilities, which are critical for modern military operations[7].

[3] Sarthak Raval, "Pollution in Space: The Damage We Cause", Campus Centre for the Environment, ASUCD, June 07, 2021, (Available at: https://cce.ucdavis.edu/news/pollution-space-damage-we-cause).
[4] Gottfried, Kurt, and Richard Ned Lebow, "Anti-Satellite Weapons: Weighing the Risks", in Daedalus, Vol. 114, No. 2, 1985, pp. 147–70, (Available at: http://www.jstor.org/stable/20024983), (Accessed May 5, 2024).
[5] Working Paper submitted by Brazil on Destructive Anti-satellite Weapons to Open-Ended Working Group (OEWG) on Reducing Space Threats, 2022, (Available at: https://docs-library.unoda.org/Open-Ended_Working_Group_on_Reducing_Space_Threats_-_(2022)/Brazil's_Working_Paper_on_Destructive_ASATs.pdf)
[6] "Space Support the Key Role of Space Capabilities in NATO Operations", in Three Swords Magazine, July 2017, p. 64. (Available at: https://www.jwc.nato.int/images/ stories/_news_items_/2017/SPACESUPPORT_NATO_ThreeSwordsJuly17.pdf)
[7] Executive Summary, in 2022 Challenges to Security in Space: Space Reliance in an Era of Competition and Expansion, by the Defense Intelligence Agency, March 2022, p. IV, (Available at: https://www.dia.mil/Portals/110/Documents/News/Military_Power_Publications/Challenges_Security_Space_2022.pdf)

ASATs can be examined under two categories, those that use brute force and those that do not use brute force. Kinetic energy ASATs physically crash into satellites, which cover anything that can virtually reach altitude, from ballistic missiles to drones and other satellites. The second main category is the non-kinetic ASATs, which use non-physical attacks, such as cyber-attacks[8], jamming and even blind satellites with lasers. These attacks can all be carried out from the air, low orbit, or even ground installations.

The first examples of ASAT weapons were appeared following the launch of Sputnik 1[9], the world's first Satellite, in 1957, by the Soviet Union, cold war rivals' concern over an orbital network of nuclear-armed satellites continued to grow, and US responded with an air-launched ballistic missile, Bold Orion[10], and then the Soviets responded with their own ASAT, the Polyot interceptor[11], which was first tested in 1963, and successfully tested an orbital anti-satellite (ASAT) weapon in 1968. All of these were examples of co-orbital ASAT weapons, which would essentially fly alongside other satellites and self-detonate, and the explosions impact will be taking down the closer, targeted satellites.

In 2007, when China as a part of force projection for the new space race, destroyed one of its old weather satellites with a ballistic missile[12], and NASA published NASA Administrator Statement on Russian ASAT Test[13], to warn that the continuing tests of Russia have led to a dangerous rise in space debris population[14] orbiting the Earth.

The Russian Ministry of Defense launched an anti-satellite (ASAT)

[8] Tomas Marozas, "Legality Of Targeting Satellites Under Jus In Bello: Specific Focus On Non-Kinetic ASAT Weapons", in Social Transformations in Contemporary Society (STCS), 2020 (ISSN 2424-5631) (online), pp. 34-35, (Available: https://cris.mruni.eu/server/api/core/bitstreams/d394c9aa-5474-4910-bcde-26ddde023bdf/content); Mark Smith, "What is cyberwarfare?", in Live Science, February 25, 2022, (Available at: https://www.livescience.com/what-is-cyber-warfare)
[9] Sputnik 1, 1957, Office of the Historian, (Available at: https://history.state.gov/milestones/1953-1960/sputnik); Elizabeth Howell, "Sputnik: The Space Race's Opening Shot", Space.com, September 29, 2020, (Available at: https://www.space.com/17563-sputnik.html)
[10] Cliff Lethbridge, "BOLD ORION FACT SHEET", (Available at: https://www.spaceline.org/cape-canaveral-rocket-missile-program/bold-orion/)
[11] The word Polyot, meaning 'flight'; Anatoly Zak, "The Hidden History of the Soviet Satellite-Killer: As soon as the Space Age got under way, the Soviet Union was trying to build anti-satellite weapons—and kept trying for decades", in Popular Mechanics, November 1, 2013, (Available at: https://www.popularmechanics.com/space/satellites/a9620/the-hidden-history-of-the-soviet-satellite-killer-16108970/)
[12] Brian Weeden, "2007 Chinese Anti-Satellite Test Fact Sheet", by SWF, January 11, 2020, (Available at: https://swfound.org/media/9550/chinese_asat_fact_sheet_updated_2012.pdf)
[13] NASA Administrator Statement on Russian ASAT Test, NASA, November 15, 2021, (Available At: :https://www.nasa.gov/press-release/nasa-administrator-statement-on-russian-asat-test/)
[14] Nola Taylor Tillman, "Space Junk: Tracking & Removing Orbital Debris", in Space.com, March 9, 2013, (Available: https://www.space.com/16518-space-junk.html)

missile[15] on November 15, 2021, destroying one of its own satellites that had been in orbit since 1982, and creating a cloud of space debris that is threatening astronauts at the International Space Station[16]. While many nations, including the western countries, have conducted ASAT tests before, this test was representing a different risk as to the space security, within the rising hostilities and armed conflict context.

In response, in April 2022, the US announced the ASAT testing ban initiative regarding the use of missiles against satellites, following the Russian test[17].

Space Debris and Pollution of Space

The problem of space debris have been widely known since the mid-1990s, firstly, because of the technical studies, such as the 1995 study by the U.S. National Research Council's, "Orbital Debris: A Technical Assessment[18]," and then, "Technical Report on Space Debris[19]" of 1999, by the Scientific and Technical Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) highlighted the issue.

International efforts to mitigate debris for sustainable outer space require multinational cooperation, which is by nature slow pace and complicated. The Inter-Agency Space Debris Coordination Committee (IADC), comprising the space agencies of China, France, Germany, India, Italy, Japan, Russia, Ukraine, and the United States, plus the European Space Agency, was established in 1993 as a mechanism for space agencies to exchange information.

At the international level, no international legal instrument gives a clear definition of the term "space debris". One of the first attempts to define space debris was made by The International Law Association (ILA), with a formal submission to UNCOPUOS in 1994, suggesting space debris to be defined as "**man-made objects in outer-space, other than active or**

[15] Mark Smith, "Anti-satellite weapons: History, types and purpose", in Space.com, last updated August 10, 2022, (Available at: https://www.space.com/anti-satellite-weapons-asats).
[16] Elizabeth Howell, "International Space Station: Everything you need to know about the orbital laboratory", in Space.com, last updated on February 23, 2024, (Available at: https://www.space.com/16748-international-space-station.html).
[17] FACT SHEET: Vice President Harris Advances National Security Norms in Space: New U.S. Commitment on Destructive Direct-Ascent Anti-Satellite Missile Testing, April 18, 2022, (Available at: https://www.whitehouse. gov/briefing-room/statements-releases/2022/04/18/fact-sheet-vice-president-harris-advances-national-security-norms-in-space/)
[18] "Orbital Debris: A Technical Assessment", National Research Council (National Academy Press: Washington DC, 1995), (Available at: https://www.google.com/books?hl=tr&lr=&id= E1ObAg AAQ BAJ&oi= fnd&pg= PT18&dq= %E2%80%9COrbital+Debris: +A+Technical+ Assessment%E2% 80%9D,+National+Research+Council&ots=nUbBcbZbhF&sig=_KjxyTh7KyWETgr6hTicpRZvS1w)
[19] Technical Report on Space Debris, A/AC. 105/720 (New York: United Nations), by UN Committee for Peaceful Uses of Outer Space Scientific and Technical Committee, UNOOSA, 1999, (Available at :http://www.unoosa.org/ pdf/reports/acl05/AC105_720E.pdf).

otherwise useful satellites, when no change can reasonably be expected in these conditions in the foreseeable future[20]".

There are limited international norms surrounding ASAT weapons and their use, and this present a challenge to the stability of outer space, in an era of rising tensions and augmenting space activities[21]. While it is accepted that the orbital debris is the inevitable consequence of human uses of space, every new launch creates some amount of space pollution, and along with the existing space debris, including defunct satellites, spent and jettisoned rocket bodies, lens caps, bolts, and even paint flecks, constitutes safety and security challenges, due to the high speeds attained by orbiting objects, even tiny bits of debris can collide with and seriously damage or destroy spacecraft.

In 2001, COPUOS charged the IADC to develop a set of voluntary debris mitigation guidelines that might be adopted by the committee and the United Nations at large and in 2002, the Inter-Agency Space Debris Coordination Committee adopted Space Debris Mitigation Guidelines[22] (hereinafter referred to as "the IADC Guidelines"). The guidelines aim at advising States about technical aspects of debris mitigation and reflect "the fundamental mitigation elements of a series of existing practices, standards, codes and handbooks developed by a number of national and international organizations[23]".

They are primarily based totally on 3 major principles: (i) stopping on-orbit break-ups, (ii) removal of space objects which have reached the end of their missions from the beneficial densely populated orbit and (iii) limiting the number of objects released during launches and space operations.

The resulting guidelines included technical recommendations for nations to limit debris.

The Inter-Agency Space Debris Coordination Committee, in their Debris Mitigation Guidelines has developed a definition of space debris as referring to "**all man-made objects including fragments and elements thereof, in**

[20] Marc G. Carns, "Consent Not Required: Making the Case that Consent is Not Required under Customary International Law for Removal of Outer Space Debris Smaller than 10 cm", Air Force Law Review, Vol. 77, 173+, 2017, p.187. (Available at: https://go.gale.com/ps/i.do?id=GALE%7CA499278059&sid= googleScholar&v=2.1&it=r&linkaccess=abs&issn=00948381&p=AONE&sw =w&userGroupName=anon%7Ea155f410&aty=open-web-entry), (Accessed at: May 3, 2024)
[21] Swan, op.cit., pp. 6-7.;Nebile Pelin Manti, op.cit., pp.216-220.
[22] "IADC Space Debris Mitigation Guidelines", by Inter-Agency Space Debris Coordination Committee, IADC Action Item number 22.4, Issued by Steering Group and Working Group 4, IADC-02-01, Revision 1, September 2007, (Available at: https://www.unoosa.org/documents/pdf/spacelaw/sd/IADC-2002-01-IADC-Space_Debris-Guidelines-Revision1.pdf).
[23] Inter-Agency Space Debris Coordination Committee, Space Debris Mitigation Guidelines, September 2007, No. 15.

Earth orbit or re-entering the atmosphere, that are non-functional[24]".

NASA, on the other hand defined orbital debris as, "artificial objects, including derelict spacecraft and spent launch vehicle orbital stages, left in orbit which no longer serve a useful purpose[25]".

While there are other definitions, all their content is essentially the same and the definition of the Inter-Agency Space Debris Coordination Committee has been endorsed by the United Nations Committee on the Peaceful Uses of Outer Space, which is considered as the main forum in which countries gather to discuss issues related to activities in outer space. The Scientific and Technical Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) only generated this definition for use in a non-binding document, most nations have adopted the definition of space debris from the guidelines in their domestic law[26].

The definition of the Scientific and Technical Subcommittee reflects the most current accepted definition of space debris at the international level, as the definition makes practical sense, as mainly based on functionality, and no difference made between large, intact objects and small particles and pieces, and therefore, enables removing non-functional items regardless of their size[27].

The Article VI of the Outer Space Treaty foresees "States Parties to the Treaty shall bear international responsibility for national activities in outer space, …, whether such activities are carried on by governmental agencies or by non-governmental entities[28],".

[24] Report of the Committee on the Peaceful Uses of Outer Space to the General Assembly (UNCOPUOS), U.N. GAOR 62nd Sess., Supp. No. 20, Annex (June 15, 2007) (shorthly, Debris Mitigation Guidelines)
[25] "NASA Handbook For Limiting Orbital Debris", 8719.14 21, 2008, (Available at: https://perma.cc/5U5S-WN5B) (i.e., NASA Handbook 8719.14).
[26] Marc G. Carns, see supra note 10, pp.190-191.
[27] For common law systems, the definition serves the practical needs. Under Common Law, abandonment is "the relinquishment of a right [in property] by the owner therefore without any regard to future possession by himself or any other person, and with the intention to forsake or desert the right...." or "the voluntary relinquishment of a thing by its owner with the intention of terminating his ownership, and without [the intention of] vesting ownership to any other person; the giving up of a thing absolutely, without reference to any particular person or purpose...." "abandonment", in Corpus Juris Secundum, Vol.1: Abandonment-Account, Action, Arnold O. Ginnow, Milorad Nikolic, (eds.), St. Paul, Minnesota West Publishing Co., 1985, p.57.
[28] Full text of the Article VI of the OST: "States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty. When activities are carried on in outer space, including the Moon and other celestial bodies, by an international organization, responsibility for compliance with this Treaty shall be borne both by the international organization and by the States Parties to the Treaty participating in such organization".

There different types of space debris are categorized under four main titles as; (a) inactive payloads, (b) operational debris, (c) fragmentation debris, and (d) micro-particulate matter[29].

(a) ***Inactive or inoperative payloads*** *consist of satellites and spacecraft which have become derelict and cannot be controlled by operating entities on Earth,*

(b) ***Operational debris*** *refer to mission-related objects and rocket bodies which are released during the launch of a satellite and discarded when they are no longer in use.*

(c) ***Fragmentation debris*** *arise from in-orbit break-ups due to explosions, collisions, and accidents in space, and*

(d) ***Micro-particulate matter*** *is generated from shedding of the surface of in-orbit objects and manned spacecraft due to the extremely hostile environment in space.*

The Article IX of the Outer Space Treaty prohibits "harmful contamination of space", but it lacks the appropriate framework to enforce or provide a clear understanding of contamination means. The term used, "**contamination**", refers to the presence, release or discharge of a contaminant, pollutant, hazardous substance to, on, onto and into an environment[30], in terms of OST, space environment; and to its effects.

Even outside the ASAT context, space debris is a risky and costly topic. In September 2020, the International Space Station had to carry out an avoidance manoeuvre for the third time since the beginning of the year in order to avoid a collision with space debris, and such manoeuvres require extra fuel, which can become costly.

Understanding the ASAT Context of Space Pollution and the Tipping Points of Space Safety and Security Risks

The impact of gravitating space debris is dangerous, as in LEO, a debris can reach up to about 1,200 miles (2,000 kilometres) in altitude and can collide with an average speed of about 22,370 mph (36,000 km/h), according to NASA[31]. At such speeds, even tiny pieces of space debris can inflict devastating damage.

In 2013, Alfonso Cuarón represented the context and gathered attention to growing safety and security risks arising from debris pollution in space, with a storyline presenting a Russian missile strike on a defunct satellite,

[29] Howard Baker, "Space Debris: Legal and Policy Implications", (Master Thesis), McGill University, Institute of Air and Space Law, 1988. (Available at: https://escholarship.mcgill.ca/ concern/theses/gb19f7031)
[30] V. Gupta, "Critique of the International Law on Protection of the Outer Space Environment", in Astropolitics, Vol. 14, 2016, p. 21. (https://doi.org/10.1080/14777622.2016.1148462); S. Gorove, "Pollution and Outer Space: A Legal Analysis and Appraisal", in N.Y.U.J. International Law & Policy, Vol. 5, 1972, p. 53.
[31] Astromaterials Research & Exploration Science, NASA Orbital Debris Program Office, (Available at: https://orbitaldebris.jsc.nasa.gov/faq/)

which started a chain reaction of explosions in space, caused multiplication of debris population gravitating at extremely high velocity, then hit NASA's Space Shuttle and caused irreparable damage, by leaving two astronauts stranded in space without communication with Mission Control, in Oscar-winning movie *Gravity*[32], *the story of which is* based on a real-life scenario first described by a NASA scientist in 1978[33], and is no more fiction. In fact, space debris have already caused grave collisions and led to losses costing millions of dollars. One of the best-known cases is Iridium 33, an active U.S. communications satellite, was obliterated on February 10, 2009, when it was struck by a defunct Russian satellite Cosmos 2251 built in the 1960s[34].

According to ESA's 2024 study[35], the total number of space debris objects in Earth orbit is augmenting, there are 36500 - for sizes larger than 10 cm, 670,000 - for sizes larger than 1 cm, more than 170 million - for sizes larger than 1 mm. However, in its February 2020 dated report[36], the European Space Agency shared an estimation of the number of space debris in orbit, which is according to their findings, more than 128 million objects from one millimetre to one centimetre, 900 000 objects from one centimetre to ten centimetres, and 34 000 objects measuring more than ten centimetres.

By 2024, according to the UN's specialised institute, United Nations University- Institute for Environment and Human Security (UNU-EHS)[37], published its Interconnected Disaster Risks 2023 report[38], there are 35,150 tracked objects in orbit, and only about 25 per cent are working satellites.

[32] Ditipriya Dutta Chowdhury, The Conundrum of Space Debris and Its Sustainable Remediation by Polluter Pays Principle, in NUJS Journal of Regulatory Studies, Vol. VII, Issue III, Centre For Regulatory Studies, Governance and Public Policy WBNUJS, (ISSN: 2456-4605(O)), p.99 et seq., (Available at: https://www.nujs.edu/wp-content/uploads/2022/12/vol-7iss-3.pdf)

[33] Jeremy Hsu, "Hollywood Space Disaster Gravity and the Real Problem of Orbital Debris: The film imagines catastrophic consequences of a worst-case Kessler syndrome, in IEEE Spectrum", October 4, 2013. (Available at: https://spectrum.ieee.org/hollywood-space-disaster-gravity-uses-kessler-syndrome-for-scares)

[34] Leonard David, Effects of Worst Satellite Breakups in History Still Felt Today, published on January 28, 2013, (Available at: https://www.space.com/19450-space-junk-worst-events-anniversaries.html)

[35] "How many space debris objects are currently in orbit?", European Space Agency (ESA), (Available at: https://www.esa.int/Space_Safety/Clean_Space/How_many_space_debris_objects_are_currently_in_orbit)

[36] "Space Debris by the Numbers", website of the European Space Agency, February 2020, (Available at https://www.esa.int/Safety_Security/Space_Debris/Space_debris_by_the_numbers).

[37] Based in Bonn, Germany, UNU-EHS conducts research on risks and adaptation related to environmental hazards and global change. The institute's research promotes policies and programmes to reduce these risks, while considering the interplay between environmental and societal factors. Research areas include climate change adaptation by incorporating insurance-related approaches, environmentally-induced migration and social vulnerability, ecosystem-based solutions to adaptation and disaster risk reduction, and models and tools to analyse vulnerability and risks linked to natural hazards, with a focus on urban space and rural-urban interfaces. UNU-EHS, Official Website, (Available: https://unu.edu/ehs/about-unu-ehs)

[38] Interconnected Disaster Risks 2023 Report, by UNU-EHS, 2023, (Available at: https://interconnectedrisks.org/)

Space sustainability refers to the preservation of the space environment for future, peaceful use. It is also essential to note that the space security and sustainability are interconnected, and both are vital to the preservation of space environment for future generations. In order to respond the pressing question that needs to take action to protect the safety and sustainability of the space environment, international environmental law can provide instruments, fundamental principles at its core, which were developed immensely over the past decades, because of the catastrophes, i.e. real-life examples.

ASAT Systems Under International Law

ASAT systems can be used to destroy a state's critical security systems such as satellites used for military communications or nuclear early-warning satellites[39], and can contribute to the congestion of the domain and threaten space sustainability by creating large debris clouds, therefore, both the ASAT capabilities and their testing must be addressed on an international level to protect the stability and sustainability of space.

There are limited international norms surrounding ASAT weapons and their use, and this present a challenge to the stability of outer space, in an era of rising tensions and augmenting space activities[40]. There exists no comprehensive legal framework regulating the use of conventional weapons in outer space and preserving outer space as a shared, sustainable environment for the peaceful uses and exploration has become a challenging task for nations.

There have been many anti-satellite weapons (ASATs) tests which took place in the XXIst century, which resulted massive amounts of space debris, cumulation of which interfering with the rights of other nations to use and explore space safely and freely.

The countries listed in the prior section have carried out more than a dozen destructive ASAT tests in space, all of which have created orbital debris that persisted long after the test itself. While some of the orbital debris from past ASAT tests has decayed from orbit, significant portions of it remain on orbit today. The number of orbital debris created by a destructive ASAT test depends on the nature of the event: primarily the speed of the intercept and the altitude at which it occurred, as well as the mass and structure of the target. If either the interceptor or target was in orbit when the test occurred, a significant portion of the resulting debris is likely to remain in orbit as well. The lifespan of that resulting debris is primarily a function of the altitude at which the destruction happened.

[39] Swan, op.cit., pp. 6-7.

[40] Swan, op.cit., pp. 6-7; Dr. N. P. Mantı, op.cit., pp.216-220.

The known destructive ASAT testing, along with the number of orbital debris tracked following the test, and how much remains on orbit is a challenging topic as there are non-tracked space debris on orbit.

Today the testing and uses of anti-satellite weapons intersect with space security and sustainability discussions on multinational platforms. As recent examples of ongoing conflicts such as Russia-Ukraine War and Israel's Gaza occupation, remind us that these weapons threaten a nation's space security and security on Earth, because they are means of asymmetric warfare. The sustainability of the outer space environment is critical to the modern societies, as most modern technology relies upon space, including telecommunications, GPS, agriculture, financial institutions, and nuclear early-warning satellites. Unlike the Cold War period, more nations and private companies are utilizing space[41]. As the access to space has increased, the environment has become more congested with satellites and debris. This congestion increases the probability of collisions, threatening the sustainability of the domain[42].

At the time of drafting of the OST[43], space was considered to be destined for scientific and military uses, and of these, "the emphasis placed on protecting scientific exploration is made evident through the principle of freedom of use and exploration enshrined in Article I.2 of the Treaty[44]". There are limited international norms surrounding ASAT weapons and their use, and this present a challenge to the stability of outer space, in an era of rising tensions and augmenting space activities[45].

In case the Earth orbits become more contested, and inoperable, the basis of the modern life will not be able to adapt, and today many nations have space forces as military branch, or space commands, and depend on space systems for their defense and security, to conduct military operations, on land, at sea and in air and in cyberspace, and an ASAT can result with the loss of lose their non-space-based capabilities, too. Therefore, the increasing levels of debris and the militarization of the environment, by way of ASAT

[41] McKayla Swan, "Anti-satellite Tests: A Risk to The Security and Sustainability of Outer Space", in Liberty University Journal of Statesmanship & Public Policy: Vol. 3: Iss. 1, Article 4, 2022, pp. 6-7, (Available at: https://digitalcommons.liberty.edu/jspp/vol3/iss1/4)

[42] Nebile Pelin Mantı, "An Assessment of Space Security: Understanding Space Threat Vectors and Their Impact on Military Aspects and Human Security Under International Law", in SPACE ENVIRONMENT AND INTERNATIONAL POLITICS, Prof. Dr. Hasret ÇOMAK, Burak Şakir Şeker, Editör, TP London (Transnational Press London), London, 2024, pp.209-228, p. 216 et seq.

[43] The main treaty in the field of space law, often referred to as the "constitution" of international space law, is the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies. (The "Outer Space Treaty"). The Outer Space Treaty was negotiated and opened for signature in 1967, in the context of the Cold War Era tensions.

[44] Melissa de Zwart * , Stacey Henderson , Michelle Neumann , "Space resource activities and the evolution of international space law", in Acta Astronautica, Volume 211, October 2023, pp.155-162. (Available at: Space resource activities and the evolution of international space law - ScienceDirect)

[45] Swan, op.cit., pp. 6-7 .; Dr. N. P. Mantı, op.cit., pp.216-220.

tests and dual-use systems, are risks to the security and sustainability of the environment in space and on Earth.

Regulation of Space Debris: Applicability of Environmental Law Principles

Every legal assessment starts by defining terms, and then the uses of it or threats it poses, as well as assessing the current legal framework relating to it. Regulation of space debris has become a challenge before UN, space faring and non-space faring nations and international organisations, that involves complex legal and political questions.

In official reports of sessions of the United Nations Committee on the Peaceful Uses of Outer Space or its Subcommittees the political, economic, and geopolitical interests in space caused great tensions and on legal aspects. In that regard, it takes a rather normative stance, considering – maybe hoping – that States' conduct, and actions can be guided and regulated by legal principles and conventions.

Space debris is in the context of international space law, and the international environmental law is a specific context for the discussion. Therefore, how sustainable development and related principles of environmental law can be adapted to the context of space law is a valuable assessment, so as the impact of principles derived from international environmental law, as they served the functional ground, as well as more specific roles in the context of space debris mitigation and remediation measures.

Peaceful use of outer space, issues of weaponization, cooperation amongst States and the principle of non-appropriation of space were the primary focusses of the Treaty and very little attention is given to environmental issues.

The Article IX of the OST provides some limitations concerning environmental protection which is **'due regard'**, **'harmful contamination'** and consultations. From the states adopting a common practice that formed the 'due regard' principle. The article's terms are vague and undefined, as the word "**contamination**" refers to harm caused to outer space through the release of chemical effluents and that space debris do not fall under the scope of Article IX. However, the environmental aspect of space is vaguely mentioned in Article IX of the OST, which provides that States must conduct their exploration of outer space "**so as to avoid harmful contamination [of outer space] and also adverse changes in the environment of the Earth resulting from the introduction of extraterrestrial matter**". In other words, the Article IX introduces the concepts of forward and backward contamination, which refer respectively to pollution of outer space due to human activities (forward contamination), and environmental effects on

Earth resulting from the introduction of extra-terrestrial matter in the atmosphere (backward contamination)[46]. However, while the wording of the article addresses both types of contaminations, most of its provisions concentrate on the backward contamination and ignore forward contamination[47].

On the other hand, collisions with space debris cannot be avoided as the debris cannot be controlled. The growing debris population will continue to collide with itself, and other space objects and will thereby exponentially increase the risk of failures for any spacecraft. In spite of the threats that space debris poses to present and future space operations, human life on Earth and the environment in general, the issue is not addressed in any existing international treaty Examining the relevance of international environmental law and role that could be played by concepts and principles derived from environmental law to address the issue of space debris, could serve to fill the gaps, and address the threats posed by space debris, rules and principles have been developed outside of international conventions, by States as well as international agencies and bodies.

In order to minimise the risk of on-orbit break-ups and ensuing damage to other spacecraft, the guidelines recommend the passivation – in other words the elimination – of all on-board sources of stored energy of a spacecraft or orbital stage when they are no longer needed[48]. Another recommendation is post-mission disposal of spacecraft when their operational phases are ended, by re-orbiting them to another orbit or de-orbiting them, depending on whether they are situated in the Geostationary Earth Orbit (GEO) or the Low Earth Orbit Region (LEO), which are protected regions for the purposes of the IADC guidelines. In the case of space objects orbiting in LEO, the guidelines suggest a 25-year post-mission orbital lifetime limit before spent space objects are de-orbited.

The IADC guidelines served as a model for the 2007 Committee on the Peaceful Uses of Outer Space's *Space Debris Mitigation Guidelines*[49], *which* constitute one of the most important sets of guidelines regarding space debris mitigation as they were adopted when the Committee represented 67 States, highlighting a general international consensus among space faring nations in that regard. The guidelines of the Committee on the Peaceful Uses of Outer

[46] Lucy Stewardson, "Space Debris: Principles of Environmental Law as Cornerstones Paving the Way for Regulation", Novembre 2021, (Available at: https://e-legal.ulb.be/volume-n05/memoires-3/space-debris-principles-of-environmental-law-as-cornerstones-paving-the-way-for-regulation)
[47] Lucy Stewardson, op.cit.
[48] Support to the IADC Space Debris Mitigation Guidelines, Inter-Agency Space Debris Coordination Committee, June 8, 2021(Available at: https://iadc-home.org/documents_public/file_down/id/5252)
[49] Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space, UNCOPUOS, Vienna, 2010, (Available at: https://www.unoosa.org/documents/pdf/psa/bsti/COPUOS_ SPACE_DEBRIS_ MITIGATION_GUIDELINES.pdf)

Space were subsequently endorsed in a Resolution of the United Nations General Assembly, which further contributed to emphasizing their central role and high political value.

In June 2019, the Committee on the Peaceful Uses of Outer Space, which represented 87 States at the time, adopted the Preamble and 21 Guidelines for the Long-Term Sustainability of Outer Space Activities. The objective of the Guidelines is worded as follows: "**to support States in engaging in activities aimed at preserving the space environment for the exploration and use of outer space for peaceful purposes by all States and international intergovernmental organizations**".

The guidelines are grouped into four categories: (1) policy and regulatory framework for space activities, (2) safety of space operations, (3) international cooperation, (4) capacity-building and awareness, and scientific and technical research and development.

While they benefit from wide adhesion and endorsement, these guidelines are not legally binding and there is no mechanism to enforce obligations in case a State fails to respect the recommendations. Although it has been observed that the guidelines are used by many States to set their own standard of conduct, and that standard practices on average have improved, a single large event can negate the progress made during years of successful mitigation efforts.

Moreover, recommendations for mitigation only concern space objects that are likely to further increase the amount of space debris in the future; it does not offer a solution regarding the very large, already existing, and problematic population of space debris already in orbit.

A study published by the European Space Agency in 2017 stated that: "the goal of the mitigation guidelines – to preserve the Earth environment for future generations – is still beyond reach[50]".

In conclusion, it is important to note that even meticulous implementation of the guidelines by all stakeholders of space activities would therefore not be sufficient to properly address the issue of space debris.

Considerations of Relevance: International Environmental Law

While the regulation of space debris was a recent cause, environmental law has developed over the years to establish principles and mechanisms to deal with environmental problems on Earth and the principles of (terrestrial) environmental law are not always adapted/adaptable to the context and

[50] S. Frey and S. Lemmens, "Status of the space environment: current level of adherence to the space debris mitigation policy", Proceedings of the 7th European Conference on Space Debris, Darmstadt, Germany, 18–21 April 2017, published by the ESA Space Debris Office, p. 7.

specificities of space law, thus do not offer the most efficient framework to address issues such as space debris. However, it is interesting to examine these principles and determine to what extent, and how, they could be (more) relevant in the context of environmental challenges posed by the space activities.

Recall for Basic Principles

It is possible to notice many similarities between environmental law and space law, especially between the issue of space debris and terrestrial environmental challenges. Therefore, international environmental law can guide international space law to address and develop a regulatory system to space debris problem. The 1967 OST is a use-focused document. Considering the augmentation of the diversity of actors and interests, and especially the role played by non-state actors, which is more visible in the context of environmental law, space law is becoming less of a "State-only" matter.

The increase in outer space activities and mega constellations points towards the importance of developing modes of environmental protection beyond Earth that do not end up reinforcing the hegemony of old space powers. Another important point is the evolving critical legal geography of outer space, which has become a domain of intersection for civilian, military, and commercial interests, and must account for cultural, economic and political elements which are influencing the ways in which outer space environments (and their diversity) are experienced, conceptualized and accessed[51].

The multiplicity of actors and stakeholders leads to numerous political, economic and societal issues that must be taken into account.

Environmental law, or some elements thereof, are thus relevant to the context of space activities, and of space pollution more specifically. Both international environmental law and space law deal with the problems having transboundary and global impact, they try to regulate and solve problems concerning "global commons[52]".

However significant differences that also exist:

a. Contrary to most human activities on Earth, any missions in outer space may be

[51] Alessandra Marino, Thomas Cheney, "Centring Environmentalism in Space Governance: Interrogating Dominance and Authority Through a Critical Legal Geography of Outer Space", in Space Policy, Volume 63, February 2023, 101521, (pp. 1-10), p.8.

[52] The Outer Space Treaty provides that space must be "free for exploration and use by all States" and prohibits the appropriation of space or celestial bodies. In the context of environmental law, "states' interdependence in terms of both contributions and solutions demands cooperation in addressing collective environmental concerns". It is broadly agreed that the action of only one actor would thus be insufficient to address the issues, and that coordinated action is required for both.

considered as ultra-hazardous.

b. Damage caused to the space environment can present other types of difficulties, including:

- *the identification of the actor at fault in case of collisions by space debris or cumulative effects,*
- *the evaluation of the damage caused and*
- *the financial compensation that should follow can prove to be complex questions that may require a different approach than can be used for terrestrial damage.*

c. Moreover, most of the space environmental concerns are taken into consideration as they relate more to man-made objects that are in orbit or could land on Earth, rather than to the space environment as such.

The challenging aspect as to the environmental law principles is that only in recent years environmental law has been implemented in this sense to protect the environment as a global common and as an emerging issue, and for the space environment, not just to preserve it for the use and exploitation of mankind. Therefore, international actors can take steps towards the protection of the space environment *per se* in the upcoming decades.

Principles of Environmental Law: Traces and Development in the Context of Space Law

The concept of sustainable development is central in international environmental law. Although it existed prior to 1987, sustainable development first started to emerge as an important concept when it was given a definition by the World Commission on Environment and Development in its "Our Common Future" report[53]. Sustainable development was later highlighted as a central goal for the international community in the 1992 Rio Declaration on Environment and Development[54] and is mentioned in multiple international instruments today.

The World Commission on Environment and Development defines sustainable development as development "that meets the needs of the present without compromising the ability of future generations to meet their own

[53] United Nations World Commission on Environment and Development, ed. Report of the World Commission on Environment and Development: Our Common Future. Oxford: Oxford University Press, 1987., p. 43.

[54] The Rio Declaration on Environment and Development, shortly Rio Declaration, was a document produced at the 1992 United Nations "Conference on Environment and Development" (UNCED), informally known as the Earth Summit. The Rio Declaration consisted of 27 principles intended to guide countries in future sustainable development. It was signed by over 175 countries. UN Documentation Centre, (Available at: https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_CONF.151_26_Vol.I_Declaration.pdf)

needs[55]".

The notion is often understood to comprise three main principles: integration, intergenerational equity and intragenerational equity. The requirement of integration is expressed in Principle 4 of the 1992 Rio Declaration and refers to the need to "reconcile economic development with protection of the environment (…)", by including economic and even social considerations in the development of environmental protection, and vice versa[56].

The principle of integration is considered as essential to achieve the inter- and intragenerational equity which are set out in Principle 3 of the Rio Declaration[57]. Intergenerational equity refers to the duty to preserve the environment for future generations and, in that regard, accounts for the part of sustainable development that is more focused on environmental protection and preservation as such. As for intragenerational equity, its focus is on equity in the distribution of the outcomes of development among current States and especially emphasises the right to economic development of developing countries. In that sense, it can be considered as reflecting the need for fair economic and social development within the sustainable development notion.

Similar concerns about preservation of outer space for future use and research, as well as ensuring equal access to, and benefit from, the resources of outer space for all, have been voiced and sustainable development seems to have emerged as a concern in the field of international space law. In 2019, the Committee on the Peaceful Uses of Outer Space indeed agreed on additional guidelines focusing on the long-term sustainability of outer space activities, which refers to the "ability to maintain the conduct of space activities indefinitely into the future in a manner that realizes the objectives of equitable access to the benefits of the exploration and use of outer space for peaceful purposes, in order to meet the needs of the present generations

[55] United Nations World Commission on Environment and Development, ed. Report of the World Commission on Environment and Development: Our Common Future. Oxford: Oxford University Press, 1987, pp.43-46.(Available at: https://www.environmentandsociety.org/mml/un-world-commission-environment-and-development-ed-report-world-commission-environment-and)

[56] "In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it" (Report of the United Nations Conference on Environment and Development, (3–14 June 1992), A/CONF.151/26 (Vol. I), 12 August 1992, (Annex I: Rio Declaration on Environment and Development, Principle 4).

[57] Duncan French, "Sustainable development", in M. Fitzmaurice, D. M. Ong. and P. Merkouris (Eds.), in Research Handbook on International Environmental Law, Chelthenham, Edward Elgar Publishing, 2010, pp. 59-61; Report of the United Nations Conference on Environment and Development (3–14 June 1992), A/CONF.151/26 (Vol. I), 12 August 1992, (Annex I: Rio Declaration on Environment and Development, Principle 3).

while preserving the outer space environment for future generations[58]".

While some argued that elements of sustainable development can already be found in the 1967 Outer Space Treaty, the principle of intergenerational equity seems to be reflected in Article I of OST, within the term "province of all mankind", which includes an aspect of preservation of the environment[59]. It has also been argued that deliberate degradation of the outer space environment, which may have the consequence that less developed countries would not be able to exercise their right to conduct space activities, would violate the 1967 OST, and its requirement of equity and respect of all States' interests. The principle of intragenerational equity requires industrialised States to assist less developed countries in developing the means to conduct space activities and protect the environment[60].

Furthermore, the preamble of the 1967 OST acknowledges "the common interest of all mankind in the progress of the exploration and use of outer space for peaceful purposes[61]" and states that "the exploration and use of outer space should be carried on for the benefit of all peoples irrespective of the degree of their economic or scientific development".

The language of the preamble can be considered to coincide with the principle of intragenerational equity and there exist other substantive and procedural principles of environmental law which are related to sustainable development and prove relevant to this analysis.

a. The Principle of Sustainable Use

The principle of sustainable use and conservation of resources appears as an emerging principle in the context of sustainable development and is embodied in Principle 8 of the Rio Declaration. According to the International Law Association's New Delhi Declaration of Principles of International Law Relating to Sustainable Development: "States are under a duty to manage natural resources (…) in a rational, sustainable and safe way so as to contribute to the development of their peoples (…) and to the conservation and sustainable use of natural resources and the protection of the environment (...). States must take into account the needs of future

[58] Report of the Committee on the Peaceful Uses of Outer Space Sixty-second session (12–21 June 2019), General Assembly Official Records Seventy-fourth Session Supplement No. 20 (Available at: https://digitallibrary.un.org/record/3824351?v=pdf)

[59] L. Viikari, "Towards Long-term Sustainability of Space Activities: Overcoming the Challenges of Space Debris: A Report of the International Interdisciplinary Congress on Space Debris", Scientific and Technical Subcommittee of the COPUOS, Forty-eighth session (7–18 February 2011), A/AC.105/C.1/2011/CRP.14 (2011), p. 41.

[60] L. Viikari, op.cit., pp. 145-147.

[61] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, opened for signature in Washington, London and Moscow, January 27, 1967, U.N.T.S., Vol. 610, Preambule.

generations in determining the rate of use of natural resources[62]".

While the general idea highlighting that the outer space must be preserved is less contentious as it is closely linked with the principle of equity, the concept of outer space as the "common heritage of mankind" can be considered very controversial with this statement, and endorsement of this statement in the Moon Agreement led to the refusal of many space faring countries to sign it.

Accordingly, the obligation contained in Article IX of the Outer Space Treaty for States to conduct activities in outer space "so as to avoid their harmful contamination" resonates, to a certain extent, with the principle of sustainable use and conservation of resources[63].

b. The Precautionary Principle

The precautionary principle relies on the acknowledgement of the vulnerability of the environment and of the limitations of scientific knowledge and predictions. As an approach to "risk management, where, if it is possible that a given policy or action might cause harm to the public or the environment and if there is still no scientific agreement on the issue, the policy or action in question should not be carried out[64]".

Although there are some doubts regarding the exact scope and effects of the principle, it is generally accepted that it involves a credible non-negligible threat, a lack of scientific certainty or evidence regarding both the potential harm and the causality, and a duty to take action[65].

The Principle 15 of the Rio Declaration states, "it requires States to take precautionary measures in order to prevent possible environmental harm that could result from potentially damaging conduct, even when there is no full scientific certainty as to the actual existence of the threat to the environment[66]".

[62] The New Delhi Declaration further states that: "the resources of outer space and celestial bodies and of the sea-bed, ocean floor and subsoil thereof beyond the limits of national jurisdiction are the common heritage of humankind". "ILA New Delhi Declaration of Principles of International Law Relating to Sustainable Development", in International Environmental Agreements: Politics, Law and Economics 2, 2002, pp. 209–216 (DOI: https://doi.org/10.1023/A:1020905309876)

[63] Deva Prasad, "Relevance of the Sustainable Development Concept for International Space Law: An Analysis", in Space Policy, Vol. 47, 2019, p. 170. (Available at: https://www.sciencedirect.com/science/article/abs/pii/S0265964618300596)

[64] "Precautionary principle", in EUROLEX, (Available at: https://eur-lex.europa.eu/EN/legal-content/glossary/precautionary-principle.html)

[65] "Late lessons from early warnings: the precautionary principle 1896–2000", Environmental issue report No 22/2001, Published 09 Jan 2002. (Available at: https://www.eea.europa.eu/publications/environmental_issue_report_2001_22/Issue_Report_No_22.pdf)

[66] Jose Felix Pinto-Bazurco, "The Precautionary Principle: Still Only One Earth: Lessons from 50 years of UN sustainable development policy", IISD, October 23, 2020, (Available at:

The precautionary principle might have contributed to the evolution of States' approach to outer space, from a presumption of freedom of use to a more conservation-oriented vision. In context of protection of the space environment, the precautionary principle can serve as a *prima facie* assessment, because the scientific knowledge of outer space is still evolving and there are growing risks and awareness regarding the irreversible and potentially grave nature of space activities and harm that can be done. Keeping in mind the most of human activities conducted in outer space can potentially be as ultra-hazardous, the application of the precautionary principle in the context of space activities presents certain difficulties.

c. The Prevention Principle

The principle of prevention requires that States take active steps to prevent foreseeable risks and protect the environment and it has been closely linked with the no-harm principle and good neighbourliness.

Similarly to environmental law, treaty law relating to space activities initially focused on protecting States' interests and avoiding causing harm to other States, with an emphasis on cooperation and due regard. The Article IX of the Outer Space Treaty states that "*[i]n the exploration and use of outer space (…), States Parties to the Treaty shall be guided by the principle of co-operation and mutual assistance and shall conduct all their activities in outer space (…) with due regard to the corresponding interests of all other States Parties to the Treaty. (…)*" and requires States to undertake consultations with States that could be affected before conducting potentially harmful activities in outer space. In this regard, the principle imposes an obligation of due diligence incumbent upon States to take precautions in order to safeguard other States from damage and contrary to the precautionary principle, the prevention principle applies to situations in which there exist foreseeable, proven risks.

While following the commercialisation of space, 'soft-law' instruments regarding activities in outer space are to be shifting from the focus on States' interests towards consideration and protection of the space environment. In the Guidelines, the Inter-Agency Space Debris Coordination Committee and the Committee on the Peaceful Uses of Outer Space, prefer to concentrate more on the protection of the outer space environment as a whole rather than specific State interests and operations. In that regard, the 2019 Guidelines for the long-term sustainability of outer space activities refer explicitly to the necessity to "avoid harm to the space environment".

The prevention principle promotes the necessity for States to exercise due

https://www.iisd.org/articles/deep-dive/precautionary-principle?gad_source=1&gclid=CjwKCAjw9IayBhBJEiwAVuc3fhnZQDL9yRVOi14AVWXkcFgRcMpvM-IS2nVKW6f3yoPMvB7oHQdKdRoCZloQAvD_BwE)

diligence regarding prevention and control when they conduct space activities.

d. The Principle of Common but Differentiated Responsibilities

Embodied in Principle 7 of the Rio Declaration, the principle of common but differentiated responsibilities finds its roots in the principle of equity examined above.

The principle is twofold:

1. Firstly, the principle provides that States share a common responsibility to protect and preserve the environment as environmental problems are global, but also requires that each State's contribution to pollution and ability to prevent and reduce environmental harm should be taken into account. The principle fosters substantive equality among nations by;

a. recognising that activities conducted by industrialised countries generate more pollution, and

b. dictating that those States should bear the main burden of combating the negative impacts of such pollution on the environment

2. Secondly, developed countries possess more resources, on economic and technological level, to address environmental issues, therefore, they should assist developing States in doing so, and different standards in the pursuit of sustainable development must apply to countries depending on their capabilities and levels of development

It is important to highlight that the environmental impact of space activities are augmenting, and while the preservation of outer space for future space activities and fear that failure to act would entail irreversible harm and a concern for both space faring and non space faring nations, degradation in outer space has been caused primarily by the space faring nations, and it is mainly those nations which have the capacity to tackle the issue of space pollution.

e. The Polluter Pays Principle

The Article 16 of the Rio Declaration defines the polluter-pays principle and provides that "whoever is responsible for polluting the environment- the polluter- shall be held liable by the national authorities to bear the cost of the pollution- prevention, control, and repair of damage caused -" and there is a dire need to extend this principle in outer space too in relation to debris creation- whoever creates the space debris shall be responsible for cleaning such debris[67].The polluter-pays principle prescribes that the actors engaging

[67] Rio Declaration on Environment and Development, 1992, Article 16, (Available at: https://www.cbd.int/doc/ref/rio-declaration.shtml).

in polluting or hazardous activities must bear the costs linked to the pollution, in terms of prevention, control, and repair of damage caused as a consequence of it[68].

The principle is in essence an economic, cost-allocating principle to guide the policies implemented by public authorities vis-à-vis private actors generating pollution; as such, it is not meant to be implemented at the inter-state level and its application in the international context is therefore limited[69]. Also some argue that the principle lacks normativity, due to the vagueness of its wording in Principle 16 of the Rio Declaration[70].

In the context of space activities, identifying the actor responsible for pollution can be challenging and in the process damage can lead to complex causation in cases where collisions – and therefore an increase in pollution of the space environment – were caused by space debris or result from a chain of cumulative events.

However, considering the particularities of the outer space, it is very difficult to implement the requirements of the principle in the context of the international space law, and it has been considered that "tiered systems and collective loss-sharing arrangements" can be more adequate to "channel the risks of ultra-hazardous activities and ensure means for adequate indemnification for damages[71]".

f. Environmental Impact Assessment

Set out in Principle 17 of the Rio Declaration, "environmental impact assessment" is a "procedure for evaluating the likely impact of a proposed activity on the environment[72]" that requires decision-makers to identify environmental risks, alternatives and mitigating measures, as well as integrate

[68] Bob Ward and Naomi Hicks, "What is the polluter pays principle?", in Grantham Research Institute for Climate Change and the Environmental, LSE, July 18, 2022, (Available at: https://www.lse.ac.uk/granthaminstitute/explainers/what-is-the-polluter-pays-principle/)

[69] ILC Draft Articles on Transboundary Harm, ILC Report (2001) GAOR A/56/10, 66, (Available at: http://untreaty.un.org/ilc/texts/instruments/english/commentaries/9_7_2001.pdf); Manual On Human Rights and the Environment, Council of Europe Publishing, Second Edition 2012, (ISBN 978-92-871-7319-5), p.313.

[70] P. Birnie, A. Boyle, C. Redgwell, "International Law and the Environment", 3rd Ed.., Hampshire, Oxford University Press, 2009, p. 322; Principle 16 of the Rio Declaration states that: "National authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment", in "Report of the United Nations Conference on Environment and Development", (3–14 June 1992), A/CONF.151/26 (Vol. I), 12 August 1992, (Annex I: Rio Declaration on Environment and Development, Principle 16), (Available at: https://www.un.org/esa/documents/ga/conf151/aconf15126-1.htm)

[71] Lotta Viikari, "Chapter 13: Environmental Aspects of Space Activities", in Handbook of Space Law, Frans von der Dunk(Ed.), 2015, p.764.

[72] Convention on Environmental Impact Assessment in a Transboundary Context, opened for signature in Espoo, 25 February 1991, U.N.T.S., Vol. 1989, p. 309, Article 1(vi).(Available at: https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-4&chapter=27&clang=_en)

environmental considerations into socio-economic planning prior to authorising an activity to proceed[73], in other words, a procedure allowing States to make informed decisions when assessing whether they should proceed with an activity or require further measures or research, and does not as such determine the outcome of the decision to be made by public authorities.

The systematic implementation of such a procedure would seem relevant and beneficial in the context of space law, where the vast majority of operations are deemed to pose a significant threat to the environment.

Requiring States to conduct an environmental impact assessment before proceeding with space operations would further the goal of sustainable development in outer space and, more specifically, contribute to the fulfilment by States of their obligation of due diligence with respect to the prevention principle.

The IADC Guidelines recommend States to establish a Space Debris Mitigation Plan for each program and project, which is in essence quite similar to an environmental impact assessment[74].

The introduction of environmental impact assessment at the international level, concerning space debris more specifically, through strategic environmental assessments, can be more effective to the consequences of space activities and can help to design and address entire policies in compliance with environmental concerns.

g. Cooperation between States

The principle of cooperation through exchange of knowledge, technology and capacity-building as set out in Principle 9 of the Rio Declaration, highlighting certain requirements of developing countries in terms of access to development, may prove to be more useful in that regard. Cooperation is at the core of environmental law and is enshrined in Article 27 of the Rio Declaration, a principle highlighting the good faith and spirit of partnership in which States should cooperate[75]. In the context of space law, cooperation and the obligations of notification and consultation that it encompasses were already recognised as early as 1967 in Article IX of the Outer Space Treaty and reaffirmed in the 2019 Guidelines for the long-term sustainability of

[73] D. Prasad. D., op. cit., p. 168; O. Elias, "Environmental impact assessment", in Fitzmaurice M., Ong D. M. and Merkouris P. (eds.), Research Handbook on International Environmental Law, Cheltenham, E.Elgar Publishing, 2010, p. 227.
[74] Space Debris Mitigation Guidelines, Inter-Agency Space Debris Coordination Committee, September 2007, section 4.
[75] Report of the United Nations Conference on Environment and Development, (3–14 June 1992), A/CONF.151/26 (Vol. I), 12 August 1992, Annex I: Rio Declaration on Environment and Development, Principle 27.

outer space activities[76]. The necessity of cooperation to control, prevent, reduce and eliminate the adverse effects of pollution is derived from the strong interdependence characterising environmental issues by ensuring that efforts made by States are efficient and coordinated, through the exchange of information and consultation procedures.

However, threats caused by space debris are of a global nature, and therefore cannot be equated to a transboundary risk affecting specific, identifiable States. In the 2019 Guidelines of the Committee on the Peaceful Uses of Outer Space, it is recommend that "States and international intergovernmental organizations with experience in space activities should encourage and support capacity-building in developing countries with emerging space programmes", through the sharing of expertise and knowledge, the gathering of human and financial resources and the accessibility of data[77].

Conclusion

Reckless and dangerous military flexing has taken place in recent years, exemplified by the anti-satellite (ASAT) testing by China, the United States, India and Russia. Principles from international environmental law are applicable to the outer space environment: as mentioned the precautionary principle, the no-harm rule, and the common but differentiated responsibilities principle, could be applied to impose stronger commitments and new obligations on space faring nations, and lead to a more equitable and successful outcome against space debris.International environmental law principles could lead to global compliance with space debris mitigation measures, which would help slow down the creation of new debris, and contribute to stabilizing the outer space environment and a principle based approach can help to advance greater collaboration and data-sharing around SSA programs, and therefore, provide a more complete picture of outer space and help prevent or minimise collisions.

In order to provide a permanent solution, and considering the rising military, the highly political and economic stakes of state and non-state space actors involved, a framework convention would be the most adequate ground for the regulation of the space debris problem, addressing the key aspects of space debris remediation, by providing a definition of space debris and

[76] Deva Prasad, op. cit., p. 169; Article IX: "In the exploration and use of outer space, including the Moon and other celestial bodies, States Parties to the Treaty shall be guided by the principle of co-operation and mutual assistance", Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, opened for signature in Washington, London and Moscow, 27 January 1967, U.N.T.S., Vol. 610, p. 205.
[77] Guidelines for the long-term sustainability of outer space activities, guideline C.3.; (Available at: https://www.unoosa.org/documents/pdf/PromotingSpaceSustainability/Publication_Final_English_June2021.pdf)

procedures, also determining an adequate rule regarding jurisdiction over space debris and potential transfer thereof, or establishing an appropriate liability regime for removal operations; promoting cooperation and implementation of efficient remediation measures and licences thereof. Since the space debris concern the safety and security of operations, transparency and availability of information would be beneficial centralisation of data and overview of the progress made by all the different stakeholders through different national and international mechanisms would facilitate access to information by the general public.

Space activities have a highly strategic value for States, and ,n order to protect their security, military and commercial interests space faring nations may be unwilling to invest large efforts to ensure mitigation, and remediation of space debris, and to cooperate too closely with others in that matter. However, as the risks posed by the space debris grow, the situations may impose on space faring states to be more cooperative in order to preserve assets, resources and activities. It is important to note that the explicit and coherent principles can strongly encourage cooperation and guide States' actions in dealing with the pressing and globally threatening issue of space debris. However, under international law, to reach an agreement on international level may not be easy for independent states, and considering this, it can be easier to agree on a complete and coherent set of principles for the preservation and protection of the outer space environment. To provide this ground, some States could take the initiative and it is likely that others will progressively join. Unilateral declarations could be made by States about the principles they will respect and the responsibilities they will take and, as the consensus becomes increasingly evident, a formal convention could eventually be agreed upon. As the threats posed by space debris seem to be materialising and the way for action appears narrower than ever, such initiatives might be necessary to ensure that the expression "the sky is the limit" does not take on a much more sinister meaning.

ENVIRONMENTAL MIGRATION IN INTERNATIONAL LAW AND ITS EFFECTS ON SECURITY

Tuba Taşlıcalı Koç*

Introduction

In the post-Cold War period, the security perception of states has changed compared to the period when security was pursued through national power elements. Since the security perceptions of states changed in the post-Cold War period, the measures they took in this context also changed[1]. This change has transformed the perception of security from being focused solely on the state to a multi-dimensional field of analysis in which humans are one of the main focal points. This change in security perception, which is analyzed with national power elements in realist theory, has found a place in Buzan's five-sector analysis security perception, and security has begun to be examined on political, economic, social, environmental and military dimensions[2].

In this perspective of Buzan[3], who introduced the concepts of "security sectors" and "regional security" to the literature, in addition to military threats, problem areas such as economic inequality, decrease in natural resources, ethnic conflicts, international migration, drug trade and smuggling, and environmental pollution are listed among the factors that threaten security[4]. Environmental pollution, which is one of the new threats listed by Buzan and his colleagues, negatively affects living and non-living beings and threatens regional and global stability and security by causing structural damage in the world we live in[5]. Therefore, this new perspective has contributed to the development of a remarkable environmental security literature on environmental issues and climate change after the Cold War[6].

As a matter of fact, in the Human Development Report published by the United Nations in 1994, environmental security was classified as "*one of the*

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[1] Nurgül Bekar, "Güvenlik Kavramının Değişimi ve Türkiye'nin Barışı Koruma Faaliyetlerine Katkısı", Avrasya Etüdleri, 2019, pp: 179-202. p: 183.

[2] Cengiz Yavaş, Çevre Güvenliği ve Uluslararası İş Birliği: Nato Örneği, (Unpublished Phd Thesis), Ankara, Ankara Yıldırım Beyazıt Üniversitesi, 2020, p. 73.

[3] Barry Buzan, Ole Waever, J. De Wilde, Security: A New Framework For Analysis, London, Lynne Rienner Publishers, 1998.

[4] Yavaş, op.cit, p. 71.

[5] Murat Gül, "Güvenlikteki Kavramsal Değişim ve Türkiye'nin Güvenlik Yaklaşımı ve Politikalarına Etkileri", Süleyman Demirel Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi 2016, C.21, S.1, pp.303-320. p: 306.

[6] Floyd, R, R.A. Matthew, Environmental Security. Approaches and Issues. Cornwall:Routledge. 2013.p: 2-11.

emerging concerns of human security all over the world". In addition to this opinion it is emphasized that the real security vulnerabilities in the coming years will not arise from traditional state-centered conflicts, but from the dangers listed as "uncontrollable population growth, economic opportunity inequalities, excessive international migration, environmental destruction, drug trade and international terrorism"[7]. It has also been stated that elements such as providing natural resources (drinking water, clean air), protection from natural disasters, preventing environmental degradation, protection from the damage caused by humans to the environment are important in environmental security[8]. As a result of the destruction of the environmental security, the need to migrate in order to find a new living space arises in individuals who do not feel safe[9] and environmental migration emerges. The existence of environmental migrants creates a dilemma in itself, and individuals who change their homelands in need of security can lead to insecurity in some respects.

In the 2015 report of the UNA-UK Foundation, it is emphasized that many countries and regions, especially in the African continent, are experiencing drought due to climate change[10]. According to the estimates of the UN Environment Programme, it is expected that 50 million people in the African continent will become "environmental refugees" by 2060 due to natural disasters such as floods, landslides, droughts and severe storms[11]. In addition, unless there is a change in the events that cause climate change, it is estimated that sea levels will rise by approximately 70 cm by the end of the century, and it is evaluated that this situation will threaten the security of 44% of the world's population living up to 150 km from the world's coasts[12]. For this reason, environmental migrants who experience environmental disasters due to the climate change around the world are expected to take refuge in richer countries[13].

It is evaluated that such a future expectation will shape the security

[7] UNA-UK, "Human Development Report", http://hdr.undp.org/en/content/human-development-report-1994, p. 28-30. (Access date: 01.03.2023).
[8] *ibid*., p.34.
[9] İbrahim Ethem Akyıldız, "Göç Teorilerinin Karşılaştırmalı Analizi", Uludağ Journal of Economy and Society / B.U.Ü. İktisadi ve İdari Bilimler Fakültesi Dergisi Cilt / Volume 35, Sayı / Issue 2, 2016, ss. / pp. 127-176, p: 153.
[10] Climate 2020: Facing the Future, UNA-UK. https://una.org.uk/climate-2020-facing-future UNA-UK Report, p. 56. (Access date: 01.06.2023)
[11] David Held, "Climate Change, Migration and the Cosmopolitan Dilemma", Global Policy, February 2016, s. 5-6.
[12] Jaime de Melo, "Climate change and the growing challenges of migration", The Brookings Institution, 24.08.2015, https://www.brookings.edu/blog/planetpolicy/2015/08/24/climate-change-and-the-growing-challenges-of-migration/#.Vdx_Da41eW1.twitter , (Access date: 01.12.2023).
[13] IOM, Climate Change and Migration: Improving Methodologies to Estimate Flows, International Organization for Migration, 2008, http://publications.iom.int/system/files/pdf/mrs-33.pdf, (Access date: 15.12.2023), p. 9.

policies of countries and create new actors in the international system. Due to these expectations, this study aims to analyze the concept of environmental migration created by climatic change, which constitutes one of the security sectors, in the context of conceptual change in security. For this reason, first of all, the difference between refugee and environmental immigration statuses is explained. Subsequently, the origins of environmental migration were analyzed in terms of time, space and purpose, and how environmental migrants affected national and international security in terms of these dimensions was examined.

Refugees and Environmental Migrants in Terms of International Law

1951 Geneva Convention Concerning the Legal Status of Refugees, to which Türkiye is a party, refugee status is stated as "*As a result of events occurring before 1 January 1951 and owing to well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality and is unable or, owing to such fear, is unwilling to avail himself of the protection of that country; or who, not having a nationality and being outside the country of his former habitual residence as a result of such events, is unable or, owing to such fear, is unwilling to return to it. In the case of a person who has more than one nationality, the term "the country of his nationality" shall mean each of the countries of which he is a national, and a person shall not be deemed to be lacking the protection of the country of his nationality if, without any valid reason based on well-founded fear, he has not availed himself of the protection of one of the countries of which he is a national."*[14]

The most important thing to consider here is that the phrase climate change is not used in the conditions for an individual to gain refugee status. In this context, the path for people who request refugee status within the scope of the Convention to qualify for this status due to climate-related conditions is closed. In fact, in a policy report of UNHCR in 2009, it was clearly stated that the concepts of climate refugees or environmental refugees have no place in international refugee law, with the statement of "*For this reason, just as a reference to an 'economic refugee' is not a reference to a recognized term under international law, neither are 'climate refugee' nor 'environmental refugee'.*"[15].

However, with changing security perceptions and new approaches in the international system, in 2020, in the Teitiota versus New Zealand Decision, individuals displaced due to climate change and natural disasters were provided with international protection within the scope of not recognizing

[14] United Nations Conference of Plenipotentiaries on the Status of Refugees and Stateless Persons convened under General Assembly resolution 429 (V) of 14 December 1950, https://www.ohchr.org/en/instruments-mechanisms/instruments/convention-relating-status- refugees#:~:text=(2)%20As %20a%20result%20of,fear%2C%20is%20unwilling%20to%20avail (Access date: 10.12.2023).
[15] Antonio Guterres , Climate Change, Natural Disasters and Human Displacement: A UNHCR Perspective, UN High Commissioner for Refugees, 14 August 2009, p. 8-9.

the right to life, and the right not to be sent back to countries where it is assessed that there is a risk of serious and irreparable harm provided by the Human Rights Committee[16]. In this history-making case, a person named Ioane Teitiota, a Kiribati citizen, stated that there was a rise in sea levels due to climate change on the island of Tarawa, where he lives [17]. In addition, Teitiota emphasized that drinking water is insufficient and living conditions have become unbalanced and unstable due to salt water pollution and excessive population density, and that the soil structure is deteriorated due to erosion of the lands, which causes a housing crisis and land disputes that cause many deaths. Thus, he stated in his application that the country of Kiribati had become an environment of unbearable and violent disputes for the applicant and his family[18].

The High Court of New Zeland found that the impacts of climate change on Kirabati did not qualify the appellant for refugee status because the applicant was not subjected to persecution required for the 1951 United Nations Convention relating to the Status of Refugees. In addition to finding a lack of serious harm or serious violation of human rights were the appellant to return to Kirabati, the court also expressed concern about expanding the scope of the Refugee Convention and opening the door to millions of people who face hardship due to climate change[19].

Upon this decision, Teitiota appealed to the UN Human Rights Committee and was ultimately found justified for violating the right to life regulated in the sixth article of the UN Covenant on Civil and Political Rights (CCPR), and the committee considered Teitiota's deportation from New Zealand to the Republic of Kiribati as a violation of his rights[20]. For this reason, the decision in question is important as it creates jurisprudence regarding the protection of the rights of people facing the negative effects of climate change.

However, as a result of the mentioned case, although it was made possible not to send back the individuals who were displaced due to climate change

[16] Sibel Safi, "Ioane Teitiota Kiribati / Yeni Zelanda Davası Ve BM İnsan Hakları Komitesi'nin İklim Mültecileri ile İlgili Tarihi Kararı", Dokuz Eylül Üniversitesi Hukuk Fakültesi Dergisi, vol.22, no.2, 2020, pp.509 - 540.
[17] UN Human Rights Committee (HRC), Ioane Teitiota v New Zealand , UN Doc CCPR/C/ 127/ D/ 2728/2016, https://tbinternet.ohchr.org/_layouts/15/treatybodyexternal/Download.aspx?symbolno=CCPR/C/127/D/2728/2016&Lang=en (Access Date: 01.12.2023)
[18] Tim McDonald, "The man who would be the first climate change refugee", 5 November 2015, BBC News, https://www.bbc.com/news/world-asia-34674374 (Access Date: 12.12.2023)
[19] Ioane Teitiota v. The Chief Executive of the Ministry of Business, Innovation and Employment , https://climatecasechart.com/non-us-case/ioane-teitiota-v-the-chief-executive-of-the-ministry-of-business-innovation-and-employment/ (Access Date: 10.01.2024)
[20] Simon Behrman, Avidan Kent. The Teitiota Case and the limitations of the human rights framework, QIL, Zoom-in 75 (2020) 25-39, p: 31.

in order to protect the right to life, in terms of legal status, these individuals are still not considered as refugees and, in short, they cannot use the rights that come with the refugee status. As a matter of fact, in the Dictionary of Migration Terms prepared by the International Organization for Migration, environmental migrants are defined as people who have to leave or choose to leave their habitual homes temporarily or permanently due to sudden or gradual environmental changes negatively affecting their lives or living conditions and move around in their own country or abroad[21].

In other words, in the above-mentioned case, while it is regulated not to repatriate individuals displaced due to climate change, based on the right to life, these individuals cannot use their refugee rights from international law because they are not considered in the said status. In summary, in terms of international law, refugeehood includes individuals who are displaced as a result of events that are not related to climate change, and it is accepted that environmental migrants and refugees have different legal statuses[22].

Environmental Immigration in Terms of Time, Space and Purpose

Environmental Immigration in Terms of Time

Environmental Migration Due to Sudden Developments

Natural disasters that occur suddenly and harm people, such as earthquakes, landslides, avalanches, floods, tornadoes and frosts, cause loss of life and property because they cannot be controlled, and law enforcement forces may be insufficient to intervene against security violations in these regions[23]. In addition, sudden environmental disasters, such as the human-made Chernobyl catastrophe, also cause negative effects on living spaces[24]. Although the earthquake is not related to climate change, it is observed that the effects and losses caused by other natural disasters such as landslides, avalanches, floods, tornadoes and frosts on nature have increased due to climate change compared to the past.

These losses create traumas on the people of the region where the disaster occurred. In addition, the negative effects of these disasters on the environment, which cannot be corrected in a short time, prevent employment and harm the continuity of economic activities. Individuals who leave their homeland and choose to live in other settlements due to these sudden

[21] Richard Perruchoud ile Jillyanne Redpath - Cross, Göç Terimleri Sözlüğü, Uluslararası Göç Örgütü, p: 17.
[22] Nükhet Yılmaz Turgut, "Çevresel Göç ve Çevre Göçmenleri Sorununun Çevre Hukukundaki Yeri", TBB Dergisi 2018 (139), pp: 287-346. p: 305.
[23] Mustafa Arslan. "Afet Sonrası Güvenlik İhlalleri ve Karşı Tedbirler", Uluslararası Doğal Afet ve Afet Yönetimi Sempozyumu, 746-750, 2-4 Mart 2016, Karabük.p: 746.
[24] Alexey V Yablokov and Nesterenko, Vassily B.; Nesterenko, Alexey; Sherman-Nevinger, consulting editor, Jannette D. 2009. Chernobyl: Consequences of the Catastrophe for People and the Environment. Boston, MA: Blackwell Publishing for the Annals of the New York Academy of Sciences.

disasters are classified as environmental immigrants due to sudden developments[25].

Environmental Migration Resulting from Slowly Evolving Events

Environmental events such as drought, deforestation, and sea level rise are the negative effects of climatic change and occur over a period of time. Although the fact that this process is spread over a long period of time reduces the immediate noticeability of negative effects, they can ultimately be as effective as natural disasters. As a matter of fact, drought, which is defined as the negative impact of water resources, agriculture and all living things as a result of the negative change in the climate in terms of humidity, causes food shortage by damaging plant areas and negatively affecting animal quality[26]. In the United Nations Convention to Combat Desertification, drought is defined as "*a natural event that negatively affects land and resource production systems and causes serious hydrological imbalances as a result of rainfall falling significantly below normal recorded levels*"[27]. This hydrological imbalance results in an increase in poverty over time. For this reason, individuals who experience these environmental events choose to change their living spaces and become environmental immigrants.

Environmental Immigration in Terms of Purpose

Environmental Immigration for the Purpose of Short-Term Settlement

The extent of environmental disasters can play a determining role on the migration duration of environmental migrants. As a matter of fact, in disasters such as avalanches and landslides, where the effects can be corrected, the reshaping of these spaces through afforestation can be achieved more easily than environmental events such as change in sea level. For this reason, individuals who have experienced such environmental disasters may choose to change settlement for a short time and return depending on the arrangement of the abandoned area[28].

Environmental Migration for the Purpose of Long-Term Settlement

The fact that the environmental disaster is now irreversible may cause environmental migrants to make their choices for long-term settlement changes. As a matter of fact, especially in island countries, the damage to clean water resources after the rise in sea level significantly threatens living

[25] Melih Görgün, "Küreselleşme Sürecinde Göçmen İlişkileri Ağının Önemi", Süleyman Demirel Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi Y.2017, C.22, Göç Özel Sayısı, pp.1317-1327. p: 1322.
[26] Erol Kapluhan, "Türkiye'de Kuraklık ve Kuraklığın Tarıma Etkisi", Marmara Coğrafya Dergisi Sayı: 27, OCAK - 2013, pp. 487-510, p:488.
[27] United Nations Convention to Combat Desertification, 1994.
[28] Nuray Ekşi,"İklim Mültecileri", Göç Araştırmaları Dergisi, Cilt: 2, Sayı: 2, Temmuz-Aralık 2016, pp. 10-58, p: 13.

spaces, and this causes individuals to change their settlement for a long time[29].

Environmental Immigration in Terms of Space

Environmental Migration within the Country

Environmental immigrants, who choose to leave their homes after environmental disasters that occur either suddenly or over time, can relocate within their own countries while choosing new living spaces. Since environmental immigrants in this position do not leave the borders of their country of citizenship, they are subject to the legal system of their own country and continue to encounter their own culture.

Environmental Migration Across Borders

Individuals who do not find the conditions of their country suitable for living after environmental disasters, both sudden and spread over time, tend to move to other countries. For this reason, environmental immigrants who choose to leave their own country and cross the border become subject to the laws of a new one and become acquainted with the culture of the new country they move to.

Effects of Environmental Migration on Security in Terms of Time, Space and Purpose

Effects of Environmental Migration on Security in Terms of Time

Effects of Environmental Migration Due to Sudden Developments on Security

Taking security measures in sudden events requires a faster reaction than slow-developing events. This short period of time prevents crisis management from being carried out effectively and therefore individuals may not be provided with a safe environment. As a matter of fact, since there has been an increase in both the number and severity of storms, which constitute one of the sudden natural disasters experienced due to climate change, in recent years, law enforcement personnel may be insufficient to ensure the security of the disaster area. This inadequacy may create a burden on migrating individuals and may cause them to be exposed to criminal acts such as looting and theft. Since environmental immigrants resulting from sudden developments are initially supported by the law enforcement forces of their own countries, they have an impact on security within the framework of national security capacity and country culture.

Effects of Environmental Migration Resulting from Slowly Evolving Events on Security

Although environmental impacts are more difficult to detect in slow-

[29]Robert A. McLeman, "On the Origins of Environmental Migration", Fordham Environmental Law Review, Volume 20, Number 2 2017 Article 3, pp: 403-425. p: 407.

developing events due to their spread over a long period of time, a more specific action plan can be constructed as there is more time for security measures to be taken. Environmental migrants who experience the environmental impacts in question and choose to settle in new living spaces also can act according to these predetermined action plans, and thus precautions can be taken against acts that threaten security.

Effects of Environmental Migration on Security in Terms of Purpose

Effects of Environmental Immigration with the Purpose of Short-Term Settlement on Security

Since environmental migrants planning for a short-term settlement aim to return to the region where the environmental event occurred, they generally prefer to migrate within their own countries and to easily accessible areas. For this reason, environmental immigrants who are subject to the legal order of their own countries return to their former residences as the threat or crisis situation ends, and they are supported by the national law enforcement forces.

Effects of Environmental Immigration with the Purpose of Long-Term Settlement on Security

In environmental migration with the purpose of long-term settlement, the situation becomes more complex compared to short-term environmental migrants, because environmental migrants with the purpose of long-term settlement change do not plan to return to their previous settlements again, and the quality of the capacities of the new settlements may affect the harmony in the region in question. In addition, the attitudes of the previous population in the new settlements towards the new group in question and their level of acceptance of them also have an impact on the security perceptions between the two groups.

Failure to reach a balance regarding the sharing of resources may cause conflict between the two above mentioned groups. For example, after environmental events related to climate change, such as drought, the effects of which can be reversed in a long time, African environmental immigrants did not prefer to live in their previous habitats, and accordingly, the possibility of the new arrival group sharing the water resources caused inter-tribal conflicts.

Effects of Environmental Migration on Security in Terms of Space

Effects of Environmental Immigration within the Country on Security

Environmental immigrants who relocate within the country continue to be subject to the laws of their home country and do not have to internalize a

new cultural identity[30]. In this respect, the security measures to be taken are regulated within the framework of the legal order of their own country and they can continue to reside in their previous settlements depending on the end of the threat or crisis situation. Since they are not in a different culture, there is no problem of identity integration and therefore there is no exposure to xenophobia[31]. However, since they can cause a relative increase in unemployment in the places they have migrated to, they can become a pressure on economic integration and social structure. If this pressure gains momentum the secure environment may diminish and criminal acts may increase leading the law enforcement agencies to take precautions.

Effects of Environmental Migration Across Borders on Security

Since cross-border environmental migration, by definition, concerns at least two countries, it requires coordination between at least two countries in terms of legal order, and this causes security to take on an international character. Especially the different cultural structure of the country of migration creates the need for individuals to become acquainted with the identity construction process. Failure to internalize this identity, which causes lack of integration, can lead to xenophobia[32].

In addition, the decrease in job opportunities for the citizens of the country of immigration creates pressure on economic integration and social structure, triggering xenophobia, and this situation can sometimes cause conflicts between the citizens of the country of immigration and environmental immigrants. Xenophobia, which we can define as the construction of the perception of the "others" in a hostile structure, can also damage diplomatic relations between two countries over time.

In addition to the events mentioned above, individuals who are prone to engage in crime and cross the border by joining environmental migrants can get involved in criminal acts such as human trafficking and drug smuggling, which are considered new threats to international security. These initiatives, which result in the border protection reflex of the immigrant country, can create a conflict environment over time[33] and It may lead to more aggressive measures being taken depending on the attitude of environmental immigrants within the country. As a matter of fact, countries' securitization policies

[30] Nazmi Tarım, İklim Değişikliğine Bağlı Göçlerin Avrupa Birliği'ne Üye Ülkeler ve Türkiye'de Sosyal Güvenlik Sistemlerine Etkileri, Dokuz Eylül Üniversitesi Sosyal Bilimler Enstitüsü Çalışma Ekonomisi ve Endüstri İlişkileri Anabilim Dalı Yüksek Lisans Tezi, İzmir, 2019. p: 42

[31] *ibid.*, 47.

[32] Bartram, D. & Poros, M. & Monforte, P. (2017), Göç Meselesinde Temel Kavramlar (Çev. Itır Ağabeyoğlu Tuncay), Hece Yayınları, Ankara, 2017, p : 181.

[33] Massey, D. S., Arango, J., Hugo, G., Kouaouci, A., Pellegrino, A., & Taylor, J. E., Theories of International Migration: A Review and Appraisal. Population and Development Review, 19(3): 431-466. p: 431.

towards environmental migrants may tend to create spaces where human rights violations can occur, such as the construction of collection centers that include military measures.

In the light of all this information, the most important thing to take into consideration is that the concept of environmental migration must be examined on three levels, as it has effects on the people, the states and the international system. In this context, while human security, right to life and human rights-based studies are at the forefront in approaches to environmental security that focus on the individual, in the traditional security approach focusing on the state, which is accepted as the primary actor, ensuring the survival of it in the event of an armed attack against the state is prioritized[34]. In the environmental security approach, which focuses on the international system, it is emphasized that nation states are inadequate against global environmental problems and therefore a joint action plan must be followed by international organizations[35].

Conclusion

The perception of security in the post-Cold War period differs from the realistic approaches of the Cold War period, and perceived threat elements vary. As a matter of fact, in the security perception with five sector analysis, security has begun to be examined on political, economic, social, environmental and military levels. Environmental security, which is one of these five sectors, is directly related to the physiological environment in which the individual lives, and a discourse has been developed in environmental security that any negative change in environmental conditions threatens human life. This discourse assumes that climate change has negative effects on the environmental conditions that ensure the continuation of human life, and that these negative effects threaten security at the individual, state and system levels.

As a matter of fact, individuals who encounter negative developments in environmental conditions due to climate change choose to leave their homes and become environmental immigrants. If these environmental migrants choose to relocate within their own country borders, they are supported by their own national law enforcement forces, while cross-border environmental migration is evaluated in terms of international security.

As a result, the common point of all security approaches that center on the individual, the state and the international system is that if the necessary measures are not taken for climate change due to environmental pollution, a

[34] Tarık Ak, Ulusal Güvenlik-Çevresel Güvenlik Ekseninde Silahlı Kuvvetler Çevre İlişkisi, (Yayımlanmamış Doktora Tezi), Ankara, Ankara Üniversitesi, 2013 p. 46.
[35] Özlem Baştan, Çevresel Güvenlik Bağlamında Sınır Aşan Sular Sorunu (Nil Havzası Örneği), (Yayımlanmamış Yüksek Lisans Tezi), Sakarya, Sakarya Üniversitesi , 2021, p. 29.

chaotic loop will emerge and such problems will cause conflicts over time and the harmony in international relations will be disrupted. In this context, it is important for decision-makers to prepare action plans by anticipating that climate change will increase environmental migration while demonstrating security policy practices.

SMALL ISLAND STATES, CLIMATE CHANGE, AND THE LAW OF THE SEA: AN ASSESSMENT OF THE REQUEST FROM ITLOS FOR AN ADVISORY OPINION, BEFORE THE DECISION

Nebile Pelin Manti*

Introduction

The interplay between the ocean and climate change is gaining a new dimension. Small Island States are among the most vulnerable of all, and many island nations are struggling to escape the effects of the climate change, which accelerates the degradation of the natural resources that underpin their economies, causing sea level rise, which leads to the salinization of rivers and lakes and therefore, scarcity of fresh water resources, and decline of coral reefs and fish stocks, which are the basis of their economies and eroding coastlines battered by intensifying storms.

On December 12, 2022, the Commission of Small Island States on Climate Change and International Law[1] (COSIS) filed an application before the International Tribunal for the Law of the Sea (ITLOS), a request for an advisory opinion on the State Parties' obligations under the United Nations Convention on the Law of the Sea (UNCLOS) to prevent, reduce, and control pollution of the marine environment from climate change, and to protect and preserve the marine environment in relation to climate change impacts[2].

The Tribunal will **deliberate on the case and is expected to issue an advisory opinion** on May 21, 2024, and this piece will provide the background and the framework for the ITLOS advisory opinion on effects of the climate change in general as written down before the May 21.

As highlighted by many, the 2024 promises to be the 'Year of Climate',

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[1] Facing this existential threat, as well as inaction on the international stage, the Prime Ministers of Antigua and Barbuda and Tuvalu signed the Agreement for the Establishment of the Commission of Small Island States on Climate Change and International Law (COSIS) on the eve of UN Climate Change Conference (COP26). (Available at: https://www.cosis-ccil.org/storage/documents/I-56940-08000 00 2805 c 2 ace. pdf). The Republic of Palau acceded to the Agreement in November 2021, Niue in September 2022, Vanuatu in December 2022, and St. Lucia in December 2022. Membership is open to any member of the Alliance of Small Island States (AOSIS).

[2] Request for an Advisory Opinion Submitted by the Commission of Small Island States on Climate Change and International, Case No. 31, filed by the COSIS, on December 12, 2022, (Available at: https://www.itlos.org/fileadmin/itlos/documents/cases/31/Request_for_Advisory_Opinion_COSIS_12.12.22.

since the international community is expecting four important deliberations, from most important international courts, namely the European Court of Human Rights[3], the Inter-American Court of Human Rights[4], the International Tribunal for the Law of the Sea, and the International Court of Justice[5]and the temporal and substantive proximity of these cases, across no less than four different international forums, is important and can be considered as a reflection of the immense frustration that civil society and States who are not the responsible but the most vulnerable to the harms resulting from climate change.

Jurisdiction of the ITLOS to Rule on the Request For An Advisory Opinion

The International courts and tribunals often have both contentious and advisory jurisdiction. In contentious cases, the decision is binding for parties, where the reasoning of the court or tribunal is analytically connected with the intricate facts of the dispute. The advisory jurisdiction, on the other hand, is to provide the courts' views on a specific matter relating to the interpretation of a norm of international law, rather than to settle a dispute between the parties, and therefore, have a potential to define States' obligations under international law.

The advisory opinions have several functions, such as to contribute to the judicial development of international law and an advisory opinion explains the law on a specific question, regardless of its lack of binding effect, advisory

[3] The three climate cases jointly pending before the Grand Chamber of the ECHR are (1) Verein Klima Senior innen Schweiz and Others v. Switzerland (violations under Article 2 (right to life) and Article 8 (right to respect for private and family life) of the European Convention on Human Rights and under Article 13 (right to an effective remedy) violation by the Swiss government); (2) Carême v. France(Claiming adoption by the French government of measures to curb greenhouse gas emissions in order to meet France's national and international climate obligations and violations under Articles 2 and 8 of the European Convention on Human Rights); and finally (3) Duarte Agostinho and Others v. Portugal and 32 Others (violations of Articles 2 and 8 of the Convention, along with Article 14 (prohibition against discrimination). In addition, they have urged the Court to read these provisions of the European Convention in light of the UN Convention on the Rights of the Child, Article 3(1) (setting "the best interests of the child" as a "primary consideration"))

[4] An application filed before the Inter-American Court on Human Rights, requesting the Court to clarify obligations of the States to protect human rights from the negative impacts of climate change. On 9 January
2023 the Republic of Chile and the Republic of Colombia, both State parties to the American Convention on Human Rights, jointly filed a request for an Advisory Opinion on the Climate Emergency and Human Rights. The Request' before the Inter-American Court of Human Rights. Request, on the official web page of the Inter-American Court: (Available at: https://www.corteidh.or.cr/ docs/opiniones/ soc_1_2023_en.pdf)

[5] Before the International Court of Justice, which has been asked to decide on the obligations of States regarding climate change, and their legal consequences vis-à-vis other States and peoples and individuals of present and future generations. Request for Advisory Opinion transmitted to the Court pursuant to General Assembly resolution 77/276 of 29 March 2023, OBLIGATIONS OF STATES IN RESPECT OF CLIMATE CHANGE, April 12, 2023, (Available at: https://www.icj-cij.org/case/187).

opinions are an authoritative, facts- detached, *urbi et orbi*[6] interpretation of international law. And secondly, unless there are compelling reasons to detach from that interpretation, the interpretation adopted in an advisory opinion will likely guide the court or tribunal in future cases.

The applications mentioned confirms the growing attention and prove the distinctive features devoted to the advisory function of international courts and tribunals, not limited to clarification of the rules, but increasingly seen as a gateway for the protection of public interests, as an instrument of preventive diplomacy, and strengthening of peaceful relations between States.

Background For the Advisory Opinion Request

The request for an advisory opinion can be introduced before ITLOS on the basis of Article 21 of the Statute of the Tribunal[7] and article 138 of its Rules, and accordingly, The Agreement establishing COSIS specifically provides that it shall be authorized to request advisory opinions from ITLOS under the Article 2(2)[8]. In conformity with the Statute of the Tribunal which includes jurisdiction over "all matters specifically provided for in any other agreement which confers jurisdiction on the Tribunal", upon the Article 21[9]. And the COSIS Agreement, therefore, provides the jurisdictional basis for the case – which was also a significant part of the motivation behind the establishment of COSIS[10].

The COSIS was founded in 2001[11], and the 8 member States, namely (1)

[6] The religious blessing of the Catholic Church, term meaning 'to the city [of Rome] and to the world", which denotes a papal address and apostolic blessing given by the pope on certain solemn. Used here to mention the advisory opinion is for the applicant, and also the Court's interpretation addresses all the parties to the Convention, without binding effect and says what law is.

[7] Statute of the International Tribunal for the Law of the Sea, December 10,1982, (1833 UNTS 561), OXIO 161, (Available at: https://www.itlos.org/fileadmin/itlos/documents/basic_texts/statute_en.pdf)

[8] The Art 2(2), The Agreement for the establishment of the Commission of Small Island States on Climate Change and International Law. Edinburgh, 31 October 2021, Entry into force: 31 October 2021 by signature, in accordance with article 4(2) (Available at: https://treaties.un.org/doc/Publication/UNTS/NoVolume/56940/Part/I-56940-08000002805c2ace.pdf)

[9] Article 21, Jurisdiction "The jurisdiction of the Tribunal comprises all disputes and all applications submitted to it in accordance with this Convention and all matters specifically provided for in any other agreement which confers jurisdiction on the Tribunal". The Art 21, The Statute Of The International Tribunal For The Law Of The Sea, opened for signature on 10 December 1982 and entered into force on November 16, 1994. (Available at: https://www.itlos.org/fileadmin/itlos/documents/basic_texts/statute_en.pdf)

[10] A Guide To Proceedings Before The International Tribunal For The Law Of The Sea, by International Tribunal for the Law of the Sea, 2021 (Available at:
https://www.itlos.org/fileadmin/itlos/documents/guide/2105-30632_Itlos_Guide_GB_IK2.pdf)

[11] Agreement for the establishment of the Commission of Small Island States on Climate Change and International Law, submitted by Antigua and Barbuda, in Edinburg, 31/10/2021, (Available at: https://commonwealthfoundation.com/wp-content/uploads/2021/12/Commission-of-Small-Island-States-on- Climate-Change-and-International-Law.pdf); Registered in UN Treaty Collection: under No. 56940, (Available at: https://treaties.un.org/Pages/showDetails.aspx?objid=08000002805c2ace)

Antigua and Barbuda, (2) Niue, (3) Palau, (4) Saint Lucia, (5) St. Kitts and Nevis, (6) St. Vincent and the Grenadines, (7) Tuvalu, and (8) Vanuatu have requested the International Tribunal for the Law of the Sea **(ITLOS**) to decide on mainly two set of questions;

- *What are the specific obligations of State Parties to the United Nations Convention on the Law of the Sea to prevent, reduce and control pollution of the marine environment in relation to the deleterious effects that result or are likely to result from climate change, including through ocean warming and sea level rise, and ocean acidification, which are caused by anthropogenic greenhouse gas emissions into the atmosphere?*

- *What are the obligations of States to protect and preserve the marine environment in relation to climate change impacts, including ocean warming and sea level rise, and ocean acidification?"*

Following the filing of the Request, the Tribunal invited States, parties to the United Nations Convention on the Law of the Sea [12] (1982 UNCLOS) and a number of intergovernmental organisations to present written statements by 16 June 2023[13] , with a record number in the Tribunal's history.

To highlight the importance of the process, the striking number of 19 submissions by non-State actors (compared to respectively 8 and 5 in the previous requests) marks an extraordinary rise in public interest and participation in international judicial proceedings under the 1982 UNCLOS, traditionally seen as an inter- State regime[14]. However, ITLOS has not ordered a second round of written submissions, which also constitutes a contrasts with its previous practice, considering the Fisheries Advisory Opinion (2015).

[12] United Nations Convention on the Law of the Sea, December 10, 1982, 1833 U.N.T.S. 397. (Available at: https://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf)

[13] On this occasion, an unprecedented 52 written submissions were received by the ITLOS Out of these, 33 are by States Parties to the Convention (including the European Union), while the remaining 19 are by a diverse range of non-State actors, including UN bodies (e.g., the United Nations Environmental Programme, the Food and Agriculture Organisation of the United Nations, and the International Maritime Organisation),intergovernmental organisations (e.g., COSIS, the International Union for the Conservation of Nature, the African Union) and civil society actors (e.g., Client Earth, High Seas Alliance, WWF, Center for International Environmental Law (CIEL) jointly with Greenpeace International). (Written statements are available at: https://www.itlos.org/en/main/cases/list-of-cases/request-for-an-advisory-opinion-submitted-by-the-commission-of-small-island-states-on-climate-change-and-international-law-request-for-advisory-opinion-submitted-to-the-tribunal/)

[14] Formerly, 31 and 17 statements were submitted in the context of the two other Advisory Opinion requests from the ITLOS in 2015 during the Case No.21 regarding the Request for an Advisory Opinion submitted by the Sub-Regional Fisheries Commission (SRFC) (Request for Advisory Opinion submitted to the Tribunal)(Available at: https://www.itlos.org/en/main/cases/list-of-cases/case-no-21/);and in 2011 during the Case No.17, regarding theResponsibilities and obligations of States sponsoring persons and entities with respect to activities in the Area (Request for Advisory Opinion submitted to the Seabed Disputes Chamber), (Available at: https://www.itlos.org/en/main/cases/list-of-cases/case-no-17/)

While the opening of the public hearings scheduled[15] on September 11, 2023, in order to listen to the oral statements of the States Parties to 1982 UNCLOS, COSIS and a limited number of intergovernmental organisations.. The latter category includes, amongst others, the African Union, and the Pacific Community and States Parties to the treaties which did not submit a written statement are participating in the oral proceedings and vice versa. Finally, the International Seabed Authority will not participate in the oral proceedings, despite submitting a written statement.

On the Interpretation of the 1982 UNCLOS Obligations

While the 1982 UNCLOS does not contain any reference to or obligation on climate change, several of its obligations are relevant at the ocean-climate nexus[16]. All submissions by States Parties and non-State actors referred to obligations under 1982 UNCLOS to the obligation to protect and preserve the marine environment (Article 192), to take appropriate measures to prevent, reduce and control pollution from any source (Article 194), to cooperate on a global and regional basis (Article 197), to conduct environmental impact assessments (EIAs; Article 206), and to adopt laws and regulations to prevent, reduce and control pollution from land-based sources and from or through the atmosphere (Articles 207 and 212)[17].

The 1982 UNCLOS is part of the greater international law system, therefore it has to be interpreted and applied in consistent with other norms and treaties and rules regulating the treaty system, such as the Article 31(3)(c) of the Vienna Convention on the Law of Treaties, which provides that the means to keep a Treaty up to date and to incorporate subsequent changes in law is the technique of systemic integration (Art. 31.3.c, *in* Vienna Convention on the Law of Treaties; i.e. the principle of "systemic integration"). This argument finds confirmation also in 1982 UNCLOS Article 293 (1), which provides that the Tribunal "shall apply this Convention

[15] Press Release Schedule Of The Public Hearings in the Case No. 31, Request For An Advisory Opinion Submitted By The Commission Of Small Island States On Climate Change And International Law, ITLOS/Press 343, August 25, 2023, (Available at: https://www.itlos.org/fileadmin/itlos/documents/press_releases_english/PR_343_EN.pdf)

[16] "'Ocean–climate nexus' explains how the oceans and atmosphere together control and express both the Earth's daily weather systems and the long-term changes in planetary climate", Dorrik Stow, 'Ocean–climate nexus', Oceans: A Very Short Introduction, Very Short Introductions (Oxford, 2017; online edn, Oxford Academic, 27 July 2017), (Available at: https://doi.org/10.1093/actrade/ 9780199655076.003.0006), (Accessed May 12, 2024); Christina Voigt, "Oceans and Climate Change Implications for UNCLOS and the UN Climate Regime", in The Environmental Rule of Law for Oceans: Designing Legal Solutions, Cambridge University Press: February 21, 2023, pp.17-30, (Available at: https://www.cambridge.org/core/books/the-environmental-rule-of-law-for- oceans/ 6A555 A9 E 9 4 4DE935C3F87B79FE8EB035); Andrea Longo & Mitchell Lennan, "Reflecting On The Range Of Views Submitted To The International Tribunal On The Law Of The Sea On Climate Change" in One Ocean Hub, ,September 4, 2023, (Available at: https://oneoceanhub.org/ reflecting-on-the-range-of-views-submitted-to-the-international-tribunal-on-the-law-of-the-sea-on-climate-change/).

[17] Andrea Longo & Mitchell Lennan, op.cit., fn.16.

and other rules of international law not incompatible with this Convention[18]".

The scope of the legal framework for the interpretation also includes the Article 237 of the 1982 UNCLOS, concerning the obligations under other conventions on the protection and preservation of the marine environment, along with the provisions in Part XII, regarding the protection of the marine environment with many rules of reference to generally accepted international rules and standards provided in other international instruments[19].

In terms of treaty interpretation, this legal technique adopted by the 1982 UNCLOS provided by the mentioned provisions enable the incorporation of external rules and standards into a framework convention, UNCLOS, in order to inform and reinforce its provisions effectively, and to respond the emerging challenges and new developments in the technology, circumstances and further legal developments, in a broader sense for the compatibility to the evolving nature of international law system.

Another dimension of the treaty interpretation covers the human rights obligations of states arising from the human rights treaties and norms, which were specifically addressed by some of the submissions[20], specifically underscoring their role as interpretative tool to substantiate State obligations under UNCLOS regarding climate change, highlighting how the relevance of these human rights translates into the following obligations for States to:

- *rapidly reduce greenhouse gas emissions consistently with their obligations under both international human rights law and environmental law,*
- *implement rules, standards, and practices to ensure the full enjoyment of human rights, by communities and individuals affected by climate change, and*
- *apply the precautionary principle to activities that might result in the pollution of the*

[18] The Article 293, Part XV: Settlement of Disputes United Nations Convention on the Law of the Sea, December 10, 1982, 1833 U.N.T.S. 397. (Available at: https://www.un.org/depts/ los/ convention_agreements/texts/unclos/part15.htm)

[19] The Article 237, Part XII: Protection and Preservation of the Marine Environment, in United Nations Convention on the Law of the Sea, December 10, 1982, 1833 U.N.T.S. 397. (Available at: https://www.un.org/depts/los/convention_agreements/texts/unclos/part12.htm)

[20] The joint submission by three UN Special Rapporteurs (Human Rights and Environment, Human Rights and Climate Change, Toxics and Human Rights) emphasises the adverse impact of climate change-induced marine biodiversity loss on a set of human rights such as the right to life, the right to self-determination, the right to a healthy environment, the right to home, privacy and family life, the right to food, the right to livelihood, including to customary fishing practices, and the cultural rights of minorities and Indigenous Peoples. Amicus brief submitted to the International Tribunal for the Law of the Sea by the UN Special Rapporteurs on Human Rights & Climate Change (Ian Fry), Toxics & Human Rights (Marcos Orellana), and Human Rights & the Environment (David Boyd), before The International Tribunal For The Law Of The Sea, in Case No. 31: Request for an Advisory Opinion Submitted By The Commission Of Small Island States On Climate Change And İnternational Law, 30 May 2023, (Available at: https://www.itlos.org/fileadmin/itlos/documents/cases/31/written_statements/4/C31-WS-4-1_Amicus_Brief_UN_Special_Rapporteurs.pdf)

marine environment[21].

Otherwise, as emphasized in the joint submissions and recognised by the Tribunal, the adverse impact of climate change-induced marine biodiversity loss on a set of human rights such as the right to life, the right to self-determination, the right to a healthy environment, the right to home, privacy and family life, the right to food, the right to livelihood, including to customary fishing practices, and the cultural rights of minorities and Indigenous Peoples[22].

On the Application of the 1982 UNCLOS Obligations

As highlighted by the prime minister of Antigua and Barbuda, Gaston Browne in the opening statements '[t]his is the opening chapter in the struggle to change the conduct of the international community by clarifying the obligation of States to protect the marine environment[23] ', and "a well-reasoned advisory opinion will facilitate international cooperation between UNCLOS States Parties and encourage a broader discussion amongst world leaders about State obligations and climate change. It will help clarify the existing obligations that States, major polluters in particular, should have complied with all these years, and which remain both legally binding and an immediate imperative to prevent climate change[24]".

The core question as to the advisory opinion proceedings remain as to the compliance of the treaty obligations, since none of the applicants are mainly accountable for the climate change and the related effects, but the applicants are the direct victims of the consequences thereof, and unfortunately, the reaction of the real polluters will determine the next level of the fight with the climate change related degradation in the oceans and the fate of small island states in the future.

The context and the facts behind these request are simple, and accessible as highlighted in the opening statements of Prime Ministers Gaston Brown (Antigua and Barbuda) and Kausea Natano (Tuvalu)[25]: ITLOS provides a highly visible fora for the visible consequences of climate change and related perpetrators obligations, and enable the vulnerable states with limited material power to challenge the legitimacy of policies pursued by the states

[21] *Ibid.*, pp.5-9.

[22] *Ibid.*, pp.5-9.; Andrea Longo & Mitchell Lennan, op.cit., fn.16.

[23] Verbatim Record, 2023, Public sitting held on Monday, September 11, 2023, at 10 a.m., at the International Tribunal for the Law of the Sea, Hamburg, President Albert J. Hoffmann presiding, ITLOS/PV.23/C31/1/Rev.1, (Available at:https://www.itlos.org/fileadmin/itlos/documents/cases/31/Oral_proceedings/verbatim_records_rev/ITLOS_P V23_C31_1_Rev.1_E.pdf)

[24] *Ibid.*

[25] Verbatim Record, 2023, Public sitting held on Tuesday, 12 September 2023, at 3 p.m., at the International Tribunal for the Law of the Sea, Hamburg, President Albert J. Hoffmann presiding, , ITLOS/PV.23/C31/4/Rev.1, (Available at: https://www.itlos.org/fileadmin/itlos/ documents/cases/31/Oral_proceedings/verbatim_records_rev/ITLOS_P V23_C31_4_Rev.1_E.pdf)

who are responsible for the climate change; to mobilise support, to resolve the problems on a more multilateral platform; and, to generate international public and legal support and pressure for legal or political improvement.

The UNCLOS obligations regarding the protection of the marine environment need to be interpreted not only in light of States' duties and commitments under the international climate change regime but considering international human rights law. As UNCLOS highlights some of the human rights obligations in some of its provisions as:

a. *the very definition of pollution in Article 1(1)(4), referring to human health*[26]*;*

b. *the reference to the "nutritional needs of the population" of land-locked and geographically disadvantaged States (Articles 69-70);*

c. *the general objective to realise "a just and equitable international economic order which takes into account the interests and needs of mankind as a whole" (preamble).*

The emphasis at this regard is on the vivid character and the quality of the 1982. UNCLOS, which is not a sole document which cannot be interpreted or applied in isolation but an interactive document in connection with the normative framework for the environmental preservation and protection, such as the United Nations Framework Convention on Climate Change[27] (UNFCCC) and the Paris Agreement[28], as the two most relevant treaties in the context of the pending Request[29]. Most of the submissions call for the Tribunal to interpret the meaning of marine pollution so as to include also anthropogenic greenhouse gas emissions, and some of them specifically recall States' commitments in the Paris Agreement, e.g., the progressive reduction

[26] The Article 1(1)(4): "pollution of the marine environment" means the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities"; in Part I Introduction, United Nations Convention on the Law of the Sea, December 10, 1982, 1833 U.N.T.S. 397. (Available at: https://www.un.org/depts/los/convention_ agreements/ texts/unclos/part12.htm)

[27] UN General Assembly, United Nations Framework Convention on Climate Change : resolution / adopted by the General Assembly, A/RES/48/189, January 20, 1994, (Available at: https://www.refworld.org/ legal/resolution/unga/1994/en/26583), [accessed May 15, 2024]

[28] Paris Agreement, Date of conclusion: December 12, 2015, Entry into force: November 4, 2016 , in accordance with article 21(1) . The Agreement enters into force on the thirtieth day after the date on which at least 55 Parties to the Convention accounting in total for at least an estimated 55 per cent of the total global greenhouse gas emissions have deposited their instruments of ratification, acceptance, approval or accession; (Available at: https://www.un.org/en/climatechange/paris-agreement and ratification timetable: https://treaties.un.org/Pages/showDetails.aspx?objid=0800000280458f37&clang=_en)

[29] To keep in mind that the Paris Agreement is largely silent on the specific minimum conduct required by States, leaving a wide degree of discretion to Nationally Determined Contributions, also its relevance and applicability to the ocean, whether within or beyond national jurisdiction. Elisa Morgera, and Mitchell Lennan, "Ensuring Mutual Supportiveness of the Paris Agreement with other Multilateral Environmental Agreements: A Focus on Ocean-Based Climate Action", June 17, 2023, in Forthcoming in Zahar (ed.) Research Handbook on the Law of the Paris Agreement (Edward Elgar, 2024), (Available at SSRN: https://ssrn.com/abstract=4482946 or http://dx.doi.org/10.2139/ssrn.4482946)

of such emissions (Article 4).

The UNCLOS obligations on the prevention and control of marine pollution, as well as of the general UNCLOS obligation to protect and preserve the marine environment (including from the adverse effects of climate change).

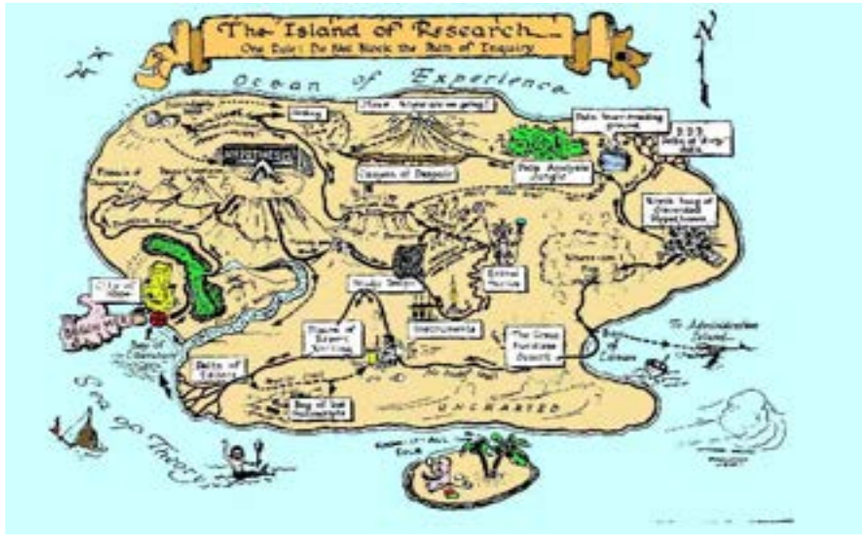
Finally, the Convention on Biological Diversity[30] (CBD**)** have been referred by several written submissions, including those of the European Union, arguing that the provisions of the CBD inform the scope and content of the due diligence obligation to protect the marine environment under UNCLOS and by the written submission of the High Seas Alliance, which emphasises the duty of cooperation in respect of areas beyond national jurisdictions, and the relevance of CBD[31].

Map 1. Map showing small island states and summary of climate finance in the Caribbean, 2010–2015 (committed amounts in million US$) (Source: SEI)

[30] The Convention on Biological Diversity (CBD), entered into force on 29 December 1993. (Official website available at: https://www.cbd.int/)

[31] Amicus Curiae Memorial Of The High Seas Alliance ,june 16, 2023, in Case No. 31: Request for an Advisory Opinion Submitted By The Commission Of Small Island States On Climate Change And International Law) (Available at: https://www.itlos.org/fileadmin/itlos/documents/cases/31/written _ statements/4/C31-WS-4-2- High_Seas_Alliance.pdf)

Map 2. The map of "The Island of Research" by Ernest Harbury, which is also hanged on the wall of the author's department, and reminds us all that the legal research is very similar to the quest of survival on a deserted island.



Conclusion

Climate change have already been changing the physical structure of low-lying maritime features and coasts, and the requests for an advisory opinions show the emergence of a declaratory ruling on what states can do to adapt to the real and potential loss of maritime territory, and resources.

While waiting for the decision of the ITLOS on May 21, the outcome will highlight the collective action is required, and all these advisory process to set the standard straight will help to determine the way forward and the future of the most vulnerable, as well as the international security on different levels of human security, food security, and whether the international legal obligations of States foreseen in the international treaty system are enough to create tangible steps towards achieving the goals to reduce the effects of climate change on national and international levels. Apparently, in consequences of climate change, we are no longer islands.

The Advisory Opinion request submitted by the COSIS can play an important role to clarify the environmental obligations of member states under UNCLOS, and on the interpretation of the treaties and norms in the fight against the impacts of climate change, and will determine the basis for the future cases; highlights on the other hand the reach to the international courts, and their jurisdiction to demand advisory opinions to bring clarity to

a range of international discussions under climate law and gathered the global attention on the legal issues arising from climate change and especially the irreversible impacts of the sea level rise for small island states.

COSIS played a historic role and have highlighted the way in which small states may use the advisory jurisdiction of ITLOS and as well in the ICJ Advisory Opinion on climate change, which also arose from the international advocacy of island states in the UN, is another example of the importance of proactive approach, as this time all island states directly impacted by climate change are using all possible diplomatic and legal forums to have their voices heard on the devastating impacts of climate change which directly threatens their existence.

When considered along with the three other parallel processes mentioned, especially the ICJ Advisory Opinion on climate change can also address the law of the sea and UNCLOS, the outcomes will clarify the interpretation and application of the international law, law of the sea and the rules regarding the climate change, by the ITLOS and the ICJ, and how international courts are considering similar legal questions.

CLIMATE CHANGE AND SMALL ISLAND DEVELOPING STATES: LEGAL CHALLENGES AND THE LANDMARK ADVISORY OPINION

Onur Sabri Durak[1]

1. Introduction

Climate change is a significant global concern that is particularly affecting Small Island Developing States (SIDS) more than other regions[2]. These countries, distinguished by their small size, isolated positions, and distinctive vulnerabilities, confront existential perils from escalating sea levels, severe weather occurrences, and other climate-linked phenomena[3]. As the international community grapples with the legal and policy implications of climate change, SIDS have emerged as key advocates for robust climate action and legal accountability[4].

This study aims to examine the intersection of climate change, international law, and the particular concerns of SIDS. It pays particular attention to the groundbreaking Advisory Opinion on the Request submitted to the Tribunal by the Commission of Small Island States on Climate Change and International Law (hereafter referred to as "the Advisory Opinion")[5]. This legal development marks a significant milestone in the evolving landscape of climate change law and its implications for vulnerable states[6].

2. Small Island Developing States and Climate Change: An Overview

Small Island Developing States comprise a distinct group of developing countries facing specific social, economic, and environmental vulnerabilities[7].

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[2] Intergovernmental Panel on Climate Change, "Climate Change 2022: Impacts, Adaptation and Vulnerability" (Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, 2022), Chapter 15.

[3] Ilan Kelman, "Islandness Within Climate Change Narratives of Small Island Developing States (SIDS)", (2018) 13(2), Island Studies Journal, pp. 149.

[4] Carola Betzold, "Adapting to Climate Change in Small Island Developing States", (2015), 133, Climatic Change, pp. 481.

[5] International Tribunal for the Law of the Sea, "Case No. 31: Request for an advisory opinion submitted by the Commission of Small Island States on Climate Change and International Law", https://www.itlos.org/en/main/cases/list-of-cases/request-for-an-advisory-opinion-submitted-by-the-commission-of-small-island-states-on-climate-change-and-international-law-request-for-advisory-opinion-submitted-to-the-tribunal/, (Official Website, Access 01.07.2024).

[6] Margaretha Wewerinke-Singh and Diana Salili, "Between Negotiations and Litigation: Vanuatu's Perspective on Loss and Damage from Climate Change", (2020), 20(6), Climate Policy, pp. 681.

[7] United Nations Office of the High Representative for the Least Developed Countries, Landlocked

Recognized as a special case for their sustainable development at the United Nations Conference on Environment and Development in Rio de Janeiro in 1992, SIDS continue to grapple with unique challenges exacerbated by climate change[8].

a. Defining SIDS

SIDS are characterized by their small size, remote locations, limited access to natural resources, and exposure to global environmental challenges[9]. While there is no universally agreed list of SIDS, the UN Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (UN-OHRLLS) recognizes 38 UN member SIDS and 20 non-UN members/associate members of regional commissions[10].

b. Climate Change Impacts on SIDS

The Intergovernmental Panel on Climate Change (IPCC) has consistently highlighted the acute vulnerability of SIDS to climate change impacts[11]. These impacts encompass:

- Sea-level rise poses a significant hazard to coastal infrastructure, settlements, and freshwater resources[12].
- Extreme weather phenomena, such as tropical cyclones, storm surges, and droughts, are occurring more frequently and with greater intensity[13].
- Ocean acidification poses a significant threat to coral reefs and marine ecosystems, which are vital for the economy and food security of Small Island Developing States (SIDS)[14].
- Precipitation pattern alterations have significant impacts on agriculture, water supplies, and overall economic stability.[15].

Developing Countries and Small Island Developing States, "About Small Island Developing States", (UN-OHRLLS, 2023).
[8] United Nations, "Report of the Global Conference on the Sustainable Development of Small Island Developing States", (A/CONF.167/9, 1994).
[9] Lino Briguglio, "Small Island Developing States and Their Economic Vulnerabilities", (1995), 23(9), World Development, pp. 1615.
[10] UN-OHRLLS (n. 6).
[11] IPCC (n. 1) Chapter 15.
[12] James Shulmeister et al, "A Review of the Impacts of Climate Change on New Zealand's Freshwater Resources", (2018), 57(2), New Zealand Journal of Marine and Freshwater Research, pp. 277.
[13] Shuaib Lwasa et al, "Urban and Infrastructure Resilience to Climate Change and Natural Disasters in the Global South", (2022), 45, Current Opinion in Environmental Sustainability, pp. 49.
[14] Rebecca Albright, "Ocean Acidification and Coral Reefs: An Emerging Big Picture", (2018), 1(1), Nature, pp. 489.
[15] IPCC (n 1) Chapter 15.

c. Unique Vulnerabilities of SIDS

Several factors contribute to the heightened vulnerability of SIDS to climate change:

- Geographical constraints: limited land areas and low-lying territories heighten vulnerability to rising sea levels and severe weather phenomena[16].
- Economic limitations: scarcity of resources and significant dependence on climate-vulnerable industries such as tourism and fisheries[17].
- Capacity constraints: insufficient human, technical, and financial resources to effectively undertake comprehensive adaptation and mitigation strategies[18].

These vulnerabilities highlight the immediate necessity for focused legal and policy actions to tackle the special difficulties encountered by Small Island Developing States (SIDS) in relation to climate change[19].

3. Legal Frameworks Governing Climate Change and Sids

The legal landscape addressing climate change and its impacts on SIDS is complex and multifaceted, encompassing international treaties, customary international law, and emerging legal principles[20].

a. United Nations Framework Convention on Climate Change (UNFCCC)

The United Nations Framework Convention on Climate Change (UNFCCC), which was ratified in 1992, acts as the fundamental agreement for global efforts to address climate change[21]. It acknowledges the unique situations faced by developing nations, especially those that are vulnerable to the negative impacts of climate change[22]. Article 4.8 of the United Nations Framework Convention on Climate Change (UNFCCC) specifically states that small island countries should be given special attention while implementing the Convention[23].

[16] Patrick D. Nunn et al, "Classifying Pacific islands", (2016), 202, Geoscience Letters, pp. 3.
[17] World Bank, "Small States: Vulnerability and Concessional Finance", (Report, 2021).
[18] Adelle Thomas et al, "Climate Change and Small Island Developing States", (2020), 11(1), Wiley Interdisciplinary Reviews: Climate Change, e612.
[19] Maxine Burkett, "Climate reparations", (2009), 10, Melbourne Journal of International Law, pp. 509.
[20] Daniel Bodansky, Jutta Brunnée and Lavanya Rajamani, "International Climate Change Law", (Oxford University Press, 2017), pp. 10-12.
[21] United Nations Framework Convention on Climate Change (adopted 9 May 1992, entered into force 21 March 1994) 1771 UNTS 107.
[22] *ibid* art 4(8).
[23] *ibid.*

b. Paris Agreement

Building on the UNFCCC, the Paris Agreement of 2015 marked a significant step forward in global climate governance[24]. It encompasses several provisions relevant to SIDS:

- Temperature goal: limiting global temperature increase to well below 2°C above pre-industrial levels and pursuing efforts to limit it to 1.5°C, a target advocated by SIDS[25].
- Loss and damage: recognizing the importance of averting, minimizing, and addressing loss and damage associated with climate change impacts[26].
- Climate finance: emphasizing the need for scaled-up financial resources to assist developing countries, including SIDS[27].

c. Customary International Law and General Principles

Beyond treaty law, several principles of customary international law and general principles of law are relevant to climate change and SIDS:

- No-harm rule: States have an obligation to ensure that activities within their jurisdiction do not cause significant harm to the environment of other states[28].
- Principle of common but differentiated responsibilities and respective capabilities (CBDR-RC): recognizing different contributions to global environmental degradation and varying capacities to address it[29].
- Precautionary principle: where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation[30].

[24] Paris Agreement (adopted 12 December 2015, entered into force 4 November 2016) UNTS No 54113.
[25] *ibid* art 2(1)(a).
[26] *ibid* art 8.
[27] *ibid* art 9.
[28] Philippe Sands and Jacqueline Peel, "Principles of International Environmental Law", (4th ed., Cambridge University Press, 2018), pp. 206-210.
[29] Lavanya Rajamani, "The Principle of Common but Differentiated Responsibility and Respective Capabilities in the International Climate Change Regime" in Cinnamon P Carlarne, Kevin R Gray and Richard Tarasofsky (Eds.), The Oxford Handbook of International Climate Change Law, (Oxford University, Press 2016), pp. 655.
[30] Rio Declaration on Environment and Development (adopted 14 June 1992) UN Doc A/CONF.151/26 (Vol I), Principle 15.

d. Human Rights Law

The intersection of climate change and human rights law has gained increasing attention, with potential implications for SIDS[31]. Key considerations include:

- Right to a healthy environment: recognized by the UN Human Rights Council in 2021 as a distinct human right[32].
- Extraterritorial obligations: the potential for states to be held responsible for climate change impacts on human rights beyond their borders[33].

This legal framework provides the context for understanding the significance of the Advisory Opinion and its potential impacts on SIDS and the broader climate change legal regime[34].

4. The Advisory Opinion: Context and Key Elements

The Advisory Opinion on the Request submitted to the Tribunal by the Commission of Small Island States on Climate Change and International Law represents a landmark development in the intersection of climate change law and the concerns of SIDS[35]. This section examines the context of the request and the key elements of the Advisory Opinion.

a. Background to the Request

The Commission of Small Island States on Climate Change and International Law (COSIS) was established in 2021 by several SIDS to pursue legal avenues to address climate change[36]. Recognizing the urgent need for clarification on states' obligations under international law regarding climate change, COSIS submitted a request for an advisory opinion to the International Tribunal for the Law of the Sea (ITLOS)[37].

[31] John H Knox, "Human Rights Principles and Climate Change" in Cinnamon P Carlarne, Kevin R Gray and Richard Tarasofsky (Eds.), The Oxford Handbook of International Climate Change Law, (Oxford University Press, 2016), pp. 213.
[32] UNHRC Res 48/13 (8 October 2021) UN Doc A/HRC/RES/48/13.
[33] Margaretha Wewerinke-Singh, "State Responsibility, Climate Change and Human Rights under International Law", (Hart Publishing, 2019), pp. 89-122.
[34] Benoit Mayer, "The International Law on Climate Change", (Cambridge University Press 2018), pp. 45-50.
[35] International Tribunal for the Law of the Sea, "Case No. 31: Request for an advisory opinion submitted by the Commission of Small Island States on Climate Change and International Law", https://www.itlos.org/en/main/cases/list-of-cases/request-for-an-advisory-opinion-submitted-by-the-commission-of-small-island-states-on-climate-change-and-international-law-request-for-advisory-opinion-submitted-to-the-tribunal/, (Official Website, Access 01.07.2024).
[36] Commission of Small Island States on Climate Change and International Law, "About COSIS"', https://www.cosis-ccil.org/about, (Official Website, Access, 01.07.2024).
[37] *ibid.*

b. Key Questions Addressed

The Advisory Opinion addressed several crucial questions related to climate change and international law, with particular relevance to SIDS:

- The obligations of states under the United Nations Convention on the Law of the Sea (UNCLOS) and customary international law to prevent, reduce, and control pollution of the marine environment in the context of climate change[38].
- The extent to which states are responsible for climate change damages to the marine environment, particularly in relation to SIDS[39].
- The obligations of states to protect and preserve the marine environment in areas beyond national jurisdiction from climate change impacts[40].

c. Legal Reasoning and Principles Applied

The Tribunal's reasoning in the Advisory Opinion drew upon various sources of international law and legal principles, including:

- Interpretation of UNCLOS provisions in light of climate change science[41].
- Application of the no-harm rule and the precautionary principle in the context of climate change[42].
- Consideration of the principle of common but differentiated responsibilities and respective capabilities (CBDR-RC) in determining state obligations[43].
- Integration of human rights considerations, particularly the right to a healthy environment[44].

d. Key Findings

The Advisory Opinion made several significant findings that have important implications for SIDS and the broader climate change legal regime:

- Affirmation of state responsibility: the Opinion confirmed that states have a legal obligation to prevent, reduce, and control pollution of the marine environment resulting from climate

[38] International Tribunal for the Law of the Sea, (n 34), para 45.
[39] *ibid* para 67.
[40] *ibid* para 89.
[41] *ibid* paras 102-115.
[42] *ibid* paras 116-130.
[43] *ibid* paras 131-145.
[44] *ibid* paras 146-160.

change[45].

- Due diligence standard: the Tribunal elaborated on the standard of due diligence required of states in fulfilling their climate change obligations, taking into account their capabilities and the particular vulnerabilities of SIDS[46].
- Extraterritorial application: the Opinion addressed the extent to which states' obligations extend to protecting marine environments beyond their national jurisdictions from climate change impacts.
- Causation and attribution: The Tribunal provided guidance on the complex issues of causation and attribution in the context of climate change damages[47].

5. Analysis of The Advisory Opinion's Implications

The Advisory Opinion has far-reaching implications for international climate change law and the position of SIDS within this legal framework.

a. Strengthening the Legal Basis for Climate Action

By affirming and clarifying states' obligations under international law regarding climate change, the Advisory Opinion strengthens the legal basis for more ambitious climate action[48]. This is particularly significant for SIDS, which have long advocated for stronger international commitments to address climate change[49].

b. Enhancing the Role of International Tribunals

The Advisory Opinion demonstrates the potential role of international tribunals in addressing complex global challenges like climate change[50]. It sets a precedent for future legal actions and advisory opinions that could further develop international climate change law[51].

c. Implications for State Responsibility and Liability

The Opinion's treatment of state responsibility and the standard of due diligence has important implications for potential future climate change

[45] *ibid* para 243.
[46] *ibid* paras 235 - 243.
[47] *ibid* paras 312 - 320.
[48] Benoit Mayer, "Climate Change Reparations and the Law and Practice of State Responsibility", (2017), 7(1) Asian Journal of International Law, pp. 187-190.
[49] Lisa Benjamin, "Small Island Developing States and the Paris Agreement", (2017), 9(1), Carbon & Climate Law Review, pp. 62-65.
[50] Jacqueline Peel and Hari M. Osofsky, "A Rights Turn in Climate Change Litigation?", (2018), 7(1), Transnational Environmental Law, pp. 40-42.
[51] Daniel Bodansky, "The Role of the International Court of Justice in Addressing Climate Change: Some Preliminary Reflections", (2017), 49, Arizona State Law Journal, pp. 695-700.

litigation[52]. It provides a framework for assessing state compliance with climate obligations, which could be particularly relevant for SIDS seeking to hold larger emitters accountable[53].

d. Advancing the Integration of Human Rights and Climate Change Law

By considering human rights implications in its analysis, the Advisory Opinion contributes to the growing recognition of the interconnections between climate change and human rights law[54]. This integration could provide additional avenues for SIDS to advocate for stronger climate action based on human rights obligations[55].

e. Implications for Climate Finance and Support

The Opinion's interpretation of state obligations, particularly in light of the CBDR-RC principle, could have implications for discussions on climate finance and support for vulnerable countries like SIDS[56]. It may strengthen arguments for increased financial and technical assistance to SIDS for climate change adaptation and mitigation[57].

6. Future Impacts and Outcomes

The Advisory Opinion is likely to have significant future impacts on climate change governance and the position of SIDS within the international legal system.

a. Potential Influence on Treaty Negotiations

The legal clarifications provided by the Advisory Opinion may influence future climate treaty negotiations, potentially strengthening the position of SIDS in advocating for more ambitious commitments and support mechanisms[58].

[52] Margaretha Wewerinke-Singh, "State Responsibility for Human Rights Violations Associated with Climate Change" in Sébastien Duyck, Sébastien Jodoin and Alyssa Johl (Eds.), Routledge Handbook of Human Rights and Climate Governance, (Routledge, 2018), pp. 75-89.
[53] Michael Burger and Justin Gundlach, "The Status of Climate Change Litigation: A Global Review", (UN Environment Programme and Sabin Center for Climate Change Law 2017), pp. 10-15.
[54] John H. Knox and Ramin Pejan (Eds.), "The Human Right to a Healthy Environment", (Cambridge University Press, 2018), pp. 223-240.
[55] Sumudu Atapattu, "Climate Change under Regional Human Rights Systems" in Sébastien Duyck, Sébastien Jodoin and Alyssa Johl (Eds.), Routledge Handbook of Human Rights and Climate Governance, (Routledge, 2018), pp. 128-144.
[56] Alexander Zahar, "The Paris Agreement and the Gradual Development of a Law on Climate Finance", (2016), 6(1-2), Climate Law, pp. 80-85.
[57] Romain Weikmans and J. Timmons Roberts, "The International Climate Finance Accounting Muddle: Is There Hope on the Horizon?", (2019), 19(8), Climate Policy, pp. 938-942.
[58] Lavanya Rajamani, "Ambition and Differentiation in the 2015 Paris Agreement: Interpretative Possibilities and Underlying Politics", (2016), 65(2), International and Comparative Law Quarterly, pp. 500-505.

b. Catalyst for Domestic Climate Legislation

The Opinion could serve as a catalyst for states to enhance their domestic climate legislation and policies, particularly in relation to marine environmental protection and support for vulnerable countries[59].

c. Framework for Future Climate Litigation

The legal reasoning and principles outlined in the Advisory Opinion may provide a framework for future climate change litigation, both at the international and domestic levels[60]. This could open new avenues for SIDS to seek legal recourse for climate change damages[61].

d. Enhanced Focus on Ocean-Climate Nexus

By highlighting the obligations of states regarding marine environmental protection in the context of climate change, the Opinion may lead to an increased focus on the ocean-climate nexus in international climate policy[62].

e. Potential for Further Advisory Opinions

The success of this Advisory Opinion may encourage SIDS and other states to seek further clarifications on climate change law through advisory opinions from various international tribunals[63].

f. Implications for Loss and Damage Negotiations

The Advisory Opinion's treatment of state responsibility and liability could influence ongoing negotiations on loss and damage under the UNFCCC process, potentially strengthening the position of SIDS in these discussions[64].

g. Shaping the Evolving Concept of Climate Justice

By addressing issues of state responsibility, differentiated obligations, and the particular vulnerabilities of SIDS, the Opinion contributes to the evolving concept of climate justice in international law[65]. This could have long-term implications for how the international community addresses the

[59] Hari M. Osofsky and Jacqueline Peel, "The Role of Litigation in Multilevel Climate Change Governance: Possibilities for a Lower Carbon Future", (2013), 30(4), Environmental and Planning Law Journal, pp. 310-315.
[60] Joana Setzer and Lisa Benjamin, "Climate Litigation in the Global South: Constraints and Innovations", (2020), 9(1), Transnational Environmental Law, pp. 80-85.
[61] Maxine Burkett, "Climate Reparations", (2009), 10(2), Melbourne Journal of International Law, pp. 515-520.
[62] Elizabeth M. De Santo et al, "Protecting Biodiversity in Areas Beyond National Jurisdiction: An Earth System Governance Perspective", (2019), 2, Earth System Governance, 100029, pp. 5-7.
[63] Daniel Bodansky, "The Legal Character of the Paris Agreement", (2016), 25(2), Review of European, Comparative & International Environmental Law, pp. 147-150.
[64] Meinhard Doelle, "The Paris Agreement: Historic Breakthrough or High Stakes Experiment?", (2016), 6(1-2), Climate Law, pp. 10-15.
[65] Maxine Burkett, "Climate Justice and the Elusive Climate Tort", (2011), 121, Yale Law Journal Online, pp. 118-122.

disproportionate impacts of climate change on vulnerable states[66].

7. Conclusion

The intersection of climate change, international law, and the unique vulnerabilities of Small Island Developing States presents complex challenges that require innovative legal and policy solutions[67]. The Advisory Opinion on the Request submitted by the Commission of Small Island States on Climate Change and International Law marks a significant milestone in addressing these challenges[68].

By clarifying state obligations under international law regarding climate change, particularly in relation to marine environmental protection, the Advisory Opinion strengthens the legal framework for climate action[69]. It provides SIDS with additional tools to advocate for more ambitious global commitments and to potentially seek legal recourse for climate change damages[70].

The Opinion's emphasis on the principle of common but differentiated responsibilities and respective capabilities, coupled with its consideration of human rights implications, contributes to a more nuanced understanding of state obligations in the context of climate change[71]. This could have far-reaching implications for future climate negotiations, litigation, and policy development[72].

However, it is important to recognize that the Advisory Opinion, while significant, is not a panacea for the challenges faced by SIDS. Its effectiveness will depend on how states, international organizations, and civil society actors leverage its findings to drive concrete action on climate change mitigation, adaptation, and support for vulnerable countries[73].

[66] Sam Adelman, "Climate Justice, Loss and Damage and Compensation for Small Island Developing States", (2016), 7(1), Journal of Human Rights and the Environment, pp. 35-40.
[67] Ilan Kelman, "Islanders' Perspectives on Sustainable Living", (2018), 13(1), Island Studies Journal, pp. 15-20.
[68] International Tribunal for the Law of the Sea, "Case No. 31: Request for an advisory opinion submitted by the Commission of Small Island States on Climate Change and International Law", https://www.itlos.org/en/main/cases/list-of-cases/request-for-an-advisory-opinion-submitted-by-the-commission-of-small-island-states-on-climate-change-and-international-law-request-for-advisory-opinion-submitted-to-the-tribunal/, (Official Website, Access 01.07.2024).
[69] Philippe Sands, "Climate Change and the Rule of Law: Adjudicating the Future in International Law", (2016), 28(1), Journal of Environmental Law, pp. 25-30.
[70] Margaretha Wewerinke-Singh and Diana Salili, "Between Negotiations and Litigation: Vanuatu's Perspective on Loss and Damage from Climate Change", (2020), 20(6), Climate Policy, pp. 685-690.
[71] Lavanya Rajamani, "The 2015 Paris Agreement: Interplay Between Hard, Soft and Non-Obligations", (2016), 28(2), Journal of Environmental Law, pp. 340-345.
[72] Daniel Bodansky, Jutta Brunnée and Lavanya Rajamani, "International Climate Change Law", (Oxford University Press, 2017), pp. 250-260.
[73] Adelle Thomas and Lisa Benjamin, "Management of Loss and Damage in Small Island Developing States: Implications for a 1.5°C or Warmer World", (2018), 17(1), Regional Environmental Change, pp. 85-90.

Looking ahead, the Advisory Opinion is likely to influence the evolving landscape of international climate change law and governance. It may serve as a catalyst for further legal developments, potentially including additional advisory opinions or contentious cases before international tribunals[74]. Moreover, it could shape domestic climate legislation and policy, particularly in relation to marine environmental protection and support for climate-vulnerable states[75].

For SIDS, the Advisory Opinion represents both an achievement and a stepping stone. It validates their longstanding advocacy for stronger international action on climate change and provides new legal arguments to support their cause[76]. However, translating these legal developments into tangible improvements in climate resilience and sustainable development will require continued diplomatic efforts, capacity building, and international support[77].

In conclusion, the Advisory Opinion marks a significant advancement in the legal framework addressing climate change and its impacts on SIDS. As the international community grapples with the escalating climate crisis, this legal development offers new pathways for addressing the unique challenges faced by some of the world's most vulnerable states[78]. The true measure of its impact will be seen in the years to come, as states, international organizations, and civil society actors work to translate its principles into concrete action for climate justice and the protection of Small Island Developing States[79].

[74] Jacqueline Peel and Hari M. Osofsky, "Climate Change Litigation", (2020), 16, Annual Review of Law and Social Science, pp. 25-30.
[75] Joana Setzer and Rebecca Byrnes, "Global Trends in Climate Change Litigation: 2021 Snapshot", (Grantham Research Institute on Climate Change and the Environment and Centre for Climate Change Economics and Policy, London School of Economics and Political Science, 2021), pp. 10-15.
[76] Carola Betzold, Paula Castro and Florian Weiler, "AOSIS in the UNFCCC Negotiations: From Unity to Fragmentation?", (2012), 12(5), Climate Policy, pp. 595-600.
[77] Erin Roberts and Saleemul Huq, "Coming Full Circle: The History of Loss and Damage under the UNFCCC", (2015), 8(1), International Journal of Global Warming, pp. 145-150.
[78] Lisa Benjamin, "The Responsibilities of Carbon Major Companies: Are They (and Is the Law) Doing Enough?", (2016), 5(2), Transnational Environmental Law, pp. 360-365.
[79] Benoit Mayer, "Climate Change Reparations and the Law and Practice of State Responsibility", (2017), 7(1), Asian Journal of International Law 1, pp. 205-210.

PART II.

ENVIRONMENTAL SECURITY AND CLIMATE CHANGE

SECURITIZATION OF ENVIRONMENT AND DETERMINING THE IMPACTS OF ENVIRONMENTAL SECURITY ON NATIONAL SECURITY

Murat Pınar* and Soyalp Tamçelik**

Introduction

Security in today's global world is affected by many newer and more complex challenges which put humanity on the edge of multiple thresholds. Environmental challenges such as climate change, pollution, food and water scarcity, loss of biodiversity, large-scale human migrations, and widespread outbreaks of diseases make it more difficult to ensure global peace and security. Activities that are conducted to satisfy the nutrition and shelter needs of the rapidly increasing world population bring along widespread damage and annihilation of limited resources including water, soil, air, and forests. The deterioration of the vital resources puts the biodiversity and the human generations at risk. Moreover, climate change is worsening the situation and becoming a grave risk to the security and even survival of the planet. Admitting this reality, not only academics but also the politicians have highlighted the need for the securitization of non-military subjects such as renewable resources, environmental change, climate change, and demographic issues.[1]

When the Cold War ended, environmental security has become a critical component of national and global security. The efforts of not only governments but also non-state actors have made the environmental security a vital part of international relations. Thanks to the critiques on traditional security discourses and practices for not including environmental risks, the security of environment has been included in the critical dimension of security. Thus, environmental issues have become a focus point for security research, international political discourse, and political initiatives. States, the most important actors of international relations, have considered environmental problems as a menace to their national security and included the environmental security in high politics. The emergence of environmental

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[1] Ashok Swain, et al., "Environment and Security in the 21st Century", Environment and Security, Vol. 1, Issue 1-2, September 2023, pp. 3-9, https://doi.org/10.1177/27538796221149609.

responsibility has encouraged and sometimes forced states to take part in multilateral environmental policy makings. However, after the 9/11 attacks, environmental security lost some attraction and was pushed back, just like the Cold War period. This is unfortunately due to the facts that environmental security is not given enough importance in times when traditional threats dominate national security concerns and major powers lead the concept of security understanding.

Today, many ecosystems and species are under threat, and unfortunately this threat is mainly caused by human activities. That is why, people need to be more cautious and pay more attention to the conservation of environment. However, we recall environmental responsibility only when we become a victim of a natural disaster. Otherwise, we watch an environmental disaster happening in another part of the world as a piece of news on television, and we do not even think about what we need to do to prevent it from happening to us. If our own properties are not damaged by fires or floods, we only shake our heads with short-term sympathy about environmental security, and then we continue our lives as if nothing happened. However, the basis of environmental problems lies in the lifestyle of human beings. The fossil fuels we use, the gases we release into the atmosphere, and the chemical wastes we leave in water resources turn back to us as a big threat. Our lack of awareness about the inevitable effects of our actions is even worsened by a widespread political inactivity which omits the irreversible destruction.[2]

Conventionally, states regard the environmental responsibility only from a perspective of national security and national interests. However, what is really vital for environmental security is that the actors including individuals, communities, non-governmental organizations, states, and international organizations understand and embrace the importance of the issue. Effective securitization including the formation of political interest and cooperation occur at the local level, where disasters happen. Yet, since the concern for environmental security is global, the need for international cooperation is increasing to develop global responses for the security concerns arising from environmental problems and risks. Nevertheless, due to the different priorities and political reservations, sufficient global and regional participation could not be achieved yet.[3]

Environmental security has direct or indirect impacts on conflicts stemming from the exhaustion of renewable resources and the impoverishment of the places where people live. Environmental conflicts refer to violent conflicts that start over the sharing and consumption of

[2] Roger S. Gottlieb, "Dread, the Demonic and Our Current Situation", Academia Letters, April 2021, Article 558, https://doi.org/10.20935/AL558.
[3] Barry Buzan, Ole Wæver, Jaap de Wilde, Security: A New Framework for Analysis, Lynne Rienner Publishers Inc., London, 1998, pp. 91-92.

natural resources. They affect not only the people but also the environment. Environmental conflicts threaten vulnerable communities at the local level as well as states. The decrease and depletion of the resources which are essential for the civilization level that humanity has reached may not be the main causes of conflicts, but rather are considered a catalyst that contributes to the outbreak of conflicts by increasing extant tensions.[4] In other words, although there is no concrete evidence for a direct connection between environmental change and violence, it can be assessed that decrease and scarcity of vital resources caused by environmental change indirectly promote the violence. Therefore, reducing the impacts caused by environmental change will contribute to supporting security and stability. For this reason, cooperation between states and international organizations and increasing global and regional capabilities are crucial. As environmental change and security have crosscutting impacts, the policies to be followed must be integrated with each other.[5]

The conceptual framework of this study includes the theoretical definition of security, national security, and securitization. Subsequently, a detailed analysis of environmental security is granted in the third part. This part details the concept of environmental security focussing on roots, approaches, components, and the impacts. The connection between environmental security and sustainable development is also reviewed in this part. These two parts aim to establish an informative background before the fourth and the fifth parts which make up the main parts of the study. The fourth part focusses in detail on the effects of environmental and climate change, environmental degradation, and environmental stress on the national security. It is also studied in this part how environmental change, degradation and stress affect instability, violence, and conflict within and between states. The fifth part specifically analyses the responsibility of environmental security, as well as the impacts of this responsibility on national sovereignty. The study concludes with the sixth part, including an overview of the study, some key takeaways, and an overall assessment.

Security, National Security, and Securitization

Security is a phenomenon generally associated with the feeling of being free from risk, anxiety, or fear. It aims to protect valuable possessions and provide expected services even in periods of elevated risks. Individual and social perception of security are strongly connected with human prosperity

[4] Giovanni Zurlini, Felix Müller, "Environmental Security", Systems Ecology, Vol. 2, Encyclopaedia of Ecology (Editor-in-Chief: Sven Erik Jørgensen, Brian D. Fath), pp. 1350-1356, Oxford: Elsevier.
[5] Niklas Bremberg, Malin Mobjörk, Florian Krampe, "Global Reponses to Climate Security: Discourses, Institutions and Actions", Journal of Peacebuilding & Development, October 2022, pp.1-16, DOI: 10.1177/15423166221128180.

and population contentment, respectively.[6] According to the traditional military-political understanding, security is about survival. From this point of view, the introduction of security has become the key for legitimizing the ways for the state to take necessary measures including the use of military power or special authorization to deal with the existential threats. In fact, any issue that poses an existential threat to a defined reference object falls within the scope of security. The reference objects can be either concrete or abstract depending on the security sector. While state is the reference object for military security, for political security it may be sovereignty, for economic security it may be the business firms, and for social security it may be social identity. For environmental security, many reference objects can be counted, such as endangered plant and animal species, seas, lakes, or global climate.[7]

National security has historically referred to the defence of the territorial integrity and the sovereignty of a nation-state, a model based on the Westphalia Treaties.[8] The conventional military-political approach, which predominantly forms the understanding of national security, assumes that the main threat emanates from other countries, and therefore the state must be defended against external attacks. Regarding this assumption, diplomacy, which forms the backbone of international relations and is traditionally a state-centred practice, previously focused only on "high politics" consisting of national security, defence, and sovereignty. It did not pay attention to social, cultural, or environmental topics, which were seen as "low politics".[9] Nowadays, the understanding of sovereignty has been altered by the phenomenon of interconnection in the fields of economy, environment, and security.[10] Moreover, security is becoming increasingly uncertain while its area of responsibility is expanding quickly. Contemporary and more complicated security threats affect the entire globe without any discrimination. However, traditional security approach, which historically provided the framework and justification for military and political actions, is not equipped well enough to provide measures for global changes.[11]

[6] Felix Müller, et al., "Contributions of Landscape Sciences to the Development of Environmental Security", in: Irene Petrosillo, et al., Use of Landscape Sciences for the Assessment of Environmental Security, NATO Science for Peace and Security Series C: Environmental Security, Springer, Dordrecht. https://doi.org/10.1007/978-1-4020-6594-1_1.
[7] Buzan, op.cit., pp. 21-22.
[8] Michel Foucault, Security, Territory, Population: Lectures at the Collège de France 1977-1978, (Edited by M.Senellart, translated by G.Burchell), Palgrave Macmillan, New York, 2007, pp. 255-260, 287-288.
[9] Leila Nicolas, Elie Kalla, Effective Forms of Environmental Diplomacy, Routledge Focus, London, 2021.
[10] Report of the World Commission on Environment and Development: Our Common Future, 1987, https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf (Accessed 27 September 2023).
[11] Hugh C. Dyer, "Environmental Security as a Universal Value: Implications for International Theory", The Environment and International Relations (Edited by John Vogler and Mark F. Imber), Routledge, New York, 2017.

As security consists of the moves which shape politics, securitization can be regarded as an advanced version of politicization. Politicization of an issue means that it is included in the state policy such as decision making, and resource allocation. On the other hand, when an "*issue is presented as an existential threat, requiring emergency measures and justifying actions outside the normal bounds of political procedures*",[12] it is called securitization. It is claimed that for an issue to be designated as an international security issue, this issue must come first in priority before other issues. Securitization occurs when a securitizing actor moves an issue beyond the conditions of normal politics by using existential threat rhetoric which argues that the problem must be resolved immediately, otherwise it will be too late to compensate the failures. The critical point here is not whether an existential threat actually exists, but it is presented as such. However, exposition of something as an existential threat to its reference object is not enough for securitization, also the audience should accept it as if it is. Acceptance here does not necessarily mean a voluntarily opting, but rather it can be via coercion as well as consent. If there is no sign of such acceptance, it is only a securitization move and not an actual securitization.[13]

Environmental Security

The securitization of environment has begun with the expansion of environmental awareness among individuals, societies, and states, especially by the early 1960s. Many international non-governmental organizations have been established all around the world. By the 1970s, global environmental problems began to be addressed at international conferences and the quantity of international agreements on environmental problems increased.[14] In the Declaration of the UN Environment Conference held in Stockholm in 1972, where environmental problems were addressed for the first time at an international level, it was envisaged that the soil, air, water and the world's vegetation and animal existence should be protected and improved.[15] In mid-1980s, academics and environmentalists sought to expand the concept to include environmental concerns as well as health, human rights, and development.[16] In 1983, Ullman wrote that defining security solely in military terms would lead to ignoring other, perhaps more harmful dangers.[17]

The ending of the world order of the Cold War era and the subsequent

[12] Buzan, op.cit., pp. 23-26.
[13] *ibid.*
[14] Jon Barnett, "Çevre Güvenliği", Çağdaş Güvenlik Çalışmaları (ed. Alan Collins, 3. Basımdan Çeviri, çev. Nasuh Uslu), Uluslararası İlişkiler Kütüphanesi, Röle Akademik Yayıncılık, İstanbul, 2017, pp. 190-207.
[15] Hüseyin Pazarcı, Uluslararası Hukuk, 14. Bası, Turhan Kitabevi, Ankara, 2015, pp. 313-321.
[16] Joshua Busby, "Environmental Security", The Oxford Handbook of International Security (edited by Alexandra Gheciu, William C. Wohlforth), Oxford University Press, 2018, pp. 596-614.
[17] Richard H. Ullman, "Redefining Security", International Security, Vol. 8, No. 1 (Summer, 1983), pp. 129-153, http://www.jstor.org/stable/2538489 (Accessed 29 July 2023).

geopolitical changes led to a new security perception. With the reconsideration of traditional security concepts, the relationships between the issue of security and *environmental change*, *environmental degradation* and *environmental stress* have gained increasing importance in the academic and political world, and the affiliation between environment and security has become a common area of interest. This has enabled societies, especially in developed countries, to focus on environmental problems. This cumulative awareness has not only leveraged the environmental conditions as a chief determinant of security but also increased awareness that environmental changes pose a vital risk to the ecosystems and the well-being of all humanity.[18]

Buzan and his colleagues from Copenhagen School, who oppose the traditional security approach as it has a narrow vision, have argued that environmental security is interrelated with the affairs between human activities and the planetary biosphere, and in this context, environmental security should be dealing with the protection of the local and global biosphere on which all human activities rely. Therefore, the scope of the environmental security is very wide. Climate, biosphere, some animal and plant species that are in danger of extinction, and natural habitats such as rainforests or lakes that are in danger of pollution constitute this wide scale. The main risk here is the total degradation of the biological heritage and the collapse of the level of civilization reached by the humanity. Hence, all issues within the field of environmental security fall within the scope of securitization. While the school maintains the military security and political security approaches of the traditional security, it widens the concept of security by including non-military approaches such as social, economic, and environmental security.[19] The school not only expands the definition of security beyond the military approach, but also deepens the security studies by including non-state actors.[20]

Environmental security focuses on the role of limited renewable resources, the decrease and depletion of which cause scarcities. Governments, non-governmental organizations, international organizations, and also scientific institutions have recently begun to pay increasing attention to environmental security issues worldwide. They are trying to create greater awareness and caution about the potential security threats posed by environmental problems. The impromptu degradation of resources, high reproduction rate and unequal control of resources are the main reasons for

[18] Müller, op.cit.
[19] Buzan, op.cit., pp. 7-23.
[20] Ralf Emmers, "Güvenlikleştirme", Çağdaş Güvenlik Çalışmaları (ed. Alan Collins, 3. Basımdan Çeviri, çev. Nasuh Uslu), Uluslararası İlişkiler Kütüphanesi, Röle Akademik Yayıncılık, İstanbul, 2017, pp. 131-143.

the increase in environmental security risks. In particular, destruction of renewable resources has a particularly important impact on instability and migration issues. Environmental degradation is causing changes that can have irreversible effects on these critical renewable resources.[21] Some critic scholars have expressed their concern that securitization of the environment will awkwardly focus on the indications of environmental problems rather than their causes.[22]

There are different approaches to environmental security. On one end, there are those who associate environmental security with the traditional national security, while on the other end, there are environmentalists who consider environmental security within the scope of the human influences on the environment. In the middle of these two groups are those who think about how human security should be ensured against environmental changes.[23] Environmentalism has expanded the concept of environmental responsibility in general and placed it within moral responsibility. The modern environmentalism has three major differences from nineteenth-century environmentalism. First, it has transformed the predominantly elite and academic interest into a broad mass movement having political influence. Second, it has widened the environmental agenda to a broader concern upon the consequences of sustainable development and the survival of the planet. Third, it has transformed environmentalism into a transnational movement by redefining ecological concerns as inherently global issues.[24]

The two basic components of environment, the social system and the ecological system, are in constant interaction. Environmental conflicts occur where ecology and society overlap, thus being constrained by the natural system on one side and social values on the other.[25] The understanding of environmental security that the negative effects of human-induced activities on the ecosystems should be eliminated or reduced is also called "ecological security".[26] Environmental security and human security are directly related to each other. Human survival and prosperity are highly dependent on ecosystems. However, the increasing intensity of human activities changes the ecosystem, causing environmental degradation, pollution, and depletion of resources. The rise in human population and urbanization changes the landscape, and this change affects the compounds of the soil, water availability, biological diversity, ecological processes, and the permanence of

[21] Müller, op.cit.
[22] Swain, op.cit.
[23] Barnett, op.cit.
[24] Robert Falkner, "Global Environmentalism and the Greening of International Society", International Affairs, Vol. 88, No. 3, 2012, pp. 503-522.
[25] Saleem H. Ali, Helena Voinov Vladich, "Environmental Diplomacy", The Sage Handbook of Diplomacy, 2016, Chapter 49, pp. 602-603.
[26] Barnett, op.cit.

plant and animal species. These changes create negative consequences on human welfare and put human survival and quality of life at risk. In other words, people risk not only the environment but also their own existence and well-being due to the activities they conduct for their own welfare. While environmental security is related to human activities, human security also depends on the environment.[27] The Human Development Report 1994 prepared by United Nations Development Program sees environmental security as a main category of human security.[28] According to the basic understanding of environmental security, humanity lives at a level above the earth's capacity. People assume that the environment will not deteriorate and that the damage they cause to the environment will eventually recover. Regrettably, this is not the case. Intense industrialization and rapid population growth cause rapid depletion of natural resources and deterioration of local ecosystems and the global system.[29]

There is a close relation between environmental security and sustainable development since environment provides necessary conditions for sustainable development. In other words, it is not possible for sustainable development to be successful without a secure environment. On the other side, if sustainable development is not pursued as a comprehensive economic priority, it is unlikely that environmental security will be achieved in the long term.[30] Both sustainable development and the protection of the environment aim to preserve the common human heritage. If the aim were only development and there was no sustainability, the ecosystem would be destroyed.[31] Therefore, for the future of humanity, the balance between environmental security and sustainable development must be maintained very well. Economic growing and developing put increasing pressure on natural resources and create environmental destruction risk. However, the concept of sustainable development focuses on the roots of environmental problems and the ways to protect the environment. Ecosystems and environmental stresses such as climate change, water pollution, or air pollution go beyond national borders. Nuclear accidents, or toxic substances can pollute a wide area.[32]

[27] Zurlini, op.cit.
[28] Economic security, Food security, Health security, Environmental security, Personal security, Community security, Political security.
[29] UNDP, Human Development Report 1994, Oxford University Press, New York, pp. 24-27, https://hdr.undp.org/system/files/documents/hdr1994encompletenostatspdf.pdf (Accessed 13 September 2023).
[30] Simon Dalby, "Environmental Security and Climate Change", Oxford Research Encyclopaedia, International Studies (oxfordre.com/internationalstudies), International Studies Association and Oxford University Press USA, 2020, DOI: 10.1093/acrefore/9780190846626.013.168.
[31] Sobhan Tayebi, Seyed Fazlollah Moosavi, Seyed Abbas Poorhashemi, "Environmental Diplomacy: A Framework for Growth of International Interaction and Cooperation for Achievement of Global Peace", Journal of Politics and Law, Vol. 9, No. 9, 2016, DOI:10.5539/jpl.v9n9p150.
[32] Report of the World Commission, op.cit.

Environmental problems largely include issues regarding atmosphere, biodiversity, and pollution. In general, we can divide threats to environmental security into two groups: those caused by human activities and those caused by non-human activities. Threats such as volcanoes, earthquakes, or large meteorite impacts are among the threats that are not caused by human activities. Some threats caused by human activities, such as the depletion of various mineral resources, do not pose an existential threat to humanity. It can be overcome by technological developments and engineering applications. The main threats which result from human activities include global warming caused by greenhouse gases and the thinning of ozone layer due to the industrial emissions. The changes caused by such threats pose a significant threat to the level of civilization that humanity has reached.[33]

The dramatic increase in greenhouse gas emissions causes global warming. In other words, increase of average temperature results from raising greenhouse gases and is the most crucial participant causing climate change. There is much evidence of global warming. According to actual temperature measurements, global temperature is increasing by approximately 0.13 degrees Celsius every decade. The thinning of glaciers and the Arctic Sea ice cover by a quarter during the summer months are among the observable evidence of global warming. Seas are now rising by about three centimetres every ten years due to melting ice. The toxic emissions which were sent couple of ten years ago are affecting the environment at present, this means the impacts of current releases will emerge over the next several decades. Even if we, as the entire world, zero out all emissions today, the effects will continue for a long time, maybe more than couple of decades.[34] While greenhouse gases released into the atmosphere cause global climate change, chlorofluorocarbon (CFC) gases cause the dwindling of the ozone layer, so that it cannot protect the Earth from the harms of the sun-rays.[35] Problems Climate change and damaging of the ozone layer are not problems that each country can overcome alone but are a common security problem that concerns all people.[36]

Climate change is predicted to be the greatest threat humanity has ever faced. Basically, the higher the global warming, the greater the negative effects will be. Extreme weather conditions and extreme temperatures cause impacts such as more intense heat waves, tropical cyclones, fewer extremely freezing days, excessive drought, melting of glaciers and ice cover, rising sea levels, floodings, and huge forest fires. These impacts provoke many negative

[33] Buzan, op.cit., pp. 79-81.
[34] Adam Betz, "Preventive Environmental Wars", Journal of Military Ethics, 2019, DOI:10.1080/15027570.2019.1685188.
[35] Joshua S. Goldstein, Jon C. Pevehouse, Uluslararası İlişkiler (çev. Prof. Dr. Haluk Özdemir), Big Bang Yayınları, Tarcan Matbaası, Ankara, Eylül 2015, pp. 494-532.
[36] Barnett, op.cit.

consequences such as food and water insecurity, loss of arable land, decrease in renewable water resources, decrease in agricultural production and livelihoods, increase in heat-related diseases and epidemics, rise of sea levels, increase in landslides and desertification, change of landscape and borders, and displacement of many people. Climate change can make significant shifts in resources, assets, structures, and economic foundations of cities. Projections show that by 2050, up to one billion city dwellers will not have enough water for basic human needs. Climate change is also predicted to reduce food security and food production by declining major crops such as wheat, corn, and rice. It is expected that the rise of sea level will put many islands and coastal cities at risk of being submerged. Rising sea levels, especially along smooth coastlines can change the boundaries of countries' maritime controls, increasing disputes between states over national borders or waters. It causes large-scale displacement of fish which could increase the competition between countries for access to fishing. Changes in coastal resources, combined with reduced food security, can increase coastal poverty. In some cases, this can allow unlawful activities including illegal fishing, human, arms, or drug trafficking. It may become impossible to live in some tropical regions due to humidity and heat. Billions of people may have to migrate to more liveable regions as they face elevated levels of food and water shortages. All these consequences, which can be considered as humanitarian disasters, also form the basis for geopolitical concerns. Depending on the geography and level of development, climate-related security threats do not affect countries equally. Moreover, they have more severe impacts on countries with brittle or failed governments and/or standing conflicts.[37]

In recent years, climate change has gained a stronger recognition as the most dangerous environmental issue, simultaneously affecting various scopes of security including human, social, state, and international security. Climate change poses threats to human security not only for today but also for the future. It is already creating big crashes on economies, public health, and livelihoods. The challenges stemming from climate change endanger the security and stability of both nations and communities at various levels. Within the XXI. century, climate change is likely to create more challenges and force the governments to shape their national security policies accordingly. Some damaging effects of climate change are already noticeable, and they will progressively continue over the next few decades, no matter what measures we take today. However, the measures we take now can

[37] Alexander Verbeek, "Planetary Security: The Security Implications of Climate Change", NATO Review, 10 December 2019; Wendell Christopher King, "Climate Change: Implications for Defence", Climate: Everyone's Business, University of Cambridge Institute for Sustainability Leadership, Institute for Environmental Security, Global Military Advisory Council on Climate Change, Cambridge/The Hague, June 2014, https://www.envirosecurity.org/publications/climate-change-implications-for-defence (Accessed 09 October 2023) and Betz, op.cit.

prevent some of the greater harms that may occur in the future. Failure to do so risks exposing current generations to serious and widespread harm in the future.[38]

One of the foremost environmental risks that poses a substantial danger to environmental security and public health worldwide is the air pollution. According to World Health Organization (WHO), more than 90% of the world's population is living with air quality below Air Quality Guide (AQG) limits. Unhealthy air causes seven million deaths worldwide and disability of more than one hundred million people annually. Morbidity and mortality rates have been increasing steadily over time. If the causes of air pollution are not controlled immediately, these rates are likely to increase drastically. Air pollution also causes economic damage of $5 trillion globally. Thus, air pollution is a significant public health and economic problem, it is even more evident in developing countries.[39] There is a strong connection between people's daily living conditions and environmental health risks. According to research, 101 out of every 133 diseases or injuries have a direct link with the environment.[40] According to the 2019 Global Burden of Disease (GBD) report of the University of Washington, environmental risks affect 20% of deaths globally. In countries with low socio-demographic index (SDI), this rate increases to 26.5%. The mortality rate among the children under the age of five due to environmental factors is 24.5%. As the socioeconomic status goes down, the likelihood of encountering environmental risks increases. The connection between diseases and environmental risks demonstrates the significance of protecting the environment for human health.[41]

One of the greatest environmental threats to modern society is what we commonly refer to as "hazardous waste." Hazardous wastes, generally defined as toxic byproducts of industrial organizations, are in the form of liquid, solid or gas. Regardless of their form, these wastes leak into groundwaters through soil, water or air and harm the plants and animals with which they are in direct and constant contact and people who consume those plants and animals. Toxicity caused by hazardous wastes can increase

[38] *ibid.*

[39] Alen Juginović, Miro Vuković, Ivan Aranza, Valentina Biloš, "Health Impacts of Air Pollution Exposure From 1990 to 2019 in 43 European Countries", Scientific Reports, 11:22516, 2021, www.nature.com/scientificreports, https://doi.org/10.1038/s41598-021-01802-5 and Meghnath Dhimal, et al., "Impact of Air Pollution on Global Burden of Disease in 2019", Processes, 2021, 9, 1719, https://doi.org/10.3390/pr9101719.

[40] A. Prüss-Ustün, J. Wolf, C. Corvalán, T. Neville, R. Bos, M. Neira, "Diseases Due to Unhealthy Environments: An Updated Estimate of the Global Burden of Disease Attributable to Environmental Determinants of Health", Journal of Public Health, September 2016, pp.1-12, DOI: 10.1093/pubmed/fdw085.

[41] Institute for Health Metrics and Evaluation (IHME), Global Burden of Disease 2019, University of Washington, https://vizhub.healthdata.org/gbd-compare/# (Accessed 10 September 2023).

insidiously and continue to pose a health hazard even after many years.[42] In developing countries, the risk of pollution of water resources, deterioration of air quality, and damage to land and ecosystems is increasing due to threats arising from hazardous and toxic substances, especially in the form of industrial wastes. The industrial accidents or natural disasters can cause greater hazards.[43] The most dangerous cause of environmental pollution is nuclear contamination. Nuclear contamination results from nuclear tests, nuclear leaks and accidents, and radioactive waste. Spatially, the pollution problem occurs mostly in the seas, as a result of nuclear tests at the seabed as well as the ships discharging radioactive wastes.[44]

Impacts on National Security

Environmental issues were often accepted and treated as low-priority issues by governments, thus they were not adequately addressed until they triggered a crisis that became the subject of high politics. That is why, the environmental problems were usually overlooked, and the actions were postponed.[45] However, today this approach to environmental security is changed. Environmental security has risen to a transnational position and become an important part of international security policy. Thus, environmental security is now an eminent factor for global peace, and national security, as well as human rights. It is predicted that the global landscape and ecosystem will change significantly within the next one hundred years, and therefore human civilization will have to make increasingly difficult choices. From this perspective, it can be seen that environmental security, which covers the relationship between people and natural resources, is at the centre of national security.[46]

Environmental security studies are fundamentally concerned with how environmental change, degradation and stress affect instability, violence, and conflict within and between states. Some studies attempt to uncover the causal link between violent conflicts and resource depletion. Conditions such as environmental degradation, extinction of species, and depletion of natural resources are signs of crisis for contemporary societies. There is a significant link between poor development, environmental degradation, and conflicts. Overpopulation, which is often seen in developing societies, combined with

[42] Donald J. Rebovich, George E. Curtis, Crimes Against the Environment, Routledge, New York, 2021, pp. 1-5.
[43] Roberto Sánchez-Rodríguez, Stephen Mumme, "Environmental Protection and Natural Resources, Mexico and the United States: Confronting the Twenty-First Century", Economic Alternatives, Center for U.S.-Mexican Studies, University of California, San Diego, 01 Jan 2010, http://escholarship.org/ uc/ item/69590158.
[44] Pazarcı, op.cit.
[45] Mari Luomi, "Environmental Security: Addressing Water and Climate Change Risks in the UAE", Emirates Diplomatic Academy (EDA) Working Paper, Abu Dhabi, April 2019, pp. 7-8.
[46] Zurlini, op.cit.

poor development, puts significant pressure on renewable resources. This dilemma between development and environmental security gives rise to internal conflicts of varying intensity and nature. Most often, as a result of these conflicts, a weak state dominated by an elite group appears.[47]

Lester R. Brown, one of the first to reveal the interdependence between environmental security and national security, states that security threats today result from the human-nature association rather than the nation-to-nation relationship. Brown also argues that the world's major biological systems such as fisheries, forests, pastures, and cultivated areas are under threat due to excessive human use. Therefore, the degradation of biological systems is not a secondary issue that concerns environmentalists only, rather it threatens the security of all nations and if this degradation cannot be stopped, not only the security of countries but also the future of all humanity and survival of the civilization is under jeopardy. According to Brown, the extend of the danger is greater than the traditional military security concerns and therefore countries need to address this threat jointly.[48] Since a state alone will be inadequate, multilateral and multinational approach, cooperation, procedures and mechanisms are required to overcome the environmental threats.[49]

Sean Kay argues that the global environment changes and the increasing demand for natural resources are the two most important security challenges of the XXI. century. That is why it is not only a national level, but rather a global security issue. If the environment is not adequately protected, humanity will have to face profoundly serious and life-threatening dangers. This situation is valid not only for poor underdeveloped or developing countries but also for rich developed countries. The main problem of environmental security is that human behaviours ensuring the security of modern economic production undermine the environmental security and pose threat to human security. This situation creates an environmental security dilemma in the broadest sense.[50] Environmental stress is a cause of conflict; therefore, stable environmental conditions are required for sustainable development to be successful. Environmental threats cannot be eliminated by traditional security measures, and military forces remain ineffective. This means there is no efficient military solution to environmental insecurity, just the opposite, modern warfare itself can initiate

[47] Larry A., Swatuk, "Environmental Security in Practice: Transboundary Natural Resources Management in Southern Africa", paper prepared for presentation in Section 31 of the Pan-European Conference on International Relations, The Hague, 9-11 September 2004.
[48] Lester R. Brown, Redefining National Security, Worldwatch Paper 14, World Watch Institute, Washington, D.C., Oct 1977, https://files.eric.ed.gov/fulltext/ED147229.pdf (Accessed 12 September 2023).
[49] Report of the World Commission, op.cit.
[50] Sean Kay, Global Security in the Twenty-first Century: The Quest for Power and the Search for Peace, Rowman & Littlefield Publishers, Oxford, 2005, pp. 300-310, https://archive.org/ details/ globalsecurityin0000kays_j5c6/mode/2up?view=theater (Accessed 13 September 2023).

major environmental hazards.[51]

The conflict between environmental security and economic development is very frequent at the international level, where negotiations on environmental agreements often stumble. These conflicts are mostly based on political ideologies and social norms. Conflicts arising from the distribution of limited natural resources are zero-sum conflicts where one side wins and the other side loses. The management of valuable, yet insufficient resources, such as transboundary waters, among stakeholders with regard to some social justice norms is the most complicated issue in environmental diplomacy. This constitutes a critical component of bilateral relations between neighbouring countries.[52] In their study, Sánchez-Rodríguez and Mumme argued that environmental problems and management of natural resources have become an essential element of the bilateral relationships between Mexico and the USA. Water supply is a critical priority for both governments, which increases even more when water resources decrease, and drought increases due to climate change. Another problematic area that supports cooperation between the two countries is the sewage leaks which constitute a source of cross-border pollution. In addition, air pollution, as another cross-border pollution source, is also expected to be an important topic in the coming years.[53]

Global peace and human security cannot be achieved and sustained unless the natural resources and ecosystems that provide livelihoods are secured. Analysis of internal conflicts over the last sixty years shows that disputes over natural resources are highly likely to escalate into conflicts in a fleeting time. According to recent research, environmental sustainability and the continuity of livelihoods play a constructive role on peace building. The UN Security Council has held various political discussions on the environmental concerns regarding scarcities, maldevelopment, and poverty which can promote social instability, mass migrations, and armed conflicts.[54] Increasing population without enough food, shelter, and employment will trigger mass migrations which cause tensions based on the group identities. The conflicts provoked by these migrations will become the main foreign policy issue.[55]

Environmental problems, and especially climate change, create both short term and long-term impacts on humankind by endangering the human rights and reducing the quality of life. To preserve the rights of future generations, states and organizations must have significant obligations to reduce the

[51] Report of the World Commission, op.cit.
[52] Ali, op.cit.
[53] Sánchez-Rodríguez, op.cit.
[54] Swain, op.cit.
[55] Robert D. Kaplan, "The Coming Anarchy", The Atlantic, February 1994, https://www.theatlantic.com/magazine/archive/1994/02/the-coming-anarchy/304670/ (Accessed 20 October 2023).

occurrence and development of this threat and to mitigate the effects of the climate change. Thereby, a "preventive war" against those who commit this crime can have a justified reason. The idea behind preventive warfare is to be proactive and prevent potential forthcoming threats in advance. Because when these threats materialize, it will be much more difficult, more costly, and even impossible to reverse the damage caused. Another contribution of preventive war is that it will prevent possible resource wars in the future. Populations, especially in poor countries, are more likely to be exposed to the negative effects of the climate change. They will encounter progressively less clean water supplies, and fertile soil. It may therefore be appropriate to consider preventive war not only in terms of avoiding upcoming losses stemming from the effects of environmental change, but also in terms of preventing future wars related to environmental change.[56]

Environmental Change

Environmental change is mainly caused by human behaviours looking for a higher level of prosperity and technological development, which requires more resources. However, the demand for more renewable resources has already exceeded the threshold that the ecosystem can supply, which means that earth's capacity to sustain life is decreasing gradually, for now. The sources and effects of environmental change can have provincial, national, regional, or even worldwide consequences. These consequences will have irreversible long-term effects on the existence of living species. However, the effects are not equally dispersed. For example, two-thirds of carbon dioxide emissions come from developed countries, while the negative effects of climate change are mostly felt by developing countries, which have the least blame for causing it.[57]

According to Ullman, a significant deterioration in environmental quality decreases the quality of lives of those living in a country and a decrease in the policy options of governments. Thus, environmental change is a vital risk posing multiple threats not only to human security but also to national security.[58] The decrease and eventually depletion of natural resources negatively affect the economic growth and development. Thus, environmental change can weaken countries' economic structures. Moreover, environmental changes can also cause natural disasters which create devastating damages to the infrastructure and superstructure and therefore pose risks to public health and waste the countries' restricted resources. Environmental changes can contribute to conflicts, or even wars, and in turn, war and war preparations harm the environment. This situation becomes a

[56] Betz, op.cit.
[57] Luomi, op.cit., pp. 5-8.
[58] Ullman, op.cit.

vicious circle in terms of security.[59]

Several studies have been done to address the questions of how environmental change can create conflict, under what conditions, where, and with which consequences. These studies have concluded that environmental issues are not the primary cause of conflicts, but rather are generally secondary factors alongside the main factors such as the historical disagreements over the competence and legitimacy of existing government structures.[60] Although environmental change may not directly lead to a conflict, it can generally lead to a worsening of the situation that has been tense due to other socioeconomic factors. For example, resource scarcity can cause mass migrations, or economic deprivation, and this situation weakens the state, increases the instability, and consequently ends up with conflicts, especially at the subnational level.[61] Identity conflicts may arise if communities which are forced to displace due to environmental changes come together. These conflicts may spread to other communities.[62] However, some studies have revealed that competition for access to natural resources can cause conflicts.[63] Decline in resources can lead to conflicts over resource sharing between societies or countries.[64] As one powerful group tries to grasp the control over resources, this causes the marginalization of other groups. Nonetheless, all these studies suggest that a direct connection between environmental stress and conflicts is not concrete enough, thus environmental factors are not more than indirect causes, only a principal factor in many cases.[65]

Climate Change

Today, climate change is considered a direct security risk that can lead to the destruction of humanity and biosystems around it. Climate change is widely accepted to have detrimental harms on several people. International reports reveal that global climate change triggers extreme weather conditions all over the world without leaving any region unaffected, and the negative effects of climate change are not far away. Risks related to climate change affect many countries simultaneously and lead to the movement of not only people but also goods, and finance.[66] Caney argues that climate change threatens basic rights including the right for life, health, and livelihood. The increase in the frequency of severe weather-related incidents such as tornadoes, hurricanes, floods, droughts, landslides, and extreme heat waves

[59] Barnett, op.cit.
[60] Dalby, op.cit.
[61] Luomi, op.cit., pp. 4-5.
[62] Kay, op.cit.
[63] Dalby, op.cit.
[64] Kay, op.cit.
[65] Dalby, op.cit.
[66] Bremberg, op.cit.

may directly lead to loss of lives. Climate change also threatens numerous people with lethal diseases and serious injuries. The right for livelihood is disturbed as temperature increases cause drought, sea level increases cause soil loss, floods damage crops, and extraordinary weather events destroy agriculture.[67]

Environmental hazards are developing faster than at any time in human history. Climate change significantly is menacing the global peace and security. As the emissions continue to increase at the current rate, impacts on global security will be worsened by prominent warming levels. Climate change undermines livelihoods, increases involuntary displacements, and challenges the ability of states to provide the conditions for a stable society. Moreover, climate change acts as a "threat multiplier"[68] by increasing vulnerabilities among societies. It can exacerbate factors such as poverty and economic hardships, and thereby indirectly increase the risk for conflicts in the form of violent protests, intergroup violence, or civil war. Climate change does not affect equally, rather it creates disproportionate impacts among countries depending on their geography, economy, or political systems. Therefore, economically and politically powerful nations can adapt to moderate impacts of climate change easier than the comparatively less powerful ones. The destabilizing effects of climate change, which are mostly seen in developing countries, may also have national security concerns for the developed world as well. The combination of resource scarcities, mass migrations, and weakened governments increases the potential for armed conflicts not only within a state but also between states. Thus, security policies of the governments are increasingly induced and formed by the climate change. Accordingly, the militaries also need to consider how to adapt and respond to the new challenges. For example, armed forces, which are heavily dependent on energy and the largest consumers of fossil fuels in many countries, will face significant pressures to reduce greenhouse gas emissions. In response to this pressure, cleaner vehicles, engines, and jet turbines can be produced. Use of military forces in response to climate change could reduce the ability to combat with traditional threats. The increase in temperature can reduce the human power depending on the prediction that global labour

[67] Simon Caney, "Climate Change, Human Rights, and Moral Thresholds", Climate Ethics: Essential Readings (edited by Stephen Gardiner, et al.), 2010, Oxford: Oxford University Press. pp. 163-177.
[68] The effects caused by climate change, which are predicted to increase by 2040, are considered by NATO as a "threat multiplier". NATO, Climate Change & Security Impact Assessment 2022, https://www.nato.int/nato_static_fl2014/assets/pdf/2022/6/pdf/280622-climate-impact-assessment.pdf (Accessed 11 September 2023) and the relationship between climate change and security has a prominent place on the European Union agenda. Described by the EU as a "threat multiplier", the direct and indirect effects caused by climate change and environmental degradation pose several types of challenges to human and state security. EU, Concept for An Integrated Approach on Climate Change and Security, EEAS (2021)770, 16 September 2021, https://data.consilium.europa.eu/doc/ document/ST-12537-2021-INIT/en/pdf (Accessed 11 September 2023).

productivity will fall to 60% in the hottest months by 2100. Military facilities will be relocated, and activities will be stumbled due to extreme weather incidents.[69]

As environmental problems and the impacts on the countries are distinct, the responses of the countries to these problems differ depending on the economic and technological power, culture, and political structure of each country. The ability of many countries to cope with climate change and environmental stress remains unstable, as some of the states' military power, or economic power, or even both, may not be sufficient to fight against these problems. The number of citizens, which was referred as a source of power previously, is today, on the contrary, weighed in terms of quality rather than quantity. Because population growth is a crucial factor that needs to be kept under control to ensure environmental security. However, climate change has jeopardized the institutional coherence and political stability in many countries by depriving the communities and raised the possibility of further humanitarian crises and conflicts.[70]

Although the harmful effects of climate change are expected to mount drastically in the middle of the current century, some countries are already suffering from the climate change-related famines, resulting in resource conflicts.[71] However, some empirical studies focusing on Africa claim that the relationship between climate change and conflict is not very clear. Despite the fact that social tensions are affected by climate change, the question of whether these tensions turn into conflict is more related with political, social, and economic conditions.[72] On the other hand, as resource pressures continue on a large scale, measures to lower the emissions and adjust to the consequences of climate change have the potential to become a source of friction between and within states.[73]

Despite the disadvantages, there are some other studies arguing that climate change has also some positive aspects. According to Etty and colleagues, greenhouse gas emissions are deliberately brought to the agenda at excessive level, and climate change is exaggerated as a global problem. According to their approach, melting of glaciers and the ice covers in and around the Arctic Ocean has paved the way for an increase in fruitful activities such as transporting, hydrocarbon extraction, tourism and fishing.[74]

[69] King, op.cit.
[70] Swain, op.cit. and Berna Aksoy Özcan, "Defining Environmental Security as a National Security Issue", International Journal of Politics and Security (IJPS), Vol. 5, No. 1, 2023, pp. 73-94, DOI: 10.53451/ijps.1178361.
[71] Betz, op.cit.
[72] Dalby, op.cit.
[73] Busby, op.cit.
[74] Thijs Etty, Veerle Heyvaert, et al., "By All Available Means: New Takes on Established Principles,

Although the formation of new sea routes provides benefits for some countries in terms of sea access, shipping and mining, this may also lead to some geopolitical struggles, increase competition for access to resources, vulnerabilities and tension between states.[75]

Environmental Degradation and Environmental Stress

Environmental conflicts are caused indirectly, if not directly, by environmental degradation. Human-caused environmental degradation is a key factor contributing to the emergence or intensification of violent conflicts. Conflicts triggered by environmental degradation arise from socio-economic and political developments. Violent conflicts triggered by the degradation of renewable resources often appear in times and areas of socioeconomic crisis. According to Baechler, violence occurs when some of the following situations overlap:

- Desperate and inevitable terms in which resources disappear and no substitute can be found.

- Scarcity of mechanisms to regulate resource use and mediocre performance of the state.

- The instrumentalization of the environment by dominant actors in order to pursue certain group interests.

- Gaining allies from certain groups of elites or foreign groups, organizing and arming.

- Expansion of a historical conflict.[76]

Homer-Dixon examined the effects of environmental degradation and environmental stress on national and international conflicts. The environmental degradations cause scarcities which further create environmental stress. More generally, environmental stress causes impoverishment, aggravates class and ethnic divisions, weakens liberal regimes, and leads to rebellions. He divides environmental scarcities into three categories: supply-driven, demand-driven, and structural. The first type rises from the reduction, or exhaustion of the resources, while population growth and changes of consumption behaviour create demand-driven scarcity. According to the Neo-Malthusian approach, natural resources are limited, and if the increase in population and consumption exceeds these limits, social poverty and consequently social collapse are inevitable. The structural scarcity, a key factor contributing to conflicts, results from imbalanced distribution of wealth and power. Some centres of power receive unevenly large shares of the resources, while others receive only a small part

Actions and Institutions to Address Today's Environmental Challenges", Transnational Environmental Law, Cambridge University Press, 2015, Vol. 4, No. 2, pp. 235-245, doi:10.1017/S2047102515000217.
[75] EU, Concept for An Integrated Approach on Climate Change and Security, op.cit. and King, op.cit.
[76] Günther Baechler, "Why Environmental Transformation Causes Violence: A Synthesis", Environmental Change and Security Project Report, Issue 4, Spring 1998, pp. 24-44.

to sustain their livelihoods. These three types of scarcities are interrelated and trigger each other to create negative social effects. Environmental scarcities can end up with self-generating violence and shattering of societies with non-functioning institutions. The most likely scenarios that could have a global impact include ethnic conflicts and civil strife resulting from deepening social divisions.[77]

According to Homer-Dixon, environmental stress can lead to various conflicts such as diplomatic and commercial disputes, chronic and widespread subnational violence, terrorism, or war. It can increase the level of tensions in the national and international community, increase the likelihood of conflicts of many diverse types, and further hinder collaborative solutions. While environmental stress can be a close and influential source of conflict in some cases, in other cases it can be an indirect actor of a complex scenario involving political, economic, and physical factors. Environmental stress can shift the balance of power and lead to power fluctuations that can be the reason of a war. In another example, global environmental degradation could widen the gap between developed and developing countries, which in turn could encourage the poor countries to look for military measures against the rich to obtain a reasonable share of resources.[78] As the connections between the environment and security are understood more, environmental degradation is increasingly recognized as a contributor to conflicts.[79] By deepening the vulnerabilities and instability, it can lead to armed conflicts, especially when combined with social and demographic problems.[80] Conflicts may arise between countries due to the share of the resources. However, it is important for states to avoid conflicts for the sake of environmental sustainability, for social and economic well-being. Therefore, global peace and security greatly depends on environmental sustainability.[81]

Environmental Security Responsibility and National Sovereignty

Responsibility for environmental security is increasingly gaining universal support, thus states are taking on this fundamental task by endorsing environmental agreements and cooperating with international environmental organizations. However, environmental responsibility has not yet achieved a strong enough position within the international order. It seems that environmental responsibilities are breached rather than fulfilled, and these abuses are mainly committed by developed powers.[82]

[77] Thomas F. Homer-Dixon, Environment, Scarcity, and Violence, Princeton University Press, New Jersey, 1999.
[78] Homer-Dixon, op.cit.
[79] Luomi, op.cit., pp. 4-5.
[80] EU, Concept for An Integrated Approach on Climate Change and Security, op.cit.
[81] Özcan, op.cit.
[82] Falkner, op.cit.

Today, environment is mostly admitted as an issue that concerns humanity as a whole, therefore the loss of biodiversity and climate change is a common concern for humanity. In order to reduce and eliminate this concern, it is necessary to use state powers to protect the global environment within the scope of "responsible sovereignty", rather than the establishment of a supranational environmental management system that will restrict the sovereignty of states. Since the adoption of the 1972 Stockholm Declaration, important results have been achieved at the normative level with the adoption of many legally binding documents. However, in particular, the absence or lack of enforcement mechanisms constitutes a significant weakness of the current environmental law system. There are significant differences of opinion among states, especially between developed countries and developing countries, regarding the strategies and procedures to be adopted, the type of commitments to be undertaken and how responsibilities will be shared. However, attitudes and policies vary significantly among developed countries also. For example, European Union states have shown a more consistent commitment to addressing environmental concerns, while the United States has been much more unwilling.[83]

From an ecological perspective, political boundaries and the boundaries of the world's ecosystems do not overlap. However, resisting climate change, protecting natural species, and preventing the destruction of renewable resources demand multinational collaboration without being limited by political borders. In this case, it can be thought that the environmentalist approach challenges and weakens the concept of national sovereignty.[84] Furthermore, the environmentalists recognize sovereignty as a primary obstacle for successful mutual reactions. According to environmental organizations, the forms and practices that cause the degradation of the environment cannot ensure its salvation; from this perspective, the state is not seen only unnecessary but also an absolutely undesirable actor.[85] The security of the global environment and the security of the state may not fully back each other. The difference between state principles and environmental ideals brings about the disagreement between traditional security and environmental security. If a global perspective can be adopted, environmental safety will become a universal value and local environmental policies can be built on this value. But if traditional interstate perspectives prevail, environmental security will be only an attachment to the traditional security agenda.[86]

[83] Francesco Francioni, Christine Bakker, "The Evolution of the Global Environmental System: Trends and Prospects", Transworld, Working Paper 08, January 2013.
[84] Falkner, op.cit.
[85] Swatuk, op.cit.
[86] Dyer, op.cit.

The rise of global environmentalism has brought important innovations to the understanding of the global environment, increased the diversity of management mechanisms in use, and strengthened the role played by non-state actors in these mechanisms. Global environmentalism has led to dense international agreements, as well as institutional associations and networks which force states to engage in international cooperation on environmental issues. Some documents penetrate into the internal affairs, serving to strengthen pro-environment groups within governments and non-government organizations. Although the effectiveness and functions of non-state actors have increased, the shadow of national sovereignty is still visible in the background of environmental management styles. The responsibility of environment was brought about by states which also have framed the international environmental agenda in terms of states' responsibilities and absolute rights. To avoid damages to global commons, states have adopted many tasks in accordance with the environmental security. The rise of environmentalism has not weakened sovereignty, rather modified its meaning and importance. Within the scope of this change, states have have established local regulations and institutions to integrate environmental goals with their policies. Sovereignty, while remaining as a vital factor of the international order, also structures the way states build global capacity for environmental governance.[87]

Lawrence Susskind, in his book "Environmental Diplomacy" published in 1994, brought wide interest to the term of environmental diplomacy in the context of how best to negotiate international environmental agreements. He discussed environmental diplomacy in the context of relations between nation states within the traditional understanding of diplomacy.[88] Contemporary use of the term has expanded to consider ways of resolving environmental conflicts. The origins of environmental diplomacy lie in traditional views of diplomatic processes through which nation states negotiate with each other on bilateral or multilateral agreements. However, as environmental problems have become indistinguishable from each other at the local and global levels and non-state actors have become more involved, environmental diplomacy has also become part of a broader discourse. Now, environmental diplomacy requires a deep understanding of the fundamentals of environmental conflicts.[89]

The environmental problems that the international community is increasingly facing will cause multifaceted ambiguities if not solved. Therefore, today, it is vital to evaluate security policies with a sustainable

[87] Falkner, op.cit.
[88] Lawrence E. Susskind, Environmental Diplomacy: Negotiating More Effective Global Agreements, Oxford University Press, New York, 1994.
[89] Ali, op.cit., p. 604.

national security approach and to adopt a new security approach regarding political, economic, and social threats that will cause fragility. States are the most essential actors in the fight to survive in the face of global environmental problems. However, there is also an inevitable necessity for international collaborations supported by states. In addition, these collaborations will motivate cooperation at the regional level and prevent conflicts in a timely and appropriate manner.[90]

Scientific evidence clearly shows that climate change is creating significant impacts, and these impacts will continue to worsen. Although the effects caused by climate change affect the entire world globally, these effects become more vital especially for island countries whose lands are entirely or largely at sea level. Long before their lands disappear under ascending sea waters, the habitability of many of these places will be disastrously reduced. These countries, which will face an existential danger by losing both their population and land due to rising waters, will be obliged to take initiatives for geo-engineering measures, if possible, together with other countries and non-governmental organizations, if not alone. However, these measures may cause other unforeseen environmental threats for the entire world. Despite the risk of creating serious negative effects on other states, conducting these measures without their consent may be perceived as a violation of sovereignty and may be a source of conflict between states.[91]

The greatest potential for conflicts lies in ethno-political tensions and mass migrations arising from interregional or demographic reasons in countries with weak state performance. In medium or high intensity ethno-political wars, competition for resource use privileges, increase of population and ethno-social separation, regional loyalty and underdevelopment collect insoluble problems that cause and/or trigger violent reactions. High intensity violence is triggered by crimes against humanity, including war crimes, rape, massacres, and genocide. The diversity of actors is huge including minorities, tribes, clans, Indigenous people, settlers, nomads, farmers, unemployed, multinational corporations, and central governments. Often governments endeavour to control violence. If successful, these initiatives would lead to prolonged periods of low-intensity conflict in focal regions.[92]

Global environmental sustainability is related to the joint benefit of all countries and people of the world. Thereby, every contribution made on a national basis to the solution of the climate change problem provides a global benefit. However, the contribution of a limited number of states may not have an impact on a global scale, so the majority of states must participate in

[90] Özcan, op.cit.
[91] Kyle Fruh, Marcus Hedahl, "Climate Change is Unjust War: Geoengineering and the Rising Tides of War", The Southern Journal of Philosophy, Vol. 57, Issue 3, September 2019.
[92] Baechler, op.cit.

this effort. At this point, there is a common benefit dilemma between states. While the gains are common globally, the costs must be afforded by each state separately. This dilemma makes not only the developing but also the developed countries to prefer their own economic policies to environmental problems, as in the example of the 1997 Kyoto Protocol. The environmental policies followed by states affect not only themselves but also other countries. Therefore, the effects of the policies can spread and last for a long time, and this creates a mutual dependency between states. The answer to the environmental challenges relies on the creation of common gains based on the resolution of conflicting interests. However, solving this common benefit problem is quite difficult due to the considerable number of actors. International organizations specialized in environmental problems also play important roles in shaping states' approaches to solving these problems. Unfortunately, countries give priority to their own economic development programs and ignore the serious pollution and environmental problems they cause in order to achieve rapid economic growth.[93]

Conclusion

Environmental security has become an indispensable scope of global and national security. In fact, environmental security is a matter of survival of humankind. Therefore, the relationship between humans and the environment is of vital importance. However, human activities for a better life are damaging the environment, the earth, and the humanity at all. Environmental change, climate change in particular, causes the degradation of the environment. Biodiversity is rapidly decreasing, and many species are disappearing due to the destruction of rainforests, pollution of lakes, rivers, seas and oceans, over-exploitation of renewable resources, and degradation of agricultural lands as a result of urbanization. The devastation of renewable resources, prompt population increase and uneven access to resources are the main reasons for the increase in environmental security risks. Environmental threats and risks increasingly menace the life on the earth. Mass migrations occur due to many effects caused by environmental change and climate change. Increases in the frequency of these effects lead to new migrations and risks. The more the number and frequency of natural disasters increase, the more the mortality and morbidity rate will be.

Scientists and environmentalists claim that the effects of climate change can be seriously detrimental. Unfortunately, human activity has a big share in accelerating these effects. The findings show that the harmful effects will affect global and regional security. Impacts caused by human activities are likely to overwhelm the ability of societies to respond, especially in underdeveloped regions or countries. That is why, urgent action is needed,

[93] Goldstein, op.cit.

and we must do all we can to mitigate climate change.

Environmental security can contribute to the internal and interstate conflicts by increasing the level of socioeconomic tensions as well as the historical struggles. The relocation of people looking for a better life, the fragmentation of society often based on existing ethnic divisions, and the degradation of state institutions are key social effects that can significantly increase the likelihood of violence in developing countries. These effects are often causally interconnected. Although environmental scarcity is not the direct initial cause of these social impacts, scarcity can influence other factors that create these impacts. Violence and conflicts caused by environmental stress are likely to increase in the coming decades, and these tensions are likely to affect developing countries earlier and more severely than the developed countries. Conflicts arise not only from political and military threats, but they also arise from environmental degradation and environmental stress. In particular, renewable resources such as water and land are particularly crucial factors in security issues caused by local and regional instability and migration. Unfortunately, in many regions renewable resources are being depleted or degraded faster than they are replenished.

The states and the non-state actors have been working on the establishment of international laws and organizations to ensure the security of the environment. The recent rise of environmentalism has provided important improvements to the understanding of the global environment by increasing the diversity of management mechanisms in use, and strengthening the role played by non-state actors in these mechanisms. In recent years, global environmental problems such as climate change and ozone layer depletion have begun to attract more attention in developed countries. Although some states may have some restrictions regarding their national interests, states are still the most important and effective actors in international relations who have great influence on the policy making over environmental security. Effective and reliable regional and international cooperation is needed to protect the ecosystem and human heritage. International cooperation to protect the global environment is vital for all the people around the world.

CRITICAL ANALYSIS OF THE GLOBAL CLIMATE CRISIS FROM THE PERSPECTIVE OF STATE SECURITY AND SOVEREIGNTY

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Introduction

Throughout history, regional and international threats have led to changes in the world order. In today's world, direct or indirect threats caused by climate change necessitate the cooperation of all international actors, including states. States can sometimes mobilize international awareness regarding global climate change with the policies they follow at the national level. Generally, state reactions only to national priority practices reveal new responsibilities.

It is not difficult to determine that various climate-related crises that will occur in the foreseeable future may lead to a radicalization in the understanding of sovereignty in the world. Throughout the millennium, the negative consequences of climate change will gradually lead to challenges in areas under the responsibility of nation-states in almost every part of the world, in some places more and less in some places. For example, considering that the average sea level will rise between 0.26 and 0.82 meters by the end of the 21st century, it will threaten the territorial sovereignty of many island states. Again, considering the possibility that a non-negligible number of people may leave their homes due to climate-related problems by the middle of the millennium, migration and asylum problems starting today will create more sovereignty problems.[1]

In the last decade, when the adverse effects of climate change, which can be defined as the long-term change in average weather events globally and regionally, were felt the most, this crisis poses a significant threat to state sovereignty and world order, primarily by increasing the pressure on the natural resources that sustain the nation-state. As stated in the Intergovernmental Panel on Climate Change (IPCC)[2], climate change may

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[1] Leo Meyer et al., Technical Support Unit for the Synthesis Report, "Climate Change 2014: Synthesis Report," Intergovernmental Panel on Climate Change, 2014, p.10-14

[2] IPCC, The Physical Science Basis: Contribution of Working Group I to the Fourth Assessment Reportof the Intergovernmental Panel on Climate Change (2007), 13. V.O. Kolmannskog,
Future Floods of Refugees: A Comment on Climate Change, Conflict and Forced Migration (Oslo: Norwegian RefugeeCouncil 2008) pp.13-16.

have adverse effects on the territorial integrity of the state and even its ability to become a state, as well as on ensuring security on land due to disasters such as desertification, changing the structure of the soil with floods, and hurricanes. The United Nations defines climate change as a threat multiplier because it triggers the risk of migration and conflict. The impossibility of combating the adverse effects of climate change on a governmental basis necessitates the cooperation of international partners, including the United Nations, in taking measures.

Our study focuses on the thesis that the climate crisis that will occur, considering the increasing border disregard, will increase all kinds of pressure on states' natural resources and pose severe threats to national sovereignty and peaceful world order. The main starting point is to investigate the arguments that the regulations that are put into effect and are likely to be implemented through global climate action will limit the sovereign status of states.

The Nature of State Sovereignty

Although it differs from today's understanding of sovereignty, it emerged due to human social existence on earth. Before revealing what transformation it has undergone in the ancient, classical, and modern ages, it is necessary to reveal what sovereignty means. The Latins expressed sovereignty with the word *maiesta*, which they described as the absolute and permanent power of a state; The Greeks called *akra exousia* to describe this power, and the Italians used the term *segniora* for those who had complete control of the state. The Hebrews called this *tomech shévet*, meaning the highest command power.[3] It is possible to see that this word, which each means "supreme ruling power" in their own languages, has a central place in philosophy, political science and law.

Although the term "Sovereignty" was not used until the 15th century, the idea dates back to Aristotle, who wrote about supreme power in the state. Roman and medieval writers talk about the state's absolute power, but their views on the nature of sovereignty are rather vague and confused. In the Middle Ages, we encountered feudalism in its modern form as a government system based on loyalty rather than the state. The intense influence of the Papacy on worldly affairs prevented the existence of independent states for a long time. However, the conflicts between the feudal lords and the Crusades provided the basis for forming new political ideas. In the absolute monarchies established in Europe, the rulers saw the necessity of basing their rights on a legitimate basis, and theocratic doctrines that emerged in the late Middle Ages came to their aid with a right of sovereignty received directly from God. The

[3] Jean Bodin, Book I, chapter 8, On sovereignty. In J. Franklin (Ed.), Bodin: On Sovereignty, Cambridge: Cambridge University Press, 1992, pp.4-8 doi:10.1017/CBO9780511802812.008

formation of modern sovereignty doctrines could occur after the states' struggle with the Papacy and feudalism. These theocratic doctrines, which remained influential until the end of the 18th century, were replaced by the understanding of national sovereignty, which means the people's will, only with the influence of the French Revolution and new intellectual movements.[4] In the words of Jean Bodin, the first sovereignty theorist of the period, it is possible to see the concept of sovereignty as the supreme, absolute, independent, original, indivisible, and inalienable feature of state power. In other words, in the Western legal tradition, sovereignty appears as a part or essence of a state's power.[5]

With the Peace of Westphalia, where we find the intellectual foundations of the modern understanding of sovereignty, regional sovereign powers were brought to the agenda to promote peace and security among independent political communities. The idea of sovereignty was further developed by Hobbes, who based his absolute power on the view that the people surrendered their natural rights to the authority in an irrevocable agreement. Although Rousseau argued that sovereignty was absolute and unlimited, he positioned sovereignty in all people's general will rather than the ruler. Finally, John Austin argued that every state must have a specific body with sovereign power, that its authority is indivisible and legally unlimited, and that only its commands create law.[6]

The Westphalian order, which introduced a new political system that demanded respect for the independence of regionally defined political communities, was accepted as a very applicable loyalty-based system for the Europe of the period and evolved into the international order. When the concept of state sovereignty was mentioned in the modern sense, it was understood that the conditions of authority, territory, population, and recognition had to be met. Through sovereignty, the state has attained a status in which its international personality (subject of international law) and territorial integrity are respected. The state is the authority with the right to determine the political and social system for self-defense and the unrestricted use of it. Although having unlimited legal power, the state usually exercises only a tiny portion of its authority. It grants individuals certain rights and privileges and binds them voluntarily to its activities. There is no legal power against the state, and the state can change or destroy them at will. We have also witnessed examples in the world where some states can transfer controlled sovereignty to their colonies and affiliated administrative units.

[4] James Miller, Rousseau: Dramer of Democracy, Yale University Pres, New Haven 1984, pp. 118-120.
[5] Bodin. a.g.e., p.35.
[6] Laurie M. Johnson Bagby, Hobbes's 'Leviathan': A Reader's Guide, Bloomsbury Publishing, NY., 2007, pp.117-120; Jean Jacques Rousseau, "Of The Social Contract and Other Political Writings", Christopher Berthram (ed.), Quintin Hoare (Translate), Penguin Books, 2012, pp. 23-25.

Modern states are considered sovereign equal actors as the cornerstone of the United Nations system. Today, at the heart of the contemporary understanding of the value of sovereignty lies the commitment of states to the preservation and promotion of international peace and security, clearly stated in the UN Charter.

Much has changed since Westphalia, and our planet has witnessed striking changes, especially in the late 20th century and the first quarter of the 21st century. Among these changes, many can be mentioned, especially economic globalization, industrialization in developing countries, the communication revolution, the increase in the importance attributed to human rights, the more significant impact of non-state actors, and, of course, anthropogenic climate change, which is the focus of this study. Due to these changes, geographical distance and political boundaries in human relations have significantly decreased. At the same time, individuals, companies, and states have become increasingly interdependent in economic, environmental, cultural, and political terms. As a result of increasing interdependence, new challenges faced by the international community, such as climate change, global terrorism, and migration, have begun to occupy the agenda. In such a globalizing and interdependent environment, the Westphalian understanding of sovereignty is insufficient, making the transformation to hybrid sovereignty adapted to the new world necessary.

Evolution of Sovereignty as Responsibility

Sovereignty is the supreme power of the state, and its legal limitation is an exception. Sovereignty includes, in practice, certain situations that may or should limit the whole exercise of powers. First of all, the sovereign cannot limit something impossible. Just as a law forbidding the sun to rise would not be possible even if it were within the legal scope of the sovereign's power, a law forbidding individuals to hold certain opinions, even if perfectly legal, would be impossible to control unless those opinions were written or spoken. In this context, it is not for the sovereign's benefit to prohibit what he cannot discover or control. However, the state is expected to enact and implement laws, considering generally accepted moral and legal situations.

Even the most authoritarian regimes will jeopardize their ability to successfully enforce laws if they create situations that contradict their people's beliefs or established rules. When considered from the perspective of modern states, areas may be exempt from state intervention.

Although states are subject to regulations that limit them within the constitutional framework, they have the initiative to change this situation. Although it can be interpreted as saying that it is not the state and its sovereignty that are limited by the constitution but the state administration and government organs, it will not be possible to see this as a complete

limitation of sovereignty.

Considering that the state's sovereignty is limited to the rules of international law and the treaties and agreements made with other states, it is possible for the state to legally reject this, according to the theory of legal sovereignty. Since these are self-imposed voluntary restrictions and there is no legal higher authority to enforce them, such a situation could be considered a sovereign limitation if not an explicit international restriction. In other words, due to real politics, states may encounter situations restricting their absolute sovereignty.

Relations between states in the international arena can become complicated in terms of sovereignty. It is expected that the rules of international law will be a legal basis that sets limits on the external independence of each state in its relations with other states. Here, the sovereign capacity of each state is not equal. Some states may define their military, political, and economic capacities as the natural equivalent of their sovereignty in the international system.

The limiting effect of the era of globalization on the control and regulation capacities of states' sovereignty is expanding. It has become difficult to bring the complex network of relationships under state control, from individuals to companies, from non-governmental structures to cross-border organized communities. This decrease in the capabilities of states does not mean that their sovereignty has come to an end. Sovereignty is no longer just a capacity used by states with their exclusive powers, but the international and supranational structure has begun to fill the sovereignty gap created by states. States prefer to be part of the sovereignty procedures of supranational structures with the urge to obtain national benefits and increase capacity. There are differences between strong and weak countries regarding compliance with sovereignty-related change procedures. There is no doubt that solid states are more successful than weak states in adapting change to their interests.

The effect of the climate crisis on increasing national and international inequalities is more destructive for weak states. A lack of capacity to cope with climate-related disasters occurring within the country can become a sovereignty crisis. The spread of groups with socially, economically, and politically fragile structures that face environmental threats to a broad base may cause weak states to face the risk of conflict.

Climate Changes and Security

As a problem caused by anthropogenic environmental factors, climate change creates problems regarding biological existence and state security, such as sudden increases in air temperature, rises in ocean levels, and changes in air-ocean flow.

The greenhouse effect created by pollutant gases released into the atmosphere due to rapid population growth, urbanization, and industrialization, and the increase in carbon dioxide emissions due to the destruction of forest areas are the leading consequences of the climate crisis. When considered in this sense, the climate crisis, which is seen as an environmental problem, has begun to be evaluated with a more comprehensive security dimension when viewed from its global dimensions.

The rapidly changing climate and the increase in extreme weather conditions constitute the focus of disaster management, environmental safety and environmental protection efforts of many international organizations, especially the United Nations Office for Disaster Risk Reduction (UNDRR) and the World Meteorological Organization (WMO.)Weather conditions, considered extreme in recent years, are gradually becoming ordinary. There is an expectation that floods, which occur every 500 years in various regions, will now occur every 25 years. Such weather events will become more frequent and intense as the planet's temperature increases, glaciers melt, and seas rise.[7] Climate-related developments will continue to seriously impact societies, economies, and security and worsen the challenges already faced.

Concerns about the security effects of climate change have increased since the 2000s. The IPCC discussed the relationship between security and climate for the first time in a subsection on "Human Security" added to its Fifth Assessment Report dated 2014, and stated that climate change, especially in low-income developing countries, is affected by extreme weather events and related issues.[8] Shared the conclusion that it has the potential to indirectly increase the risk of migration and violence due to resource shortage. Focusing primarily on the effects of climate change on human security, the Report concluded that climate change poses a threat to human security in 4 ways;

1. *Restriction of livelihoods*
2. *Compromising culture and identity*
3. *Migration movements*
4. *Questioning state capabilities (IPCC,2014).*[9]

[7] Matthew Barnett, K. O'Brien, "Global Environmental Change And Human Security: An introduction", R. Matthew, J. Barnett, B. McDonald, & K. O'Brien (Eds.), Global Environmental Change And Human Security, Cambridge, MA: MIT Press, 2010, pp.30–32.
[8] Hans Brauch, "Climate Change, Environmental Stress And Conflict", In German Federal Ministry for Environment. (Ed.), Climate change and Conflict (Berlin: Federal Ministry for Environment, Nature Conservation and Nuclear Safety, 2002, p. 19.
[9] IPCC, (2021). Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press.

It is not difficult to associate natural disasters such as floods and landslides, floods, problems in the solar system, earthquakes, drought, and excessive rainfall with climate change. Inevitably, these situations that threaten human life should also be considered as national security problems. Drought, which causes a decrease in agricultural efficiency, pushes countries to search for solutions to increase food resources. In contrast, the increase in ocean levels can cause crises between countries, such as cities being submerged under water or borders becoming blurred. Migration is one of the main consequences of the increasing day-by-day climatic crises such as floods, fires, extreme heat, drought, and the failure to take adequate measures.

The increase in internal and external migration mobility moves beyond the classical understanding of sovereignty within geographical borders. Despite the actual situation created by climate-related migration regarding border security and territorial sovereignty, it is known that migrants face obstacles in obtaining refugee status recognized by international law.

According to the IPCC's 2023 report,[10] the frightening increase in global surface temperature, the increase in human-induced greenhouse gas emissions and the highest measurable temperature averages increase the perceptibility of climate-related disruptions.

Climate Change as a Threat to Sovereignty

In the modern sense, state sovereignty is based on the legitimacy of a state's output and input. While the output legitimacy of a state is its ability to meet the demands of its citizens to access essential resources such as food, water, energy, and employment, a state's input legitimacy includes the extent to which its citizens have a say in governance, such as voting and legal applications.[11] In this sense, sudden changes in the climate turning into a crisis will negatively impact a state's ability to provide essential resources to its people. (This is a situation that erodes output legitimacy.) While this negativity causes the fragility and failure of the state, it may lead to negative consequences in terms of regional and international security.

When considering the climate crisis, it is necessary to consider states' territorial integrity and dominance within territorial borders in a broader sense. In this sense, threats to state stability and continuity should be based not on climate change but on how these changes may interact with the

[10] IPCC, (2023). Sections. In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, pp. 35-115, doi: 10.59327/IPCC/AR6-9789291691647 p.68
[11] Vivien A. Schmidt, "Democracy and Legitimacy in the European Union," in The Oxford Handbook of the European Union, ed. Erik Jones, Anand Menon, and Stephen Weatherill, Oxford: Oxford University Press, 2012.

current security environment. Governments' capacities to effectively manage climate crises to protect their essential resources and public welfare vary.

When evaluating the impact of rapid climate change on natural resources, it is necessary to look at it within the framework of current values regarding state fragility, state sovereignty, and world order. The increasing frequency and severity of weather events daily reveal critical water, transportation, and energy problems. These problems are not only national issues, but the transboundary nature of some climate impacts, such as rising sea levels and fish stock migration, can increase the likelihood of conflict between states.[12] There is no established rule in international law regarding solving problems related to rising sea levels. Although there are efforts to reach results with the existing rules and their interpretation, problems regarding resolving disputes may be encountered soon.[13]

According to WMO data, meteorological disasters have been occurring more frequently worldwide and reaching severe levels in recent years due to climate change. International cooperation has become increasingly needed to combat the chronic problems experienced by many people subjected to migration due to climate-related floods, storms, and droughts yearly. According to World Bank it is estimated that by 2050, 216 million people will migrate within or between countries to meet their work, food, and water needs due to climate crises. By 2050, it is estimated that there will be large increases in the wave of national-scale migration in every region of the world: Sub-Saharan Africa could see as many as 85.7 million internal climate migrants; East Asia and the Pacific, 48.4 million; South Asia, 40.5 million; North Africa, 19.3 million; Latin America, 17.1 million; and Eastern Europe and Central Asia, 5.1 million. [14]

From this perspective, climate change may seriously challenge state sovereignty in many parts of the world. Namely, climate change can trigger the country's management problems by increasing the pressure on critical resources such as water and food. With decreases in water and food, livelihoods within the country may suffer. Thus, destabilizing factors such as population displacements, migration, and political unrest may increase.[15] The relative increase in these factors can create significant pressure on the

[12] W. Neil Adger et al., "Human Security," in IPCC 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, Cambridge: Cambridge University Press, 2014, pp.785–91

[13] Uğur Bayıllıoğlu, Deniz Seviyelerinin Yükselmesi ve Esas Hatlar Üzerindeki Etkileri: Yeni Bir Türk–Yunan Uyuşmazlığına Doğru Mu?. Erciyes Üniversitesi Hukuk Fakültesi Dergisi, 17(1), 2002, p. 98.

[14] Viviane Clement, Kanta Kumari Rigaud, Alex de Sherbinin, Bryan Jones, Susana Adamo,; Jacob Schewe, Nian Sadiq, Elham Shabahat, Groundswell Part 2: Acting on Internal Climate Migration. World Bank, Washington, DC. 2021. http://hdl.handle.net/10986/36248 License: CC BY 3.0 IGO.

[15] Michael McElroy, D. James Baker, Climate Extremes: Recent Trends with Implications for National Security, Cambridge, MA: Harvard University Center for the Environment, 2012.

international system created by sovereign states.

International Climate Policies

States are social structures that cannot be perceived naturally in nature and are expressed as indivisible regarding sovereignty.[16] This situation creates a resilient and subjective reference point for active earth structures. This creates a challenging situation for the normative system on which authority is based.[17] In the case of the climate change crisis creates a need for a more innovative understanding of the change in the human social order and for neighboring states to redirect their security and threat perceptions. So much so that, due to actions aimed at reducing/limiting the effects of carbon emissions and climate change, the situations in which states feel threatened and the roles of actors in the international relations scene are changing rapidly. From this perspective, according to the Montevideo Convention on the Rights and Duties of States, a state must have a defined territory for its citizens living on it to survive in human security.[18]

With the international discussion of climate change, which started with the United Nations Human Environment Conference held in Stockholm, Sweden, in 1972, international steps began to combat climate change. At the First World Climate Conference held under the leadership of the World Meteorological Organization in 1979, the harms of dependence on fossil fuels and deforestation were expressed. Then, in 1988, the United Nations General Assembly expressed climate change as a common problem of humanity. Its resolution numbered 43/53 on "Protection of the Global Climate for the Present and Future Generations of Humanity."

Based on the negotiations of the Framework Convention on Climate Change, which started at the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992, it has a historical importance in terms of decisions taken, such as protecting the climate system according to the principle of shared responsibility, taking precautions against the effects of climate change and including the measures in national development programs.[19]

The 1997 Kyoto Protocol is another international agreement that sets binding targets for states to reduce CO2 emissions as the most critical measure to mitigate climate change. The Paris Agreement is another supporting agreement regarding the specification of these emission targets.

[16] Jean-Jacques Rousseau, The Social Contract and Discourses, London : J.M. Dent & Sons, Ltd, 1913.

[17] Samantha Besson, "Sovereignty," in Oxford Public International Law (OPIL), April 2011.

[18] Stefanie Jansen, "International Law and the Criteria for Statehood," from: https://arno.uvt.nl/show.cgi?fid=121942.

[19] United Nations Framework Convention on Climate Change, United Nations, FCCC/INFORMAL/84, 1992, pp.1-4

This agreement, which aims to determine action for the post-2020 scenario at the point reached with the Kyoto Agreements, can be said to be the most important agreement reached in history up to that point, as all countries are asked to develop emission reduction targets and the agreements are legally binding.

However, beyond the criticism that the agreements cannot provide a solution to the crisis in general, when we look at the overall picture, considering the current state of international environmental law and human rights law, it is seen that they do not have a very competent mechanism regarding human security issues caused by the climate crisis and the territorial integrity of states.[20]

It is important to understand climate geopolitics well so that nations indifferent to the global climate crisis can understand why the climate problem is so essential and humanitarian. It is a reality that the problem will only come close to being resolved with the existence of nations coming together for this purpose, independent of their interests.

In our increasingly globalizing world, the international community has a much more active role thanks to technology and media. Considering that the climate crisis will become an Achilles heel of modern society if not addressed effectively, "to manage the unavoidable, to avoid the unmanageable" stands before us as a reality to collaborate. When evaluating this situation from the perspective of state sovereignty, states see collective global governance as a threat to their political independence. Collective actions require collective decision-making and collective practices, and these, therefore, create the need for international organization and precautions. These organizations make decisions by majority rather than unanimously because it is easier and faster. However, when evaluated by countries, this continues to be seen as undermining their sovereign power.

Creating common policies regarding measures regarding global climate change cannot be evaluated only within the framework of the individual responsibility of states. Responsibility towards the international community is more flexible as it does not include coercive mechanisms. Due to flexible liability, states prefer not to be a party to coercive regulations and prioritize economic interests.[21] The rules brought by the World Trade Organization, which regulates the international trade regime, have content that favors multinational companies and restricts the powers of states in environmental

[20] Mohammad Kamrul Ahsan, "Revisiting The Concept of Human Security," Philosophy and Progress, August 8, 2018, pp.19–22.
[21] Senem Atvur, Asiye Gün Güneş Gülal, Ceren Uysal Oğuz, İklim Krizi ve Ekolojik Bağlamda Devletin Rolünü Yeniden Düşünmek, Politik Ekonomik Kuram, Özel Sayı, 2023, p.52. https://doi.org/10.30586/1347417.

and health issues.

Responsibilities of States Due to Climate Changes

The Earth, a planet that hosts different living species and the ecosystems around them, could absorb the changes in the ecosystem through natural cycles that operate in harmony per the principle of interdependence. This sustainable system has been changing since the emergence of the human species until today, and human domination over nature is constantly, rapidly, and uncontrollably increasing. In this sense, as a search for dominance, technical advances and the development of capitalism, especially after the Industrial Revolution, have become a turning point in increasing ecological destruction. As a result of humanity's perception of nature as an unlimited and accessible source of raw materials, the increasing human population, expanding living spaces, and the use of fossil fuels as the primary energy source have caused irreversible damage to the ecological cycle.

This being the case, it also creates a necessity for states, as governing structures with sovereignty over the land on which people live as citizens, to strive internationally against the devastating effects of the climate crisis.

Climate-related crises and ecological threats can affect not only the fate of humans and other living things in the future, as they do today, but also the deepening of imbalances between all actors, including the states that make up the international system. In particular, actors with high vulnerability are more likely to be directly exposed to the destructive effects of the climate crisis despite their minimal impact. International NGOs in various platforms, such as the United Nations, mostly bring up demands to protect the rights of vulnerable and disadvantaged groups and ensure global climate justice. In the face of the weight of the economic interests of states and the global energy lobby, such demands are no more than a weak cry.

Many structural reasons exist for states' reluctance to reduce greenhouse gas emissions. On the other hand, actors such as the European Union go beyond states' responsibilities and adopt climate change laws through central decision-making bodies and strive to achieve them by setting climatic targets. Although more than the efforts of the Union are needed, they achieved partial success by popularizing the use of renewable energy and energy efficiency practices. The EU aims to reduce greenhouse gas emissions by 55% by 2030 and has declared its commitment to achieve climate neutrality by 2050. The Union aims to shape all economic policies based on environmental priorities within the framework of the Green Deal. In this context, it develops additional measures to minimize the carbon footprint in emission-intensive sectors. It plans to price carbon through the Emission Trading System and make producers who exceed the emission limit pay

additional fees. Through the "Border Carbon Tax Mechanism",[22] it wants to make European manufacturers competitive against products from countries with low carbon emission costs. The climate policies implemented by the Union directly concern not only the member countries but also all economic and political partners.

Conclusion

The climate crisis poses a significant threat to the survival of the nation-state system and world order by putting pressure on the resources required for the welfare of the states' citizens or by physically changing their basic geostrategic structures. It is imperative that not only states but also other actors fight against this threat by producing common policies in cooperation. Increasing awareness of the need for cooperation in the fight against environmental threats makes changing the traditional understanding of power and sovereignty inevitable.

In order to cope with the climate crisis, adequate measures must first be implemented to force states and multinational companies. However, neither a national nor a global effective mechanism exists to achieve this. Due to economic interests and sovereignty concerns, states are reluctant or insensitive to be part of such a mechanism. The effects of climate change are spreading exponentially because greenhouse gas emissions cannot be reduced. The need for more measures to reduce the destructive effects increases the losses exponentially.

Suppose the area affected by the climate crisis remains only at the point of decisions formulated within the United Nations Framework Convention on Climate Change framework. In that case, it will not have an impact proportionate to the threat. In order to reduce climate risks to state stability, continuation of hegemony, and world order, national governments and regional and international security institutions such as NATO, OSCE, African Union, ASEAN, and the United Nations Security Council need to adapt to the solution of the crisis.

Considering the irreversible pressure and destruction caused on our planet by the uncontrollable capitalist economic growth approach resulting from increasing production and consumption on a global scale, we are faced with the reality that climate change is not just an increase in air temperature. Considering that the climate crisis may lead to food deprivation, economic instability, and social and intercountry conflicts, especialy transboundary river disputes and scarcity of water and food resources, will increase the risks of conflicts between states and subnational groups. It should be noted at this

[22] Sam Lowe, The EU's carbon border adjustment mechanism: How to make it work for developing countries Centre for European Reform, Policy Brief, European Policy Center, 22 April 2021, https://www.cer.eu/sites/default/files/pbrief_cbam_sl_21.4.21.pdf.

point that Technical solutions such as changing irrigation techniques, making agricultural practices drought-resistant, and reducing emissions are critical in risk management. However, when addressing climate risks to the world order, the international security community must also underline this risk. Otherwise, national policies and practices will hover on the edge of the threat. In this context, it will be essential to improve, strengthen, and create new international, regional, national, and subnational governance structures to combat climate change.

Many examples show that countries have difficulty adapting to the losses and damages they experience due to severe weather events such as hurricanes and typhoons in the world, as well as slow events such as sea rise or desertification. It is seen that countries are prosperous in covering the losses and damages incurred in proportion to their capacities. While climate-related crises can turn into disasters for poor and underdeveloped countries, the situation may be more tolerable for developed countries. This requires climate change to be high on the international security agenda and for nations to cooperate against the risks that pose the most significant challenge to a functioning world order.

CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR (CBRN) WARFARE'S IMPLICATIONS ON THE ENVIRONMENT

Doğan Şafak Polat*

"Warfare is inherently destructive of sustainable development. States shall therefore respect international law providing protection for the environment in times of armed conflict and cooperate in its further development, as necessary." [1]

Introduction

As noted in a United Nations (UN) report, warfare adversely affects ecosystems at all levels. The degree to which warfare impacts on populations[2] and ecosystem depends on the type of disturbance,[3] the ecosystem's sensitivity and resilience, and the timing of the impacts.[4] Warfare invariably causes destruction, leading to the release of toxic compounds, death of wildlife, and polluted air. War-induced pollution contaminates water bodies, soil, and the atmosphere, making areas uninhabitable for humans.[5] The use of chemical, biological, radiological and nuclear weapons has exacerbated the strain on ecosystems and the environment.

Emerging from the shadow of World War I was a new form of warfare that brought new kinds of mass destruction. The term weapons of mass destruction (WMD) includes nuclear, biological, and chemical weapons. CBRN (Chemical, Biological, Radiological, and Nuclear) warfare began with the Germans' use of chlorine gas in World War I and remains a threat in

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[1] United Nations General Assembly, A/CONF.151/26 (Vol. I), "Report of the United Nations Conference on Environment and Development", Principle 24, 12 August 1992, A/CONF.151/26/Vol.I: Rio Declaration on Environment and Development (un.org) (Access 11.11.2023).

[2] Duncan Pendersen, "Political violence, ethnic conflict, and contemporary wars: broad implications for health and social well-being", Soc. Sci. Med., Vol. 55, 2002, pp. 175–190; Gary E. Machlis and T. Hanson, "Warfare Ecology", BioScience, Vol. 58, 2008, pp. 729–736.

[3] J.P. Dudley, J.R. Ginsberg, A.J. Plumptre, J.A. Hart, and L.C. Campos, "Effects of War and Civil Strife On Wildlife and Habitats", Conserv. Biol., Vol. 16(2), 2002, pp. 319–329; Gary E. Machlis, and T. Hanson, "Warfare Ecology", BioScience, Vol. 58, 2008, pp. 729–736.

[4] Arthur H. Westing, "Ecological effects of military defoliation on the forests of South Vietnam", BioScience, Vol. 21(17), 1971, pp. 893–898; S. Demarais, D.J. Tazik, P.J. Guertin and E.E. Jorgensen, "Disturbance Associated With Military Exercises", Ecosystems of Disturbed Ground, L.R. Walker (Ed.), Elsevier Science B. V., Amsterdam, NL., 1999, pp. 385–396.

[5] The world's militaries account for an estimated 6% of all greenhouse gas emissions, and many governments don't even report data on emissions from military activities according to Scientists for Global Responsibility (SGR), "World's militaries avoiding scrutiny over emissions, scientists say", The Guardian, 11 Nov. 2021, World's militaries avoiding scrutiny over emissions, scientists say Greenhouse gas emissions The Guardian (Access 29.12.2023).

contemporary conflicts. CBRN weapons are highly effective in defeating enemies but cause extensive harm to all living organisms in the affected areas. Mustard gas, for example, contaminates the soil and remains hazardous for years. Radiation from nuclear detonations can linger in the environment for decades, with fallout capable of traveling great distances. Consequently, these weapons not only cause immediate casualties but also pose long-term dangers to organic life. Due to their devastating potential, the development and use of these weapons are closely regulated by international coalitions. Despite this, many have already caused significant environmental damage through testing and use in warfare.

Modern CBRN warfare has the potential to inflict severe environmental harm that humanity has fortunately not yet experienced.[6] The debate over the use of CBRN weapons has persisted for a long time. Scientists believe that even a limited nuclear conflict represents a grave threat to global ecology, potentially causing catastrophic climate and ecosystem disruptions.[7] Despite these dangers, nuclear weapons have been tested in various locations in the world. The production, testing, transport, and deployment of powerful CBRN weapons represent the most severe environmental consequences of war.

This chapter primarily examines the extensive environmental consequences of nuclear, biological, and chemical warfare, as well as the resulting ecological impacts.

Effects of Nuclear Wars

Nuclear warfare has both direct and indirect repercussions for the environment. The quick physical destruction caused by explosions, along with biospheric damage from ionizing radiation or radiotoxicity, has a substantial influence on ecosystems in the affected region. Furthermore, weapons-induced disturbances in the atmosphere or geosphere can cause changes in weather and climatic patterns. The atomic bombs of Hiroshima and Nagasaki are the only known instances of nuclear weapons being used in war, resulting in widespread devastation of infrastructure and enormous loss of life.

By the end of 1945, the bombings had resulted in up to 140,000 fatalities in Hiroshima and 80,000 in Nagasaki,[8] with around half of the deaths occurring on the day of the attacks. Radiation poisoning accounted for 15 to

[6] Jay E. Austin and Carl E. Bruch, The Environmental Consequences of War: Legal, Economic, and Scientific Perspectives, Cambridge University Press, 2010.
[7] Remus Prăvălie, "Nuclear Weapons Tests and Environmental Consequences: a Global Perspective", AMBIO, Vol. 43, 2014, pp. 729-744.
[8] Sustainable Community Action (SCA), "Environmental impact of war", https://sca21.fandom.com/wiki/Environmental impact_of_war#cite_note-rerf-deaths-3 (Access 19.11.2023).

20% of these deaths. In the aftermath, many more succumbed to leukemia (231 cases) and solid cancers (334 cases) due to radiation exposure.[9] These bombs had yields of approximately 15 kilotons and 21 kilotons of TNT respectively.[10] Despite the devastation witnessed in Hiroshima and Nagasaki, governments continue to defend their possession and potential use of nuclear weapons. Extensive research highlights the catastrophic effects of nuclear weapons on humans, animals, plants, and natural resources such as water bodies and soil. Recognized impacts include immediate fatalities, blunt trauma, thermal radiation, firestorms, radioactive fallout to surrounding areas, radiation sickness, cancer, and genetic disorders.[11]

Nuclear conflict would undoubtedly have a negative impact on the environment. Nuclear weapons have the potential to annihilate marine and terrestrial life through radiation contamination. Although their use has been heavily restricted since the U.S. bombings in Japan during World War II,[12] military experts remain concerned about the proliferation of nuclear materials as well as chemical and biological weapons.[13]

The long-term environmental consequences of a nuclear war often receive insufficient attention. The concept of "nuclear winter," which emerged in the mid-1980s, was significant in armaments reduction during that time[14] but has since faded from public discourse. Recent studies employing advanced climate models suggest that even a small-scale nuclear exchange could have profound global effects. For example, an exchange involving just 50 nuclear weapons could lower global temperatures by 1.25 degrees Celsius, resulting in shorter growing seasons and food shortages.[15] A larger nuclear conflict could be catastrophic, potentially reducing global temperatures by up to 7 degrees Celsius, leading to widespread famine and ecological disruption. Besides immediate blast casualties, radioactive fallout would spread globally,

[9] *Ibid.*
[10] World Nuclear Association, "Hiroshima, Nagasaki, and Subsequent Weapons Testing", Hiroshima, Nagasaki and Subsequent Weapons Testing - World Nuclear Association (world-nuclear.org) (Access 19.11.2023).
[11] Louis Maresca and Eleanor Mitchell, "The Human Cost and Legal Consequences of Nuclear Weapons under International Humanitarian Law", International Review of the Red Cross, 2015.
[12] United Nations, "Nuclear Weapons", https://disarmament.unoda.org/wmd/nuclear/ (Access 20.11.2023).
[13] U.S. Department of the Army, "Joint Publication 3 - 40 Joint Countering Weapons of Mass Destruction", https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_40.pdf (Access 20.11.2023).
[14] Owen B. Toon, Alan Robock and Richard P. Turco, "Environmental Consequences of Nuclear War", Physics Today, Vol. 61 (12), December 2008, pp. 37–42. https://web.archive.org/web/ 2012031 2010 1 14/http: //climate.envsci.rutgers.edu/pdf/ToonRobockTurcoPhysicsToday.pdf (Access 21.11.2023).
[15] "How nuclear war would affect the world climate and human health", Freeman Spogli Institute for International Studies, Aug 30, 2017, https://medium.com/freeman-spogli-institute-for-international-studies/how-nuclear-war-would-affect-the-world-climate-and-human-health-8b40b4668074 (Access 22.11.2023).

causing radiation sickness, cancer, and genetic mutations.[16]

There is an urgent need to refocus on the environmental consequences of nuclear conflict. The Nuclear Non-Proliferation Treaty (NPT) aims to limit the spread of nuclear weapons and technologies, encourage peaceful nuclear energy cooperation, and accelerate nuclear disarmament.[17] Despite these efforts, nuclear-armed states[18] are modernizing their arsenals, North Korea has emerged as a new nuclear power, and global nuclear arms control is in crisis.

It is critical to emphasize the environmental consequences of nuclear weapons. Participants in this agreement have voiced worry about the devastating humanitarian repercussions of nuclear weapons.[19] In the aftermath of a nuclear war, smoke and dust would spread through the stratosphere, darkening the sky and hindering photosynthesis. This would lead to severe crop failures, famine, and significant ecological disruption, similar to the event that caused the extinction of the dinosaurs. The devastation from larger bombs would cause immediate fatalities within a wide blast radius, and survivors would suffer severe burns and cancers. Radioactive fallout from detonations would spread globally, contaminating crops, livestock, and causing direct radiation sickness and cancer. Over time, this debris would cause genetic alterations in plants, animals, and humans, similar to the impacts of the Chernobyl tragedy.[20]

Nuclear blasts would set off large flames, with smoke from burning houses, oil and gas fields, refineries, and industrial locations emitting highly poisonous gases. Extensive forest fires would further the destruction, causing more deaths and property loss. The combined effects of wildfires, radioactive fallout, increased ultraviolet radiation, atmospheric oxygen depletion, elevated carbon dioxide levels, reduced sunlight, and temperature drops could culminate in widespread famine.[21] If agricultural and economic systems collapse or epidemics break out post-nuclear war, the death toll could escalate

[16] *Ibid.*
[17] "Treaty on the Non-Proliferation of Nuclear Weapons (NPT)", UN Office for Disarmament Affairs, https://disarmament.unoda.org/wmd/nuclear/npt/#:~:text=The%20NPT%20is%20a%20landmark,and%20general%20and%20complete%20disarmament (Access 22.11.2023).
[18] Five states are considered to be nuclear-weapon states (NWS) under the terms of the Treaty on the NPT. In order of acquisition of nuclear weapons, these are the US, Russia (the successor of the former Soviet Union), the UK, France, and China. Other states that possess nuclear weapons are India, Pakistan, and North Korea. Israel has nuclear warheads.
[19] Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, Final Document, Vol. 1, UN Doc. NPT/CONF.2010/50, 2010, p. 19.
[20] National Institutes of Health, "The genetic effects of Chernobyl radiation exposure", May 4, 2021, https://www.nih.gov/news-events/nih-research-matters/genetic-effects-chernobyl-radiation-exposure (Access 25.11.2023).
[21] Richard P. Turco, O. B. Toon, T. P. Ackerman, J. B. Pollack and C. Sagan, "Nuclear winter: global consequences of multple nuclear explosions", Science, Vol. 222(4630), 1983 Dec 23, pp. 1283-92, https://pubmed.ncbi.nlm.nih.gov/17773320/ (Access 29.11.2023).

dramatically, potentially reaching several hundred million in the worst-case scenario.[22]

The spread and usage of nuclear weapons, whether in peacetime or combat, have left a profound influence on the Earth's surface. By the late 1990s, about 2000 nuclear weapons tests had been performed globally.[23] These detonations pose a substantial threat to local biodiversity due to the partitioning of released energy into thermal (35%), kinetic (50%), and radioactive (15%) components.[24] Despite the global financial crisis of 2009, the Stockholm International Peace Research Institute (SIPRI) observed that military expenditure, arms production, and transfers between nations did not decline. In fact, military projects received over $1.5 trillion in funding globally, marking a 49% increase since 2000. Currently, an estimated 30,000 nuclear warheads exist worldwide, with the USA and Russia possessing 95% of them.[25]

Thermal Impacts of a Nuclear Bomb

Nuclear blasts' thermal emissions profoundly impact local ecosystems. At the epicenter, where temperatures can exceed 3000 degrees Celsius,[26] life is incinerated, as seen in the bombings of Japan.[27] Beyond this central point, a radial thermal wave (ranging from 100 to 1000 degrees Celsius) severely threatens vegetation, causing burning and defoliation similar to intense wildfires.[28] The amount of the plant damage is determined by parameters such as moisture content and the nature of the vegetation in the blast zone.

Thermal emissions have an indirect influence on nearby woods by causing

[22] Arthur M. Katz, Life After Nuclear War: the Economic and Social Impacts of Nuclear Attacks on the United States, Ballinger, Cambridge, Massachusetts, 1982.
[23] X. Yang, R. North and C. Romney, "Worldwide nuclear explosions", Int. Geophys., Vol. 81(B), 2003, pp. 1595-1600.
[24] S. Glasstone, "The effects of nuclear weapons", Available from the US Department of Defense, Washington DC, USA, OTSI, identification 972902, 1964, https://apps.dtic.mil/sti/ tr/pdf/ADA087568.pdf (Access 11.12.2023); H. L. Brode, "Review of nuclear weapons effects", Annu. Rev. Nucl. Sci., Vol. 18(1), 1968, pp. 153–202; M. Eisenbud, and T. F. Gesell, "Nuclear weapons", Environmental Radioactivity from Natural, Industrial & Military Sources, Academic Press, San Diego, CA, USA, 1997, pp. 271–314.
[25] "World Military Expenditure Increases Despite Financial Crisis", Global Research, SIPRI Yearbook, 2 June 2010, World Military Expenditure Increases Despite Financial Crisis - Global ResearchGlobal Research - Centre for Research on Globalization (Access 21.12.2023).
[26] H. L. Brode, "Review of nuclear weapons effects", Annu. Rev. Nucl. Sci., Vol. 18(1), 1968, pp. 153–202; V. S. Pinaev and V. A. Shcherbakov, "Fires caused by nuclear explosions and their consequences", Combust. Explos. Shock Waves, Vol. 32(5), 1996, pp. 572–576.
[27] J. Silberner, "Hiroshima & Nagasaki: thirty six years later, the struggle continues", Sci. News, Vol. 120 (18), 1981, pp. 284–285, 287.
[28] S. Glasstone, "The effects of nuclear weapons", Available from the US Department of Defense, Washington DC, USA, OTSI, identification 972902, 1964, https://apps.dtic.mil/sti/tr/pdf/ADA087568.pdf (Access 25.12.2023); R. J. Lifton, Death in life: survivors of Hiroshima, Random House, New York, NY, USA,1967.

and spreading wildfires, which impair both plant and animal populations.[29] There is scant research on the temperature effects of nuclear bombs on animals, including humans. However, exposure to these thermal waves can cause severe burns, with fatal burns occurring within a certain radius from the blast's epicenter.[30] This can lead to significant die-off events in local animal populations, potentially reducing species diversity in a short period. The severity of burns varies with distance from the epicenter, with animals in sheltered habitats potentially avoiding mass die-offs. However, the impact varies among species. For instance, rats on Bikini Atoll could evade thermal and kinetic emissions due to their subterranean habitats.[31] Thus, predicting the effects on animal populations requires consideration of such factors.

Blast Effects of a Nuclear Bomb

During a nuclear warhead detonation, approximately 50% of the total energy disperses radially from the epicenter, with blast energy comprising a significant portion.[32] This blast energy, ranging from 1 to over 3500 kPa, inflicts extensive damage on plants, stripping foliage, breaking branches, and uprooting vegetation.[33] Animals caught in the blast wave suffer various injuries, with terrestrial species experiencing overpressure injuries, such as severe lung damage and hemorrhaging.[34] While larger animals are generally less susceptible to these injuries, mortality rates rise with increased overpressure exposure. Debris and shrapnel carried by the blast further contribute to injuries and fatalities among animals.

[29] Michael J. Lawrence, Holly L. Stemberger, Aaron J. Zolderdo, Daniel P. Struthers and Steven J. Cooke, "The effects of modern war and military activities on biodiversity and the environment", Environmental Reviews, Vol. 23 (4), December 2015, pp. 443-460.
[30] A. W. Oughterson, G. V. LeRoy, A. A. Liebow, E. C. Hammond, H. L. Barnett, J. D. Rosenbaum and Schneider, B.A., Statistical analysis of the medical effects of the atomic bombs. Available from the Report of the Joint Commission for the Investigation of the Effects of the Atomic Bomb in Japan, Army Institute of Pathology, Report No. TID-5252, 1951, UNT Digital Library, https://digital.library.unt.edu/ark:/67531/metadc1025669/ (Access 25.12.2023).
[31] L. R. Donaldson, A. H. Seymour and A. E. Nevissi, "University of Washington's radioecological studies in the Marshall Islands, 1946–1977", Health Phys, Vol. 73 (1), 1997, pp. 214–222.
[32] P. A. Randall, "Damage to conventional and special types of residences exposed to nuclear effects", Available from the US Atomic Energy Commission, Washington, DC, USA. Report WT-1194, 1961, https://www.osti.gov/biblio/4029823 (Access 10.01.2024).
[33] L. M. Shields and P. V. Wells, "Effects of nuclear testing on desert vegetation", Science, Vol. 135 (3497), 1962, pp. 38–40; L. M. Shields, P. V. Wells and W. H. Rickard, "Vegetational recovery on atomic target areas in Nevada", Ecology, Vol. 44 (4), 1963, pp. 697–705.
[34] J. H. Jaffin, L. McKinney, R. C. Kinney, J. A. Cunningham, D. M. Mortiz, J. M. Kraimer, G. M. Graeber, J. B. Moe, J. M. Salander and J. W. Harmon, "A laboratory model for studying blast overpressure injury", J. Trauma, Vol. 27 (4), 1987, pp. 349–356.

Figure 1. Media Coverup of Impacts of U.S. Nuclear Weapons Testing on Native People in in the Pacific.

Aquatic organisms, particularly fish, are highly sensitive to blast effects due to their anatomical structures, resulting in significant fish die-offs following nuclear detonations. Marine mammals and diving birds also experience severe lung damage and increased mortality rates.[35] In contrast, invertebrates in aquatic systems are generally unaffected by pressure waves, although coral reefs can suffer extensive damage from warhead detonations, leading to widespread coral mortality.[36] While the immediate impacts of nuclear detonations result in a reduction in local flora and fauna, populations and biodiversity can recover over time through dispersal and contributions from surviving organisms.

Excluding humans from test locations has been shown to help in the recovery and flourishing of creatures in damaged places, such as the Marshall Islands atolls (See Fig. 1).[37]

Radiation Impacts of a Nuclear Bomb

Nuclear weapons emit energy in the form of ionizing radiation, such as gamma and X-rays, as well as radionuclides of various elements.[38] These emissions can impact life in multiple ways. In humans, acute radiation exposure can lead to radiation poisoning, manifesting as symptoms such as hemorrhaging, tissue destruction, and potentially death at high doses, as

[35] Michael J. Lawrence, L. J. Holly Stemberger, Aaron J. Zolderdo, Daniel P. Struthers and Steven J. Cooke, "The effects of modern war and military activities on biodiversity and the environment", Environmental Reviews, Vol. 23 (4), 2015, pp. 1-20.
[36] Z.T. Richards, M. Beger, S. Pinca and C. C. Wallace, "Bikini Atoll coral biodiversity resilience five decades after nuclear testing", Mar. Pollut., Bull. 56, 2008, pp. 503–515.
[37] J. S. Davis, "Scales of Eden: conservation and pristine devastation on Bikini Atoll", Environ. Plan. D, Vol. 25 (2), 2007, pp. 213-235.
[38] A. Aarkrog, "The radiological impact of the Chernobyl debris compared with that from nuclear weapons fallout", J. Environ. Radioact, Vol 6, 1988, pp. 151-162.

observed in the bombings of Japan.[39] Terrestrial mammals also face increased mortality from radiation exposure, often worsened by the synergistic effects of thermal energy.[40] Plants can suffer tissue damage and death from acute radiation exposure, with effects varying based on their developmental stage.

Radioactive exposure can have chronic effects on animal populations, increasing the incidence of chronic diseases like neoplasia and causing chromosomal and genetic abnormalities. While some species exhibit reduced reproductive capacities, others appear unaffected, potentially due to the immigration of unaffected individuals. The long-term effects of radiation exposure remain uncertain and may vary depending on the intensity and type of radiation.[41]

Despite these dangers, nuclear weapons test and manufacturing sites, which are frequently devoid of human activity owing to high radiation levels, can serve as crucial habitats for plant and animal species.[42] These areas often host diverse and thriving ecosystems compared to regions with routine human activity. Thus, despite potential chronic health impacts on resident organisms, these sites contribute positively to biodiversity conservation.[43]

Effects of Biological Wars

The Earth's biological resources play a crucial role in humanity's economic and social advancement. Consequently, there is increasing acknowledgment that biological diversity is a global asset of immense value to both present and future generations. However, the current threat to species and ecosystems has reached unprecedented levels.[44]

Biological warfare differs from conflicts involving other forms of WMD, which include chemical, radiological and nuclear warfare. Biological warfare, when compared to conventional weapons, which are primarily used for their explosive, kinetic, or incendiary capabilities, makes use of living microorganisms, toxins, or pathogens to cause harm.[45]

[39] T. Ohkita, "A. Acute Effects", J. Radiat. Res., Vol.16 (Suppl. 1), 1975, pp. 49-66.
[40] G. D. Ledney, T. B. Elliot and M. M. Moore, "Modulation of mortality by tissue trauma and sepsis in mice after radiation injury", The Biological Basis of Radiation Protection Practice, K. L. Mossan and W.A. Mills (Eds.) Williams and Wilkens, Baltimore, MD, USA, 1992, pp. 202-217.
[41] "Genetic Effecs of Radiation", National Research Council (US) Committee on the Biological Effects of Ionizing Radiation (BEIR V), Washington (DC), National Academies Press (US), 1990, https://www.ncbi.nlm.nih.gov/books/NBK218706/ (Access 10.01.2024).
[42] C. K. Wanebo, K. G. Johnson, K. Sato and T. W. Thorslund, "Breast cancer after exposure to the atomic bombings of Hiroshima and Nagasaki", N. Engl. J. Med., Vol. 279 (13), 1968, pp. 667-671.
[43] R. H. Gray and W. H. Rickard, "The protected area of Hanford as a refugium for native plants and animals", Environ. Conserv., Vol. 16 (03), 1989, pp. 251-260.
[44] "History of The Convention of Biological Diversity", https://www.cbd.int/history (Access 10.01.2024).
[45] Tamar Berger, Arik Eisenkraft, Erez Bar-Haim, Michael Kassirer, Adi Avniel Aran and Itay Fogel, "Toxins as biological weapons for terror—characteristics, challenges and medical countermeasures: a mini-review", Disaster Mil Med., Vol. 2 (7), 2016, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5330008/ (Access 10.01.2024).

Offensive biological warfare is a war crime under the Geneva Protocol of 1925 and numerous international humanitarian law treaties. The Biological Weapons Convention (BWC) of 1972 outlaws the creation, manufacture, acquisition, transfer, stockpiling, and use of biological weapons. The BWC does not ban defensive biological research for preventive or protective reasons.[46]

Biological weapons, often referred to as "bio-weapons" or "biological threat agents," encompass living organisms or replicating entities, including bacteria and viruses. These agents can cause diseases such as anthrax, brucellosis, tularemia, and plague. Bio-weapons and new disease outbreaks represent a severe threat to genetic diversity in populations of wild and domestic animals and plants, with the potential to wipe out endangered species.[47]

One challenge of biological warfare is its delayed effectiveness compared to nuclear or chemical attacks, as it can take days to manifest fully. Biological agents' uncontrollable nature further limits their utility. Despite their limitations, bioweapons can be used in a variety of ways to achieve strategic or tactical advantages over enemies.[48]

The increased risk of bio-weapons being employed in biological warfare or bioterrorism is an important concern. Many germs and poisons that may be used as biological weapons are easily obtained and mass-produced. The aerosolization of these biological agents can result in widespread fatalities.[49]

Biological warfare and chemical warfare share some commonalities, as toxins produced by living organisms fall under the purview of both the BWC and the Chemical Weapons Convention. Toxins and psychochemical weapons, known as midspectrum agents, typically have shorter incubation periods compared to bio-weapons.[50]

Biological warfare is extremely dangerous to both the environment and humans. Biological warfare has far-reaching consequences for the

[46] "Biological Weapons Convention", UN Office for Disarmament Affairs, https://disarmament.unoda.org/biological-weapons/ (Access 10.01.2024).
[47] Joseph F. Plat, "The Bioterrorism Threat: Technological and Political Considerations", Homeland Defense, Safeguard System Group, Los Alamos National Laboratory, 01 March 2000, https://www.osti.gov/servlets/purl/763997 (Access 12.01.2024); William P. Noel, "Bio-Terrorism Threat and Casualty Prevention", Sandia Report, SAND2000-0006, Sandia National Laboratories, January 2000, https://www.osti.gov/servlets/purl/750306 (Access 12.01.2024).
[48] Stefan Riedel, "Biological warfare and bioterrorism: a historical review", Proc (Bayl Univ Med Cent), Vol. 17 (4), 2004 Oct, pp. 400–406, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1200679/ (Access 10.01.2024).
[49] World Health Organization, "Biological Weapons", https://www.who.int/health-topics/biological-weapons#tab=tab_1 (Access 16.01.2024).
[50] Robert G. Darling and Erin E. Noste, "Future Biological and Chemical Weapons", Ciottone's Disaster Medicine, 2016, pp. 489–498, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7152330/ (Access 16.01.2024).

environment, biodiversity, and natural reserves. These include water, air, and soil pollution, food contamination, genetic diversity loss, invasive species introduction, and biodiversity loss.[51]

Efforts to control biological weapons are imperative from an ecological standpoint. Global attention is needed to prevent ecological disasters associated with bio-weapons, including the development of methods to detect and mitigate their effects.[52]

The 1992 Convention on Biological Diversity represents a significant step forward in the conservation and sustainable use of biological diversity, as well as the equitable distribution of benefits from the use of genetic resources. The convention, influenced by the global community's dedication to sustainable development, seeks to address emerging challenges to biodiversity and encourage its conservation.[53]

Effects of Chemical Wars

Chemical weapons (CW) refer to the utilization of chemical substances' toxic properties as armaments. These chemical agents, primarily inorganic, are employed in warfare to disrupt or incapacitate bodily functions, often resulting in varying degrees of disability or fatality.[54] The evolution of chemical warfare has led to the development of a wide array of compounds for both military and civilian applications, inadvertently causing significant environmental harm.[55]

The origins of chemical warfare trace back to ancient times. For instance, during the Trojan War in 431 BC, the Greeks utilized sulfur mixtures combined with pitch resin to produce suffocating fumes. Efforts to regulate chemical weapons can be dated back to a 1675 Franco-German agreement signed in Strasbourg.[56] Subsequently, the Brussels Convention in 1874 aimed to prohibit the use of poisoned weapons. The Hague Convention of 1899 strengthened these efforts by prohibiting projectiles that dispersed "asphyxiating or deleterious" gasses. This restriction was subsequently

[51] Joseph P. Dudley, "Bioweapons, Biodiversity, and Ecocide: Potential Effects of Biological Weapons on Biological Diversity", BioScience, Vol. 52, Jul 2002, pp. 583-592.
[52] Gigi Kwik Gronvall, "Prevention of the Development or Use of Biological Weapons", Health Secur., Vol. 15 (1), 2017 Feb. 1, pp. 36–37.
[53] "Convention on Biological Diversity", Republic of Türkiye Ministry of Foreign Affairs, https://www.mfa.gov.tr/convention-on-biological-diversity.en.mfa (Access 18.01.2024).
[54] Brendan M. Doran, "The Human and Environmental Effects of CBRN Weapons", Student Theses 2015-Present, 10, 2015, https://fordham.bepress.com/environ_2015/10 (Access 18.01.2024).
[55] "What is a Chemical Weapon?", Organizaton for the Prohibitation of Chemical Weapons (OPCW), https://www.opcw.org/our-work/what-chemical-weapon (Access 18.01.2024); Brendan M. Doran, "The Human and Environmental Effects of CBRN Weapons", Student Theses 2015-Present, 10, 2015, https://fordham.bepress.com/environ_2015/10 (Access 18.01.2024).
[56] "Introduction to Chemical and Biological Weapons", Carnegie Endowment for International Peace, https://carnegieendowment.org/research/2001/01/introduction-to-chemical-and-biological-weapons?lang=en (Access 19.01.2024).

tightened at the second Hague conference in 1907. Despite these agreements, major belligerents in World War I flagrantly disregarded the bans on chemical weapons established by the Hague Declaration of 1899 and the Hague Convention of 1907.[57]

The power vacuums engendered by warfare often lead to illegal competition over natural resources, exemplified by activities such as illegal logging, deliberate forest fires for land clearance, and the extraction of minerals using highly toxic methods. Throughout World War I, about 124,000 tons of chemicals were used in combat, with mustard gas being especially renowned for causing extensive deaths.[58] Despite being considered a military asset, chemical weapons accounted for only a small percentage of the overall casualties on the Western Front.[59] However, their usage resulted in significant environmental degradation, including soil erosion, deforestation, and water contamination.[60]

The humanitarian toll of chemical warfare became increasingly evident, prompting international agreements to curb their use. The Geneva Protocol,[61] adopted in 1925, prohibited the employment of chemical and biological weapons in conflict, but did not restrict their stockpiling or research. Nonetheless, subsequent conflicts saw the continued use of chemical agents, including nerve gases, by various nations, such as Italy in Ethiopia (1935-36), Japan in China during World War II (1938-42),[62] and in Yemen (1966-67).[63] New chemicals, such as Sarin, Soman, and VX, were developed for use in weapons, exacerbating the environmental consequences of warfare.[64]

[57] "Public health response to biological and chemical weapons", World Health Organization Geneva, 2004, https://iris.who.int/bitstream/handle/10665/42611/9241546158.pdf?sequence=1 (Access 19.01.2024).
[58] Gerard J. Fitzgerald, "Chemical Warfare and Medical Response During World War I", Am J Public Health, Vol. 98 (4), 2008 April, pp. 611–625.
[59] M. Meselson, "The Myth of Chemical Superweapons", The Bulletin of Atomic Scientists, April 1991, pp. 12-15; Henry Sokolski, "Looming Security Threats, Rethinking Bio-Chemical Dangers", Orbis, Spring 2000, http://www.wizard.net/~npec/papers/2-00fpri-full-vers.htm (Access 21.01.2024).
[60] Maria Poy, "Environmental Contamination and Warfare", Groundsure, Nov. 11, 2015, https://www.groundsure.com/environmental-contamination-and-warfare/ (Access 19.01.2024).
Brendan M. Doran, "The Human and Environmental Effects of CBRN Weapons", Student Theses 2015-Present, 10, 2015, https://fordham.bepress.com/environ_2015/10 (Access 21.12.2023).
[61] "The Geneva Protocol - Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare", UN Office for Disarmament Affairs, https://disarmament.unoda.org/wmd/bio/1925-geneva-protocol/ (Access 19.01.2024).
[62] Adam Wiercinski and Jeremy P. Jackson, "Nerve Agents", October 24, 2022, https://www.ncbi.nlm.nih.gov/books/NBK493158/ (Access 21.01.2024).
[63] Lina Grip and John Hart, "The use of chemical weapons in the 1935–36 Italo-Ethiopian War", SIPRI Arms Control and Non-proliferation Programmme, October 2009, https://www.sipri.org/sites/ default/files/Italo-Ethiopian-war.pdf (Access 27.01.2024).
[64] Gert G. Harigel, "Chemical and Biological Weapons: Use in Warfare, Impact on Society and Environment", Nuclear Age Peace Foundation, November 22, 2001, https://www.wagingpeace.org/chemical-and-biological-weapons-use-in-warfare-impact-on-society-and-environment/ (Access 27.01.2024).

The Vietnam War (1961-1973) witnessed the extensive use of chemical defoliants, causing widespread damage to public health and ecosystems.[65] Notably, the deployment of Agent Orange by the US military resulted in long-lasting environmental and health consequences, affecting millions of Vietnamese civilians and military personnel.[66] Similar environmental devastation occurred in Malaya during the Emergency period (1948–1960), where Agent Orange was also employed, albeit on a smaller scale than in Vietnam.[67]

The use of incendiary weapons like napalm during the Vietnam War further exacerbated environmental degradation, leading to the destruction of vast forested areas and loss of biodiversity. Furthermore, Saddam Hussein's use of chemical warfare during the Iran-Iraq War (1980-1988)[68] and on Kurdish people in Halabja (1987-1988) demonstrated the long-term threat presented by chemical weapons.[69]

Following wars such as the Gulf War (1990-1991), the environmental consequences of warfare became increasingly apparent.[70] The purposeful destruction of Kuwaiti oil wells and "the spilling of oil"[71] into the Persian Gulf culminated in one of history's biggest environmental disasters.[72] Similarly, ongoing conflicts, such as the war in Yemen and the Russo-Ukrainian War, continue to inflict severe environmental damage, including

[65] Joshua H. Daskin and Robert M. Pringle, "Warfare and wildlife declines in Africa's protected areas", Nature, Vol. 553 (7688), 2018, pp. 328-332.
[66] "Agent Orange", History, May 16, 2019, https://www.history.com/topics/vietnam-war/agent-orange-1 (Access 28.01.2024); Jessica King, "U.S. in first effort to clean up Agent Orange in Vietnam", 2012.08.10, CNN, Archived from the original on 2013.03.03, https://edition.cnn.com/ 2012/08/10/ world/ asia/ vietnam-us-agent-orange/ (Access 28.01.2024).
[67] Kua Kia Soong, "Who were the victims of Agent Orange in Malaya?", Malaysiakini, Feb. 1, 2021, https://www.malaysiakini.com/columns/561192 (Access 30.01.2024); "Agent Orange", United States Department of Veterans, January 9, 2008, Archived from the original on July 3, 2012. https://web.archive.org/web/20120703211712/http://www1.va.gov/agentorange/(Access 30.01.2024); "Pesticide Dilemma in the Third World: A Case Study of Malaysia", Phoenix Press, 1984, p. 23; Arnold Schecter, Thomas A. Gasiewicz, "Dioxins and Health", July 4, 2003, pp. 145–160; Albert J. Mauroni, "Chemical and Biological Warfare: A Reference Handbook", July 2003, pp. 178–180.
[68] Henry Sokolski, "Looming Security Threats, Rethinking Bio-Chemical Dangers", Orbis, Spring 2000, http://www.wizard.net/~npec/papers/2-00fpri-full-vers.htm (Access 30.01.2024).
[69] "Whatever Happened to The Iraqi Kurds?", March 11, 1991, https://www.hrw.org/legacy/reports/1991/IRAQ913.htm (Access 30.01.2024); Seçil Özdemir, "Iran-Iraq War: The Employment of Chemical Weapons", The Journal of Iranian Studies, E-ISSN: 2651-4370, Vol. 6 (1), 2022, pp. 105-133.
[70] UN Environment Program, "Why we need to protect biodiversity from harmful effects of war and armed conflict", 06 Nov. 2018, https://www.unep.org/news-and-stories/story/why-we-need-protect-biodiversity-harmful-effects-war-and-armed-conflict (Access 30.01.2024).
[71] Christopher Joyner and James Kirkhope, "The Persian Gulf War Oil Spill: Reassessing the Law of Environmental Protection and the Law of Armed Conflict", Case Western Reserve Journal of International Law, Vol. 24 (1), 1992, p. 29.
[72] O. Linden, A. Jerneloev and J. Egerup, "The Environmental Impacts of the Gulf War 1991", IIASA Interim Report, IIASA, Laxenburg, Austria: IR-04-019, 2004.

the contamination of water sources and destruction of critical ecosystems.[73]

Efforts to mitigate the environmental consequences of warfare have been hampered by the the continuous use of chemical weapons, as well as the destabilizing effects of armed conflict. Despite international accords such as the Chemical Weapons Convention (CWC)[74] of 1997, which sought to restrict the research, manufacturing, and use of chemical weapons, incidents of their usage continue,[75] highlighting the continued difficulty of addressing environmental degradation in war zones.[76]

Conclusion

Wars inevitably bring about devastation, leading to the widespread presence of hazardous materials, deceased wildlife, and an atmosphere laden with noxious fumes.[77] While daily headlines often fret over the repercussions of climate change, scant attention has been paid to the ramifications of CBRN conflicts. Among these, nuclear warfare stands out as the most perilous to the environment, capable of affecting the entire planet. Even a small-scale nuclear war would have disastrous climatic consequences: global temperatures might drop by up to 7 degrees Celsius for numerous years, reminiscent of the previous ice ages. Moreover, the stratospheric dispersion of smoke and dust would obscure the atmosphere, hindering photosynthesis, triggering widespread crop failures, famine, and ecological upheaval.

While a US-Russia conflict appears improbable presently, the potential launch of hundreds or even thousands of nuclear warheads deters states from resorting to such weapons. The concept of "nuclear winter", prominent in the mid-1980s, played a pivotal role in curtailing nuclear proliferation.[78] Despite its wane following the Soviet Union's collapse and the decline of the US and Russia's arsenals of nuclear arms, subsequent climate model studies in the mid-2000s underscored the heightened environmental impact of modern nuclear weapons. Fallout from these weapons' debris clouds could disseminate globally, contaminating agriculture and livestock, and causing

[73] Gabija Leclerc, "Russia's war on Ukraine: High environmental toll", European Parliamentary Research Service, PE 751.427, July 2023 https://www.europarl.europa.eu/ RegData/etudes/ ATAG/ 2023/ 751427/EPRS_ ATA(2023)751427_EN.pdf (Access 30.01.2024).
[74] "Chemical Weapons Convention", Organizaton for the Prohibitation of Chemical Weapons (OPCW), https://www.opcw.org/chemical-weapons-convention (Access 01.02.2024).
[75] "Cost of War", Watson Institute, November 2019, Environmental Costs | Costs of War (brown.edu) (Access 30.01.2024).
[76] "The Chemical Weapons Convention", SIPRI Fact sheet, April 1997, reproduced in SIPRI Yearbook 1993: World Armaments and Disarmament (Oxford University Press: Oxford, 1993), Appendix 14A, pp. 735-56; Convention on the Prohibition of the Development, Production, Stockpiling, and Use of Chemical Weapons And on Their Destruction, Summary and Text, Arms Control Today, October 1992, Supplement, 16 pages, and Arms Control Today, April 1997, pp. 15-28.
[77] "Cost of War", Watson Institute, November 2019, Environmental Costs | Costs of War (brown.edu) (Access 31.01.2024).
[78] Alan Robock, "Policy Implications of Nuclear Winter and Ideas for Solutions", AMBIO, Vol. 18, 1989, pp. 360-366.

radiation-related illnesses and cancers. Furthermore, nuclear detonations would ignite colossal fires, releasing highly toxic smoke from burning infrastructure and industrial facilities, exacerbating casualties and property damage.

The potential climatic cataclysm of nuclear conflict, if widely acknowledged, should serve as an even stronger deterrent. While the laws of war require avoiding injury to neutral states and noncombatants, medium- and large-scale nuclear confrontations would have far-reaching global climatic consequences, impacting even those who were not directly engaged. As the gradual disaster of global climate change worsens, the full scale of nuclear war's climatic destruction will become an urgent issue in world diplomacy.

Even though CBRN conflicts may seem improbable in the near term, vigilant monitoring of all CBRN incidents worldwide is imperative due to their direct and indirect consequences. Aside from the tremendous loss of human life, biodiversity and ecosystems are frequently the first victims, with wildlife and forests particularly ravaged. The intricate process of investigation and attribution necessitates collaborative efforts among authorities with diverse responsibilities. Hence, heightened attention should be devoted to CBRN weapons and incidents. Success in addressing this issue hinges on universal participation in UN-initiated agreements, coupled with the fulfillment of duties and cooperative efforts by all states cognizant of its gravity.

ECHOES OF THE PAST: POWER & COLONIAL IMPACT ON CONTEMPORARY CLIMATE POLITICS

Harun Abubakar Siddique[1], Abubacarr Kanagie[2], and Alhassan Abdulai[3]

Introduction

In the unfolding narrative of global political dynamics, particularly in the realms of climate change, economic policies, trade agreements, and environmental concerns, there is a compelling need to examine the intricate web of power relations that continues to shape the global landscape. This chapter seeks to provide a comprehensive analysis of these dynamics, exploring how historical patterns of influence and control persist in modern frameworks, from economic neocolonialism to climate change negotiations. Our exploration begins with an examination of the continuing impact of colonial legacies in current geopolitical and economic structures, where former colonial powers maintain influence over their erstwhile colonies through sophisticated, albeit subtle, mechanisms of control.

Central to this discourse is the concept of economic neocolonialism, manifesting in the 21st century through policies and practices that uphold the dominance of developed nations. The imbalance in global trade agreements, such as the Economic Partnership Agreements (EPAs) and the North American Free Trade Agreement (NAFTA), highlights the asymmetrical benefits favoring developed countries at the expense of developing ones. These agreements often result in significant economic and social ramifications, including the undermining of local industries and the erosion of sovereign policymaking capabilities.

Transitioning from economic to environmental concerns, this chapter delves into the power dynamics prevalent in climate negotiations. As the world grapples with the escalating climate crisis, the United Nations Framework Convention on Climate Change (UNFCCC) and its Conference of the Parties (COP) have become arenas where these dynamics are prominently displayed. Historical exploitation and resource extraction by colonial powers, particularly in the Global South, have not only contributed to environmental degradation but have also set the stage for current debates

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on climate justice and responsibility.

The legacy of these power imbalances is further illustrated through a detailed analysis of two pivotal moments in international climate politics: the Kyoto Protocol and the Paris Agreement. The Kyoto Protocol's approach, based on differentiated responsibilities, created a division between industrialized and developing nations, while the Paris Agreement's shift to voluntary commitments introduced new complexities. These developments highlight the persistent challenges faced by the Global South, including limited financial support, technological disparity, and constraints in policy-making capacity.

This chapter, therefore, aims to unravel these complex layers of power, equity, and responsibility that define our current global economic and environmental landscape. It underscores the importance of recognizing and addressing these historical and ongoing imbalances in order to forge more equitable and effective paths forward in both economic and environmental arenas.

Historical Perspectives, Colonial Legacies & Resource Exploitation

Colonial powers' historical exploitation of natural resources has profoundly shaped the economic, social, and environmental landscapes of colonized regions. This exploitation was not merely an economic endeavor, but a complex process embedded within the larger context of colonial domination and control. It was driven by the insatiable demand for wealth and resources by colonial powers seeking to enhance their economic and political status on the global stage. The legacy of this exploitation is still felt today, with many of the exploited regions continuing to grapple with the environmental degradation, economic dependency, and social upheaval that were initiated during the colonial period. This chapter aims to examine the methods colonial powers use to exploit natural resources, assess the impacts on colonized societies, draw parallels with contemporary resource extraction, and consider the ongoing legacy and ways to address it. Understanding this history is crucial in formulating equitable and sustainable approaches to resource management and economic development in the post-colonial world. The historical exploitation of natural resources by colonial powers in colonized areas is a complex and multifaceted topic that highlights the enduring legacy of colonialism and its parallels with contemporary resource extraction. This examination will delve into the methods, impacts, and continuing influences of colonial resource exploitation, drawing connections to modern practices.

Colonial Methods of Resource Exploitation

Colonial powers employed various strategies to extract natural resources

from their colonies. These methods included the imposition of systems that prioritized the extraction of valuable resources like minerals, oil, and agricultural products for the benefit of the colonial power. Colonizers often restructured the economies of colonized regions, focusing on monoculture or single-resource extraction, which disrupted local economies and ecologies. This resulted in a dependency model, where colonized regions became reliant on the colonial power for economic survival, facilitating continued exploitation[4].

Colonial powers utilized a myriad of strategies to exploit natural resources from their colonies, affecting both the ecological and social fabrics of these regions. Apart from restructuring economies towards monoculture and single-resource extraction, colonialists also introduced new crops and agricultural systems to maximize resource exploitation. For instance, the British gave preferential treatment to certain tree species, significantly impacting forest diversity in regions like Nagaland, and Northeast India.[5] Similarly, in Trinidad, colonial authorities organized a system for the constant search and exchange of plants, experimenting with new species to bolster resource extraction.[6] The exploitation of natural resources was intrinsically linked to the broader colonial aims of extracting super profits through the control of land, labour, and markets, often leading to the formation of distinct land and resource spaces in European neo-colonial countries.[7] This exploitation was not just economic but also cultural, as colonialism worked to eradicate the colonized's cultures, histories, and identities, perpetuating a cycle of dependency and exploitation.[8]

Moreover, the colonial enterprise was marked by extreme exploitation and monoculture, leading to atrocities and even genocide of indigenous populations as resources were extracted relentlessly.[9] One harrowing example of genocide during the colonial period is the destruction of the Cape San society under Dutch colonial rule between 1700 and 1795. This genocide was characterized by land confiscation, massacres, forced labor, and cultural suppression, which collectively aimed to annihilate the indigenous population of the region[10]. Another well-documented case is the German genocide of

[4] John Richards, The Unending Frontier: An Environmental History of the Early Modern World (Berkeley: University of California Press, 2003).
[5] S. Babu, "Clearing the Forest: Colonialism and Deforestation in Nagaland, Northeast India," IOSR Journal of Humanities and Social Science, vol. 19, pp. 14-16, 2014
[6] R. Pemberton, "The Trinidad botanic gardens and colonial resource development, 1818-1899," Revista/review Interamericana, vol. 29, 1999.
[7] O. Chumachenko, Y. Kryvoviaz, O. Kustovska, and I. Kolganova, "Protected Areas As A Basis For Biodiversity Conservation And Ecosystem Services In Europe: Assessment Of Ukraine's Contribution," 2022.
[8] N. Saito, "Settler Colonialism," in Settler Colonialism, Race, and the Law, 2020.
[9] C. Perrotta, "Plundering the World," 2020, pp. 55-75.
[10] M. Adhikari, "A total extinction confidently hoped for: the destruction of Cape San society under Dutch colonial rule, 1700–1795," Journal of Genocide Research, vol. 12, pp. 19 - 44, 2010.

the Herero tribe in Southwest Africa (now Namibia) between 1904 and 1905. This genocide is often referred to as the first genocide of the 20th century, marking a period of brutal colonial exploitation and mass murder.[11] Such strategies highlight the profound and often devastating impact colonialism had on the natural and human landscapes of colonized regions.

Impacts on Colonized Societies

The extraction of resources had profound impacts on colonized societies. It led to significant environmental degradation, including deforestation, soil depletion, and the loss of biodiversity. Additionally, the social fabric of these societies was altered; forced labor, displacement, and the disruption of traditional lifestyles were common. The wealth generated from this exploitation rarely benefited the local population; instead, it was funneled to the colonial powers, contributing to immense economic disparities that are still evident today[12]

The extraction of resources by colonial powers led to widespread and multifaceted impacts on colonized societies, deepening their environmental and social crises. Environmentally, extractivism in various forms, including hydroelectric developments, clearcut logging, mining, and oil and gas production, has been devastating. It threatens Indigenous peoples' land-based self-determination and creates contested, politicized landscapes, leading to the collapse of key ecosystems, loss of species and habitats, and reaching environmental tipping points. Socially, resource extraction has reshaped societal and institutional norms, aggravating state-society relations and intensifying struggles over land and mining rights. This often leads to increased social conflicts and a pervasive local resource curse, where communities face the adverse effects of pollution, displacement, and cultural disruption without seeing significant economic benefits[13][14].

In colonized societies, the forced labor and displacement accompanying these activities disrupted traditional lifestyles and cultural practices. Indigenous populations, in particular, faced severe challenges as their lands were appropriated and their ways of life were irreparably altered. Moreover, the wealth generated from this exploitation rarely benefited the local population. Instead, it was funneled to the colonial powers, contributing to immense economic disparities that persist in many of these regions today.

[11] Jeremiah J. Garsha, "Expanding Vergangenheitsbewältigung? German Repatriation of Colonial Artefacts and Human Remains," Journal of Genocide Research, vol. 22, pp. 46 - 61, 2020
[12] Walter Rodney, How Europe Underdeveloped Africa (Washington D.C.: Howard University Press, 1972).
[13] Anna J. Willow, "Indigenous Extractivism in Boreal Canada: Colonial Legacies, Contemporary Struggles and Sovereign Futures," Humanities research, vol. 5, 2016.
[14] Kristina Dietz and Bettina Engels, "Contested Extractivism, Society and the State: An Introduction," 2017

The social fabric of these societies was altered, with long-lasting effects on community structures, cultural identities, and economic resilience[15].

The long-term environmental and social impacts of colonial resource extraction are profound and far-reaching. Colonial expansion directly led to significant environmental degradation, including the depletion of the ozone layer, air pollution, loss of forests and biodiversity, and the extinction of numerous animal and plant species[16]. In Latin America, colonialism resulted not only in environmental destruction but also in severe economic disparities and the widespread elimination of indigenous populations, profoundly affecting the economic, environmental, and social well-being of these regions.[17] The cultural and ecological fabric of indigenous societies was especially disrupted. Traditional land and resource appropriation, impacts on culturally significant habitats, and resource alienation severely affected Indigenous Peoples' natural world and cultural practices.[18] This wholesale disruption devastated local ecosystems, destroyed traditional cultures and livelihoods, and impacted both ecological well-being and human health.[19]

Additionally, the process of extractivist has been environmentally and socially destructive, threatening Indigenous peoples' land-based self-determination and leading to contested, politicized landscapes.[20] The imposition of settler colonialism has further erased Indigenous legal orders and accountability mechanisms, complicating transformative engagement in resource extraction research and challenging the ability of these communities to protect their interests and maintain their cultural practices.[21]

Resource wars in the postcolonial era have further led to dispossession and death, with trans-local resistance emerging to promote participatory democracy through temporary coalitions with international and national groups.[22] These long-term effects underscore the need for a comprehensive understanding and redress of the historical injustices perpetuated by colonial

[15] Renard Sexton, "Unpacking the Local Resource Curse: How Externalities and Governance Shape Social Conflict," Journal of Conflict Resolution, vol. 64, pp. 640 - 673, 2019
[16] M. M. Akram & N. Zaidi, "Impact of Colonialism on Environment: A Socio-Ecological Study of Twilight in Delhi," Special Issue, 2021.
[17] Wanda Deifelt, "Decoloniality, Ecology and Sustainability," 2021.
[18] C. Dick et al., ""From the beginning of time": The colonial reconfiguration of native habitats and Indigenous resource practices on the British Columbia Coast," FACETS, 2022.
[19] Rob White, "Resource Extraction Leaves Something Behind: Environmental Justice and Mining," International Journal for Crime, Justice and Social Democracy, vol. 2, pp. 50-64, 2013.
[20] Anna J. Willow, "Indigenous Extractivism in Boreal Canada: Colonial Legacies, Contemporary Struggles and Sovereign Futures," Humanities research, vol. 5, 2016.
[21] V. Morgan et al., "Resource extraction and intersectoral research: Engaging accountable relations in the Environment Community Health Observatory Network," Environment and Planning C: Politics and Space, vol. 39, pp. 972 - 992, 2020.
[22] S. Banerjee, "Voices of the Governed: towards a theory of the translocal," Organization, vol. 18, pp. 323 - 344, 2011

resource extraction practices.

Parallels with Contemporary Resource Extraction

Modern-day resource extraction often mirrors the colonial model, albeit in a neo-colonial context. Multinational corporations, sometimes with the support of local elites, continue to exploit natural resources in less developed countries. These activities can lead to environmental degradation and social disruption, echoing the colonial experience. The primary difference is that today's exploitation is facilitated by global capitalist markets and often justified by the pursuit of economic development.[23]

in this context, postindustrial narratives of 'resource triumphalism' construct commodity-supply zones as contemporary 'badlands', playing a key role in the sociospatial ordering processes reminiscent of colonial practices.[24] Contemporary First Nations art, for instance, focuses on resource extraction and its links to settler colonial governance, articulating critical indigeneity and sovereignty.[25] This reflects how indigenous communities continue to face the consequences of resource extraction, which often coincides with or is adjacent to their traditional lands, presenting not only opportunities for wealth and sustainable development but also significant threats to their way of life and environment.[26]

Modern colonialism, characterized as a political system of economic exploitation, continues to extract resources from one territory for the benefit of another. This system is where a foreign population settles a territory previously occupied by indigenous peoples, echoing the colonial patterns of resource extraction and societal disruption. Moreover, extractivism in forms like hydroelectric developments, clearcut logging, mining, and unconventional oil and gas production, is an environmentally and socially destructive extension of the colonial societal structure. Arguments of 'green colonialism' employed by mining companies are determined by modern/colonial matrix power, showcasing how contemporary justifications for resource extraction are often couched in the language of environmentalism or development but continue to perpetuate exploitation.[27] Consequently, resource wars in the postcolonial era, leading to dispossession

[23] Michael Watts, "Resource Curse? Governmentality, Oil and Power in the Niger Delta, Nigeria," Geopolitics 9, no. 1 (2004): 50-80.
[24] G. Bridge, "Resource Triumphalism: Postindustrial Narratives of Primary Commodity Production," Environment and Planning A, vol. 33, pp. 2149 - 2173, 2001.
[25] E. Kisin, "Unsettling the contemporary: critical indigeneity and resources in art," Settler Colonial Studies, vol. 3, pp. 141 - 156, 2013.
[26] L. Godden et al., "Accommodating Interests in Resource Extraction: Indigenous Peoples, Local Communities and the Role of Law in Economic and Social Sustainability," Journal of Energy & Natural Resources Law, vol. 26, pp. 1 - 30, 2008.
[27] Nicholas S. Paliewicz, "Arguments of green colonialism: a post-dialectical reading of extractivism in the Americas," Argumentation and Advocacy, vol. 58, pp. 232 - 248, 2022

and death, reflect the continuation of colonial patterns where trans-local resistance emerges to promote participatory democracy through temporary coalitions with international and national groups.[28]

Climate Change as a Global Challenge & Global Nature of Climate Change

Climate change stands as a formidable global challenge, unequivocally transcending national borders, cultural divides, and socio-economic distinctions. It's a phenomenon that respects no boundaries, with its pervasive and profound impacts felt across every continent and ocean. Particularly acute are its effects in regions already grappling with vulnerability, many of which also bear the deep scars of colonial exploitation and historical neglect. These areas find themselves on the frontline of climatic upheaval, facing heightened risks and fewer resources to cope with the unfolding crisis. This chapter seeks to delve into the global dimensions of climate change, scrutinizing its complex impacts on vulnerable and historically colonized regions while emphasizing the critical need for a concerted, globally unified response.

The IPCC underscores the universal nature of climate change, noting its capacity to affect ecosystems, communities, and economies worldwide. It highlights the susceptibility of certain regions, especially those with historical burdens that exacerbate their current vulnerability.[29] The World Bank echoes this sentiment, stressing that while climate change is a universal threat, its impacts are unevenly distributed, often hitting hardest those least responsible for greenhouse gas emissions.[30]

Moreover, historical analyses reveal how colonial legacies have left many regions in a state of heightened susceptibility to environmental shocks. Scholars like Dipesh Chakrabarty have argued that the intersection of these historical inequities with the current climate crisis necessitates a rethinking of global histories and responsibilities, urging a more nuanced understanding of the global nature of climate change.[31] As nations strive to navigate this unprecedented challenge, the United Nations Framework Convention on Climate Change (UNFCCC) plays a pivotal role in fostering international cooperation and facilitating discussions around equitable and effective solutions. It emphasizes the importance of global solidarity and shared but differentiated responsibilities, recognizing the varied capacities and historical

[28] S. Banerjee, "Voices of the Governed: towards a theory of the translocal," Organization, vol. 18, pp. 323 - 344, 2011.
[29] Intergovernmental Panel on Climate Change (IPCC), "Summary for Policymakers," in Global Warming of 1.5°C (2018).
[30] World Bank, "Turn Down the Heat: Why a 4°C Warmer World Must be Avoided" (2012).
[31] Dipesh Chakrabarty, "The Climate of History: Four Theses," Critical Inquiry 35, no. 2 (2009): 197-222.

contributions to the problem among nations.[32]

Global Dimensions of Climate Change

Climate change, driven by the accumulation of greenhouse gases such as carbon dioxide, methane, and nitrous oxide, represents a global crisis. The primary source of these gases is the burning of fossil fuels — coal, oil, and natural gas — which powers economies, industries, and transportation systems worldwide. The release of these gases does not respect national borders; once emitted, they mix with the atmosphere, contributing to a global problem that affects every region on Earth. The effects of climate change are indeed widespread and varied, impacting not just the environment but also socio-economic and political structures globally.

The most direct effect of increased greenhouse gases is a rise in global average temperatures. This warming is not uniform, with some areas experiencing more significant changes than others. As temperatures rise, weather patterns shift, leading to changes in precipitation. Some regions experience prolonged droughts, while others face increased rainfall and flooding. These changes can disrupt agricultural practices, water resources, and natural ecosystems, with significant implications for food security and water availability.[33] The increased energy in the climate system also leads to more frequent and severe weather events. Hurricanes, typhoons, and cyclones are becoming more intense, and areas that previously did not experience such events may now face them. Similarly, heatwaves and cold snaps are more severe, posing risks to human health and affecting energy systems. The economic cost of these events is immense, often hitting the poorest communities the hardest.[34]

One of the most visible effects of global warming is the melting of ice caps and glaciers. This melting contributes to rising sea levels, which pose a significant threat to coastal communities around the world. Island nations and coastal cities are particularly vulnerable, facing the risk of flooding and, in some cases, complete submergence. This not only has implications for human settlements but also affects coastal ecosystems, such as coral reefs and mangroves, which are critical for biodiversity and local livelihoods.[35] The environmental changes brought about by climate change have profound socio-economic implications. Agriculture, fishing, and forestry, which are the primary livelihoods for millions of people, are particularly vulnerable to

[32] United Nations Framework Convention on Climate Change (UNFCCC), "The Paris Agreement" (2015).
[33] National Aeronautics and Space Administration, "The Effects of Climate Change" (2023).
[34] U.S. National Oceanic and Atmospheric Administration, "Billion-Dollar Weather and Climate Disasters: Overview" (2023).
[35] United Nations Environment Programme, "Rising Waters: The Causes and Consequences of Flooding in the United States" (2021).

climate shifts. Changes in temperature and precipitation patterns, as well as increased frequency of extreme events, can lead to crop failures, reduced fish catches, and forest fires. This not only affects food security and income but also can lead to displacement and migration, exacerbating social and political tensions.[36]Climate change also has significant political implications. Resource scarcity, displacement, and the economic costs of climate impacts can lead to increased tensions both within and between countries. The struggle for resources such as water and arable land can exacerbate existing conflicts and lead to new ones. Furthermore, the need for collective action against climate change challenges existing political structures and requires unprecedented levels of international cooperation.[37]

Impact on Vulnerable Regions

The most severe impacts of climate change are often felt in the world's most vulnerable regions, where environmental changes intersect with and exacerbate existing socio-economic challenges. Small island nations, for instance, are at the forefront of experiencing the dire consequences of rising sea levels and increased storm intensity. These nations often have limited land area and are faced with the existential threat of submersion, which could lead to the displacement of entire populations. In addition to the physical impacts, the threat to these nations' cultural heritage and identity is profound, as communities may be forced to abandon their ancestral lands and ways of life. The Intergovernmental Panel on Climate Change (IPCC) has highlighted the vulnerability of these regions, noting that even slight increases in sea level can have devastating effects on their economies and infrastructures.[38]

Drought-prone regions in Africa are experiencing more intense and prolonged dry periods, significantly impacting agricultural productivity and water availability. Studies have shown that climate change exacerbates existing vulnerabilities, leading to greater food insecurity and socio-economic instability.[39] In flood-prone areas of South Asia, increased rainfall variability and rising sea levels contribute to catastrophic flooding events. Research indicates that these events not only have immediate impacts on human life and property but also long-term consequences for health, livelihoods, and regional economies.[40]

[36] Food and Agriculture Organization of the United Nations, "The Impact of Disasters and Crises on Agriculture and Food Security" (2018).
[37] United Nations Security Council, "Climate Change and Security" (2023).
[38] Intergovernmental Panel on Climate Change, Special Report on the Ocean and Cryosphere in a Changing Climate (2019).
[39]National Research Council, Adapting to the Impacts of Climate Change (Washington, DC: The National Academies Press, 2010).
[40] M. Parry, O. Canziani, J. Palutikof, P. van der Linden, and C. Hanson, Eds., Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment

The Arctic is warming at an alarming rate, with temperatures increasing at nearly twice the global average. This rapid warming is causing extensive melting of sea ice and permafrost, leading to severe implications for local communities and wildlife. The Arctic Council, through its assessments, has documented the profound changes occurring in the region and their global implications, including potential shifts in weather patterns and increased accessibility for shipping and resource extraction.[41] The vulnerabilities of these regions are often amplified by historical factors such as colonialism. Colonial legacies have left many of these regions with economies dependent on a narrow range of activities, often linked to the extraction and export of natural resources. Scholars have examined how these historical patterns of economic exploitation have made these regions particularly susceptible to external shocks, including those brought about by climate change.[42]

Climate Change, Neocolonialism, And Environmental Exploitation

The interplay of climate change, neocolonialism, and environmental exploitation presents a complex, multifaceted challenge in the contemporary global landscape. These issues are interconnected, revealing deep-seated inequalities and systemic imbalances in global power structures. The devastating effects of climate change are felt across the globe, but the burden falls most heavily on those who contributed least to the problem. Developing nations, often situated in ecologically fragile regions, bear the brunt of rising sea levels, extreme weather events, and resource depletion. These nations historically played a minimal role in greenhouse gas emissions, yet they face the severe consequences of a warming planet fueled by industrialized nations. This disparity exposes a profound climate injustice, the uneven distribution of environmental burdens and benefits. The Paris Agreement, while acknowledging this inequity, falls short in addressing the historical responsibility of developed nations and providing adequate support for adaptation and mitigation measures in developing countries. Climate injustice refers to the uneven distribution of climate change impacts, disproportionately affecting developing countries despite their minimal contribution to global emissions[43]. These nations often lack the financial and technological resources to mitigate and adapt to climate change, exacerbating existing vulnerabilities. The injustice could be examined from the following points;

Report of the Intergovernmental Panel on Climate Change (Cambridge, UK: Cambridge University Press, 2007)

[41] Arctic Council, "Arctic Climate Impact Assessment" (2004).

[42] Walter Rodney, How Europe Underdeveloped Africa (Washington D.C.: Howard University Press, 1972).

[43] Roberts, J. T., & Parks, B. C. (2007). A Climate of Injustice: Global Inequality, North-South Politics, and Climate Policy. MIT Press.

i. Vulnerability and Impacts: Developing nations, particularly in regions like Sub-Saharan Africa and South Asia, are more susceptible to climate change impacts due to their geographical locations and reliance on climate-sensitive sectors like agriculture[44]. Extreme weather events, such as droughts and floods, have devastating effects on food security, livelihoods, and health[45]. The following are some of the factors that make developing countries more prone to the menace of climate change;

Geographical factors: Developing countries are often located in regions more vulnerable to climate change, such as low-lying islands and coastal areas, making them more susceptible to sea level rise, storm surges, and flooding.

Socioeconomic factors: Poverty, lack of infrastructure, and limited access to healthcare and education further exacerbate the impacts of climate change. These factors make it harder for communities to cope with extreme weather events and recover from disasters.

Climate-dependent livelihoods: Many developing countries rely heavily on agriculture, fishing, and tourism, which are highly sensitive to changes in temperature, rainfall, and weather patterns. Climate change disrupts these livelihoods, leading to food insecurity, economic instability, and increased migration.

In various parts of the world, the impact of climate change is evident through specific examples: In the Sahel region, prolonged droughts have severely undermined agricultural productivity, leading to widespread food insecurity and malnutrition. In Bangladesh, a combination of rising sea levels and extreme weather events has escalated the incidence of flooding, resulting in the displacement of millions and the devastation of agricultural lands. Similarly, the Pacific Islands are facing an upsurge in the intensity and frequency of cyclones, which have inflicted considerable damage on infrastructure, homes, and the economic livelihoods of the residents.

ii. Historical Emissions and Responsibility: The principle of "common but differentiated responsibilities" recognizes that industrialized countries bear a larger burden for historical greenhouse gas emissions[46]. Yet, this principle has not fully translated into equitable climate action or support for affected developing nations. Because of;

Unequal distribution of historical emissions: Developed nations like the United States, Europe, and Japan have historically contributed far more to atmospheric greenhouse gas concentrations than developing nations. Around

[44] Mertz, O., Halsnæs, K., Olesen, J. E., & Rasmussen, K. (2009). Adaptation to climate change in developing countries. Environmental Management, 43(5), 743-752.

[45] IPCC. (2014). Climate Change 2014: Impacts, Adaptation, and Vulnerability.

[46] United Nations Framework Convention on Climate Change, 1992

60% of the CO2 released since the Industrial Revolution originated from just 20 countries, highlighting the uneven global legacy of emissions.[47]

Development disparities: Developing nations often lack the financial and technological resources to transition to low-carbon economies, as their primary focus remains on addressing poverty and basic needs. This creates a situation where the principle of "common but differentiated responsibilities" seems impractical unless accompanied by robust international support.

The current framework of the UNFCCC faces several limitations, including a lack of enforcement mechanisms. Without legally binding provisions, developed nations are not held accountable for their historical emissions, nor are they compelled to support developing countries adequately. This results in voluntary, often unmet pledges, impeding equitable climate action. Additionally, political and economic challenges in developed countries, such as competing priorities and budgetary constraints, hinder their ability to provide significant financial and technological assistance. The shifting dynamics of emissions also present a complication; as some developing countries undergo rapid economic growth, their increasing emissions challenge the application of the "differentiated" responsibility principle, necessitating a more nuanced approach to historical and current contributions. Moreover, while international mechanisms like the Green Climate Fund are designed to support developing nations in adaptation and mitigation, the effectiveness and sufficiency of this support remain controversial and debatable.

Economic Neocolonialism in the 21st Century?

Neocolonialism in the 21st century manifests through economic policies and practices that maintain the dominance of developed nations over former colonies[48]. This dynamic is evident in various forms, including trade agreements and debt. The following highlights the inequality in the transactions on the globe;

i. Unequal Trade Agreements: Trade agreements often favor developed countries, with asymmetrical benefits and protections. For instance, the Economic Partnership Agreements (EPAs) between the European Union and African, Caribbean, and Pacific countries have been criticized for undermining local industries in favor of European goods.[49]

[47] Frielingdstein et al. (2019): This scientific report provides detailed data on historical emissions by country, showing that the top 20 emitters contributed over 62% of cumulative CO2 emissions from 1750 to 2017. (Source: https://www.earth-system-science-data.net/about/news_and_press/2022-11-11_global-carbon-budget-2022.html)
[48] Ndlovu-Gatsheni, S. J. (2013). Empire, Global Coloniality and African Subjectivity. Berghahn Books.
[49] Hurt, S. R. (2003). Co-operation and coercion? The Cotonou Agreement between the European Union

Asymmetrical benefits and protections: Many trade agreements, particularly those between developed and developing nations, lack balance. Developed countries often enjoy lower tariffs and market access for their goods and services, while developing countries face high tariffs and restrictions on their exports. This can flood developing nations with cheap goods from developed countries, undercutting local industries and stifling economic diversification.

Loss of sovereignty and policy space: Trade agreements often include clauses that limit the ability of developing countries to implement policies that could protect their industries or regulate foreign corporations. This can undermine their ability to pursue development strategies that prioritize public welfare and environmental sustainability.

Intellectual property rights: Agreements like the Trade-Related Aspects of Intellectual Property Rights (TRIPS) agreement can make it more expensive for developing countries to access essential medicines and technologies. This can limit access to healthcare and hinder technological development.

Economic Partnership Agreements (EPAs) and the North American Free Trade Agreement (NAFTA) serve as pertinent examples of contentious trade agreements. EPAs, particularly those between the European Union and countries in Africa, the Caribbean, and the Pacific, have drawn criticism for their negative effects on local industries. These agreements often result in the flooding of ACP markets with European agricultural products, which undermines local farmers and diminishes food security. On the other hand, NAFTA, though not directly a product of colonialism, is frequently highlighted as an example of an imbalanced trade deal. It has been blamed for causing job losses in the United States and environmental degradation in Mexico, showcasing the complex repercussions of such large-scale trade agreements on participating countries.

Implications of unequal trade agreements include exacerbating the development gap between affluent and impoverished nations, as they often perpetuate a reliance on developed countries for goods and services, hindering the ability of developing countries to escape poverty. These agreements can also result in adverse social and environmental impacts, such as job losses, poverty escalation, and environmental degradation in less developed nations. Moreover, they can erode democracy and sovereignty, compromising the capacity of developing countries to independently dictate their economic and environmental policies, thus weakening democratic structures and limiting governmental responsiveness to their citizens' needs.

ii. Debt Burdens: The debt crisis in many developing countries,

and ACP states and the end of the Lomé Convention. Third World Quarterly, 24(1), 161-176.

exacerbated by structural adjustment programs imposed by the International Monetary Fund and the World Bank, perpetuates economic dependence and limits sovereign policy space[50]. This debt trap is a modern form of economic control akin to colonial-era exploitation.

The dynamics of the debt trap, particularly within the context of Structural Adjustment Programmes (SAPs) and economic dependency, manifest through various mechanisms as dictated by the International Monetary Fund (IMF) and the World Bank. These institutions frequently mandate policies such as austerity, deregulation, and privatization under the guise of fostering economic growth. However, the implementation of austerity measures can exacerbate debt burdens by necessitating cuts in crucial social services and investments, thus impeding development and compelling nations to incur further debt to satisfy fundamental needs. Simultaneously, the push towards deregulation and privatization often disproportionately benefits foreign corporations and investors, leading to a systematic extraction of resources and profits from developing economies. This not only shifts economic power to external entities but also perpetuates financial dependence. Furthermore, SAPs commonly impose conditionalities that severely restrict a government's capacity to formulate and execute independent economic and social policies tailored to the welfare of its populace, thereby limiting sovereign policy space and reinforcing economic vulnerabilities.

Developing countries often fall into cycles of unsustainable debt and resource extraction reminiscent of colonial-era control and exploitation. These cycles are driven by unfavorable loan terms, including high interest rates, hidden fees, and opaque agreements from private lenders and international institutions, making debts challenging to manage. Moreover, loans often tied to resource extraction projects can lead to reliance on export-oriented industries, which leaves countries vulnerable to commodity price fluctuations and environmental degradation. This debt burden can erode national sovereignty, forcing governments to prioritize creditor demands over their citizens' needs and limiting control over economic destinies, a situation that parallels historical colonial exploitation. Furthermore, the contemporary manifestations of this neocolonialism are evident in the intergenerational burden of high debt levels, perpetuating dependence and obstructing long-term development. Additionally, the associated austerity measures and resource extraction practices can worsen poverty, inequality, and environmental harm, reflecting the damaging legacy of colonialism.

The specter of colonialism may recede into the annals of history, but its shadow stretches long into the 21st century in the form of neocolonial economic structures. Unequal trade agreements, laden with unfair terms and

[50] Stiglitz, J. E. (2002). Globalization and its Discontents. W. W. Norton & Company.

trade barriers, continue to benefit the economic interests of developed nations at the expense of developing ones. The exploitation of cheap labor and natural resources, often in former colonies, fuels the engine of global capitalism, leaving developing nations trapped in a cycle of debt and resource dependency. There is the persistence of extractive economic models that echo colonial patterns, enriching elites while perpetuating poverty and underdevelopment[51]. The crippling debt burdens borne by many developing nations, often incurred under colonial or neocolonial pressures, further exacerbate this dynamic, limiting their ability to invest in sustainable development and pursue climate-resilient pathways.

Environmental Exploitation

Environmental exploitation in previously colonized regions is often the result of external policies and practices prioritizing resource extraction over ecological and social considerations[52]. This issue is closely tied to the broader themes of neocolonialism and climate injustice.

The extraction of natural resources, such as minerals, oil, and timber, by multinational corporations often occurs at the expense of local environments and communities. The "resource curse" theory posits that countries abundant in natural resources often face negative developmental consequences stemming from their exploitation[53]. This phenomenon is deeply rooted in historical contexts where colonial powers extensively exploited resources in their colonies, largely ignoring environmental sustainability and the well-being of local communities. Such exploitation has left a lasting impact, evident in present-day inequitable trade agreements, disproportionate control over resource wealth, and continued unsustainable extraction methods. Additionally, contemporary manifestations of these colonial legacies are seen in the practices of multinational corporations. These entities frequently engage in land acquisitions for resource extraction, a process that often involves the displacement of local communities, mirroring past colonial dispossession tactics. These displacements typically occur without proper compensation or consultation. Furthermore, the prevalent power imbalances in these regions often result in exploitative contracts and practices, wherein corporate interests in profit maximization overshadow the need for environmental stewardship and social responsibility, akin to historical colonial extraction agreements.

The multifaceted consequences and social costs of unsustainable resource

[51] Chakrabarty, D. (2007). Provincializing Europe: Postcolonial thought and historical difference. Princeton University Press.
[52] Le Billon, P. (2001). The political ecology of war: Natural resources and armed conflicts. Political Geography, 20(5), 561-584.
[53] Auty, R. M. (1993). Sustaining Development in Mineral Economies: The Resource Curse Thesis. Routledge.

extraction extend across environmental, health, socio-economic, and political dimensions. Environmental degradation is a primary concern, as these practices often lead to deforestation, water and air pollution, and a significant loss of biodiversity, thereby threatening ecosystems and the livelihoods dependent on them. Concurrently, these environmental issues give rise to serious health repercussions for local communities, who may suffer from increased respiratory illnesses, waterborne diseases, and a scarcity of essential resources. Moreover, the process of resource extraction frequently instigates social conflict and exacerbates existing inequalities, often fueling corruption and tension between local communities and extracting corporations. This phenomenon ties into the broader concept of the 'resource curse,' a paradox wherein countries rich in natural resources find themselves trapped in a cycle of poverty and underdevelopment. Manifestations of this curse include the Dutch disease, where a boom in resource revenues leads to a stronger national currency, rendering other economic sectors, such as manufacturing, less competitive internationally. Additionally, the influx of resource wealth often leads to weakened institutional structures and rampant corruption, further undermining development efforts. The overemphasis on resource extraction not only neglects other crucial economic sectors but also leaves countries highly vulnerable to the volatility of resource prices and ongoing environmental degradation.

Indigenous and local communities are disproportionately affected by resource extraction due to a confluence of historical injustices and systemic vulnerabilities. These communities, frequently marginalized and politically underrepresented, find themselves particularly susceptible to the adverse effects of such activities.[54] This susceptibility is not only a result of contemporary socio-political dynamics but is also deeply rooted in historical contexts, particularly the dispossession of land which has long been a source of disenfranchisement for these groups. Furthermore, the impact transcends the physical and economic realms, profoundly affecting the cultural and spiritual dimensions of these communities. The loss of ancestral lands and the resultant environmental degradation pose significant threats to the preservation of traditional practices, severing spiritual ties to the land and leading to a gradual erosion of cultural identity. This multifaceted impact underscores the complex and layered challenges faced by indigenous and local communities in the face of resource extraction and environmental changes. The role of international environmental governance in addressing these challenges is crucial but remains limited. Efforts like the United Nations Convention on Biological Diversity (CBD) and various environmental protocols attempt to regulate and mitigate the impacts of environmental

[54] United Nations. World Social Report 2023: Inequality in a Rapidly Changing World. United Nations Department of Economic and Social Affairs.

exploitation, but their effectiveness is often hampered by enforcement issues and power imbalances[55].

Addressing the intertwined injustices of climate change, neocolonialism, and environmental exploitation demands a fundamental shift in perspective and action. Developed nations must acknowledge their historical and ongoing responsibility for the present crisis and commit to substantial financial and technological support for developing countries. Trade agreements and economic partnerships need to be renegotiated to promote fair terms and equitable growth. Environmental policies must prioritize ecological sustainability and respect for Indigenous rights and knowledge systems. Only by dismantling the structures of neocolonialism and environmental exploitation can we pave the way for a truly just and sustainable future for all.

Power Dynamics in Climate Negotiations

The calls for collective action in addressing the climate crisis in a world that is fast approaching tipping points where climate chaos might become inevitable is taking center stage[56], with the United Nations Framework Convention on Climate Change (UNFCCC's) Conference of the Parties (COP) serving as the supreme decision-making body of the UNFCCC's climate convention held annually.[57] The power dynamics in these negotiations play a crucial role in shaping the world's commitment to limiting global mean temperature well below 2 degrees Celsius above pre-industrial levels before the turn of the next century. Recent concerns have however highlighted the need for a thorough analysis of the "gatekeepers" to climate governance, the power structures that exist as well as historical power imbalances. This has therefore given rise to questions on climate injustice in this current climate regime.[58] The discussion has taken diverse shapes and forms but, in this chapter, we will explore the power dynamics that exist between the economically developed industrialized nations and the developing world commonly referred to as the Global North and Global South respectively.

History is replete with colonization accompanied by the exploitation of resources by the colonial powers in their colonies particularly in the global south. Sufficient to mention is the exploitation of Africa by the Western

[55] Morgera, E. (2011). International environmental law and biodiversity. Environmental Policy and Law, 41(1-2), 27-33.
[56] NRDC. 2022. "Climate Tipping Points Are Closer Than Once Thought." NRDC. Accessed January 24, 2024. https://www.nrdc.org/stories/climate-tipping-points-are-closer-once-thought.
[57] Kuyper, Jonathan, Heike Schroeder, and Björn-Ola Linnér. "The Evolution of the UNFCCC." Annual Review of Environment and Resources 43 (2018): 343-368.
[58] Schlosberg, David, and Lisette B. Collins. "From environmental to climate justice: climate change and the discourse of environmental justice." Wiley Interdisciplinary Reviews: Climate Change 5, no. 3 (2014): 359-374.

world since 1500 which made ginormous contributions to the economies of 3 continents (South America, North America and Europe).[59] These extractive legacies stemming from the complete disappearance of forests to the pollution of water bodies served as the smoking gun pointing to the total disregard of colonizers for the environment of their colonies. It further presents a picture of a power whose primary objective was economic dominance with little or no regard for environmental consequences or human rights abuses. This unhealthy destruction of the environment to keep the industries in the industrialized nations running created the first imbalance, a huge disservice to Mother Nature the consequences of which will be felt centuries later.

There is need for powerful states to commit to undoing the structural inequalities created by their colonial extractivist legacies. The extraction of resources such as fossil extraction, forestry and minerals denied the populations of these colonies an equitable share in the economic benefits. These extractive legacies over the years have led to the depletion of "renewable" natural resources such as forests and fertility of soils at a rate which is rendering these resources non-renewable.[60] *Special Rapporteur E. Tendayi Achiume to the Human Rights Council on racial inequality and discrimination*

The developmental trajectory of the global North and its prosperity in both colonial and neocolonial periods focused on the exploitation of raw materials essential for the success of its industries to the detriment of the countries concerned[61]. The net-effect of colonization on colonies therefore was negative with reports indicating that Africa's per capita income expressed as a percentage of the per capita income of the West declined by 55% in 1500, to 22% in 1913 to 6% as at 2011[59]. As Voskoboynik 2018 aptly put it, human have a tendency of being more empathetic to land which is theirs and people who look like them[62]. This therefore begets a sense of moral dissociation which largely accounted for colonial powers giving little importance to the people, cultures and lands of their colonies. An analysis by Maddison in the year 2007 showed a staggering decline in the share of Africa's GDP between 1500 to 2003 declining from 8 percent to 3 percent[63].

This decline in GDP of the developing world coupled with other

[59] Terreblanche, Sampie. "The exploitation of Africa and Africans by the Western World since 1500 A bids eyeview." In Ubuntu conference at the law faculty of the University of Pretoria. 2011.
[60] "Global Extractivism and Racial Equality." Report A/HRC/41/54. Published May 14, 2019. Accessed January 24, 2024. https://www.ohchr.org/en/documents/thematic-reports/ahrc4154-global-extractivism-and-racial-equality-report-special.
[61] Singh, Nishtha. "Climate Justice in the Global South: Understanding the Environmental Legacy of Colonialism." Global Climate Justice: 46.
[62] Voskoboynik, Daniel Macmillen. The Memory We Could Be: Overcoming Fear to Create Our Ecological Future. New Society Publishers, 2018.
[63] Maddison, Angus. "The west and the rest in the world economy: 1000-2030." World Economics 9, no. 4 (2008): 75-99.

challenges these nations are grappling with such as corruption and authoritarian governments as well as exploitative capitalism, essentially divert the attention of many of these nations from the climate change crises, net zero and just transition[61]. There is therefore an urgent call for social sustainable development in the global south which will in turn play a crucial role in advancing climate change mitigation and adaptation ambitions. The changing climate crisis calls for resilience which leaves the developing nations at a disadvantage with lessons from the COVID-19 pandemic further defining how weak the developing economies are to these major shocks. The pandemic indicated that the developed economies were better equipped to handle the crisis and any natural disaster with a greater ability to bounce back from the ills posed by these shocks[64]. The same could not be said about developing nations hence the need for these nations to speed up their developmental trajectories to help build resilience. However, it is important to mention that the blueprint for development laid down by the global north is environmentally exploitative and accounts for decades of ecological destruction. The adoption of approaches employed by the developed world will therefore pose more harm to the environment and further worsen the climate change crisis.

This then begets the following questions:

- *Who gets to pay for the unsustainable exploitative legacies which drove the world into the climate crisis?*
- *What happens to developing nations that have untapped natural resources that serve as raw materials and fetch foreign exchange for development?*
- *How much power should the developed world wield in climate negotiations?*
- *What commitments and resolutions enforce a sense of fairness in climate change negotiations and what pledges are deemed a fair payment for the decades of pollution by the advanced economies?*

These questions and many more call for a need to work on two fronts; reducing social as well as historical injustice and abating greenhouse gas emissions[61]. This will involve earnestly rectifying historical wrongs as well as the investigation of current socio-economic practices. To promote global cooperation to redress the imbalance in this world, the United Nations Conference of Parties plays the role of the ideal platform. Set with the task of making discussions easier COP, as a global assembly, figures out how limiting human impact on the biosphere can be best set-in practice, thus leading us toward a future of social and environmental justice. One might ask, what constitutes power in climate negotiations at COP and does it disadvantage some parties? The submission below tries to unravel the existing

[64] World Bank. "The economy in the time of COVID-19." (2020).

power structures that exist and which power structures can effectively help restore balance and fairness in climate change negotiations.

Understanding What Constitutes Power

It is important to point out that power in the realm of international relations is traditionally conceptualized in largely material terms. This is why standard approaches to power encompass things like military power, economic dependency and the availability of natural resources; all of which together form the foundation for political hegemony[65]. According to one version of this theory, whoever is armed with the greatest military forces or who owns the largest capital can pursue his designs with a fair chance to win. This "hard power" approach can also provide key insights into a number of developments. Recent global escalations such as the invasion of Ukraine by Russia and the other such instances clearly demonstrate the concept of hard power approach[66].

However, hard power theory loses its applicability in the context of global warming. No country, regardless of its military might or economic weight, can force another country to halt global warming[66]. This subject has taken a different form, that is power in global warming in terms of necessary ability. The answer to this question involves tangible capabilities, in particular the control over important greenhouse gases and significant funding for implementing mitigation measures[67]. The advanced economies with nations such as the US, Canada, Australia, the EU, and the emerging giants in the BASIC group (Brazil, South Africa, India, China) are major players in global climate change discussions. Their influence is, of course, shaped by domestic political dynamics, but they have a basic capacity for change[68]. For many of these influential actors, there is currently a frustrating lack of willingness to use that power to truly engage the problem of climate change head-on.

This forces us to take a second look at the existing power conceptions based off the work of Barnett and Duvall 2005 who helped develop the power taxonomy which presents four different kinds of Power[69]. These are *structural, productive, compulsory and institutional power*.

A structural power works to shape and direct the framework of a given

[65] Wagner, Jan-Philipp NE. "The effectiveness of soft & hard power in contemporary international relations." E-International Relations (2014): 1-2.
[66] Milkoreit, Manjana. "What is Power in the Global Climate Negotiations?" January 2014. https://sustainability-innovation.asu.edu//wp-content/uploads/sites/15/2014/08/ccc-brief-no5.pdf
[67] Caney, Simon. "Climate change and the duties of the advantaged." In Intergenerational Justice, pp. 321-346. Routledge, 2017.
[68] Lemos, Maria Carmen, Arun Agrawal, Hallie Eakin, Don R. Nelson, Nathan L. Engle, and Owen Johns. "Building adaptive capacity to climate change in less developed countries." Climate science for serving society: Research, modeling and prediction priorities (2013): 437-457.
[69] Barnett, Michael, and Raymond Duvall. "Power in international politics." International organization 59, no. 1 (2005): 39-75.

system, as well as the larger society, going far beyond direct coercion or control. Such power attempts to shape the rules, norms, and institutions through which conflicts are mediated, and both resources and wealth are distributed. An example of structural power might be a government's use and enforcement of laws about licensing and economic activity that certainly shape the overall economic structure.

Productive power also referred to as soft power entails a party's ability to influence how people think, to control or shape the creation, distribution, or allocation of resources, goods, and services. Tied closely to economic and industrial processes, for instance, any corporation or coalitions of corporations that dominate a strategically important sector of the economy and who control aspects of the creation and distribution of certain goods, exercise something close to productive power, as they shape market and resource dependencies.

Compulsory power exhibits a relationship where the one who is holding power is able to force others to behave in a particular way, whether they want to or not. It involves the use of force, authority or any other means of enforcement. An example would be the government's ability to enforce laws and punish lawbreakers with arrests, fines, or imprisonment. By doing so, they are able to compel citizens to obey particular rules and conform to certain behavioral norms.

Institutional power is that which resides in the institutions of society, such as the governmental, religious, educational and social systems. It includes the ability to make decisions that people will follow. It is a function of (a) the roles that people enact, such as teacher, and (b) the power that people have of others within those roles. For example, educational institutions exercise power over knowledge, values and modes of comprehension, thereby contributing to the process of socializing children and young adults. In addition, educational institutions also exert influence over our culture and societal norms.

When applied to global climate negotiations, this taxonomy has three out of four categories that appear ineffective both in terms of thorough understanding and influencing power dynamics within the UNFCCC negotiations. Coercive power has little relevance as it is impractical to compel nations to reduce greenhouse gas emissions or contribute towards climate finance. The UN is an ongoing process of establishing global institutions and its procedural rules are less effective due to repeated rule violations such as

Bolivia's objections in 2009[70] and Russia's in 2012[71] and United States of America cessation to participate in the Paris Agreement on climate change mitigation efforts, stating that the agreement would "undermine" the U.S. economy, and put the U.S. "at a permanent disadvantage" in 2019. Structural power becomes important in light of disparities in sources of emissions, economic wealth and climate vulnerability among the negotiating parties. Global climate politics are shaped by the dynamics between developed and developing nations, or the Global North and South. Nevertheless, with the exception of emerging powers within BASIC coalition, little will change in this scenario over short to medium term thus limiting avenues for transformative impact.

This therefore makes a case for productive or soft power a central player in the global climate change governance because entails a party's ability to influence how people think, to control or shape the creation, distribution, or allocation of resources, which lead scholars to question when ideas can become powerful.

Are Ideas Powerful Enough?

Questioning if a compilation of ideas could make a difference in the minds of people who are in possession of significant resources and hence promote effective multilateralism without necessarily relying on hard power capacities is raised when one explores the power of ideas. The current academic debate has no definite response, thus necessitating looking into historical situations. Moral ideas and those shaping social norms particularly bound up with selfhood and sense of place have proved to be powerful. However, it still remains unclear why some ideas would drive people under certain conditions.

When discussing the existing narratives in climate change negotiations, different views emerge with one dominant story presenting global warming as a global issue that requires united international action. This message has however failed to get through to key decision makers despite alluding to harmony and moral duty[72]. On the other hand, there are narratives that have focused on national interest, market rationality and a market-based approach to climate policy among major emitters which have gained a lot of traction[66]. But ideas which are based on neo-liberalism have not been able to achieve the desired effects on climate change.

There are many other narratives that range from one's own sense of

[70] Below, Amy. Environmental politics and foreign policy decision making in Latin America: ratifying the Kyoto protocol. Routledge, 2014.
[71] Tipton, Jessica E. "Why did Russia ratify the Kyoto Protocol? Why the wait? An analysis of the environmental, economic, and political debates." Slovo 20, no. 2 (2008): 67-96.
[72] Maslin, Mark A., John Lang, and Fiona Harvey. "A short history of the successes and failures of the international climate change negotiations." UCL Open Environment 5 (2023).

liability to creating a sustainable future, redefining a life worth living, and addressing global inequality. Formulating a single universal and strong narrative at the global level may be difficult or even unpalatable. However, it could be useful to concentrate on national-level narratives about climate change that galvanize various groups of citizens into action[73]. This recognizes the different cultural and ideological situations in nations and hence emphasizes context-specific stories that create meaningful dialogues within climate change. Has this approach eliminated the inequity that exists in climate negotiations? Probably not. But has it helped to shape future engagements towards a more acceptable climate change discourse? Yes, it has. Is there more that needs to be done? Yes, and as a starter, there is a need to give priority to financial support, technology transfer, and capacity-building projects that repair historical injustice and re-balance the vulnerability-responsibility equation.

Case Study: From Kyoto to Paris: A Tapestry of Power and Inequity in Global Climate Politics

While the world struggled with the increasing problems of climate change, two pivotal points in international climate politics -- the Kyoto Protocol and the Paris Agreement -- determined the narrative of power and equity. In this case study, we will examine the historical background of this, digging deeper into how the developed and developing countries interacted and the effects of these interactions for the Global South.

Kyoto Protocol: The Seeds of Differentiation (1997-2012)

The Kyoto Protocol, seen as a historic breakthrough, laid a basis for confronting climate change by allocating emission reduction targets among the rich countries. This differentiation, however, that was based on historically different responsibilities, created a wide gulf between the Global North and the Global South[74]. It offered two distinct propositions which many scholars considered the primary reason why it was unsuccessful even before its ratification[75].

Differentiated Responsibilities: The protocol, with its focus on differentiated responsibilities, created a dichotomy between the industrialized nations and those not in developing countries, thereby establishing a power imbalance.

Unequal Finances: Developing countries wanted a fair share of the burden.

[73] Pauw, W. Pieter, Richard JT Klein, Kennedy Mbeva, Adis Dzebo, Davide Cassanmagnago, and Anna Rudloff. "Beyond headline mitigation numbers: we need more transparent and comparable NDCs to achieve the Paris Agreement on climate change." Climatic Change 147 (2018): 23-29.
[74] Loeser, John D., and Rolf-Detlef Treede. "The Kyoto protocol of IASP basic pain terminology." PAIN® 137, no. 3 (2008): 473-477.
[75] Rosen, Amanda M. "The wrong solution at the right time: The failure of the kyoto protocol on climate change." Politics & Policy 43, no. 1 (2015): 30-58.

The demand from the developing nations was that historical carbon emitters should bear the main responsibility, they argued. With little funding for adaptation and mitigation measures, it had further demonstrated to them the unjust nature of the protocol.

The Paris Agreement - Shifting Sands (2015-Present)

The Paris Agreement was a ground breaking transformation in international climate negotiations. The nations of the world moved away from legally binding greenhouse gas reductions and more toward liberalizing those responsibilities which represented a new approach[76]. On the other hand, the agreement presented its own set of difficulties, leaving the Global South precarious and lacking leverage.

Voluntary Commitments and Ambiguity: Voluntary commitments aimed to help foster inclusivity in reporting on nationally determined contributions (NDCs). But that created a lot of ambiguity about the obligations of developed and developing countries. This change in the dynamics of the climate narrative had added an extra layer of complexity to the climate discourse.

Insufficient Ambition and Finance Gaps: The voluntary nature of commitments led to concerns about insufficient ambition on the part of advanced economies. Also, despite all the talk about climate finance, there were still gaps, hindering developing nations from adapting to changes and mitigating damage.

Persistent Disadvantages for the Global South

Through the lens of historical precedents, a common thread emerges: that of the persistent disadvantages faced by the Global South. The disadvantages can be summarized as follows:

Limited Financial Support

The Global South consistently faced challenges in securing the promised financial resources for climate action including the Loss and Damage Fund to help finance climate change adaptation. Recent developments at COP 28 hold hopes for a more robust climate financing mechanism in the coming years[77]. The financial gap remains a lacuna for parties, again hindering sustainable development initiatives.

[76] Agreement, Paris. "Paris agreement." In report of the conference of the parties to the United Nations framework convention on climate change (21st session, 2015: Paris). Retrived December, vol. 4, p. 2017. HeinOnline, 2015.

[77] Miron, Steve, Adelle Thomas, Adrian Martinez Blanco, Alex Aleinikoff, Alex De Sherbinin, Alice Baillat, Ama Francis et al. "Loss and Damage and Displacement: Key Messages for the Road to COP 28." (2023).

Technology Disparity

Despite the promise of technology transfer, developing countries are still not able to get any breakthroughs in clean and sustainable technologies. This technological divide has also deepened the rift between developed and developing countries.

Capability Limits

Developing countries' capacity to engage in effective climate policies continues to cause great anxiety. The failure to create the requisite backup for this capacity has made those in the Global South quite helpless to cope with climate change.

Moving from the Kyoto Protocol to the Paris Agreement in global climate politics unfolds a picture of power relations, stratification differences as well as persistent Global South problems. Because there is a pressing need for climate action. This study therefore strove to emphasize the importance of adopting different approaches to addressing the climate challenge in history and looking forward to creating future agreements that address the entire web of power and inequity.

Conclusion

This chapter articulates the necessity for a fundamental shift in both mindset and action regarding climate change, neocolonialism, and the exploitation of environmental resources. It underscores the lasting influences of the Global North and their continuous ramifications in the Global South, highlighting the urgent need to reframe the global climate conversation to diminish these imbalances. The analysis of the intricacies in balancing power during climate negotiations reveals the critical need for early adoption of a more equitable approach. To transform discussions about climate change from passive conversation to proactive, ambitious commitment, inclusive and substantial action is imperative. The disparities in finance and technology, as well as the differing capacities of developing nations to implement these technologies, are pivotal issues where dialogue and collaborative efforts between the North and South can begin, aiming for a fairer and more sustainable future.

Upon examining historical precedents, it is evident that the division created by differentiating responsibilities based on history has widened the gap between the Global North and South in their commitments towards sustainability. Consequently, there is a need to recalibrate the balance between vulnerability and responsibility, adopting strategies that not only acknowledge past errors but also pave the way for a fairer future. Looking ahead, there should be a focus on financial support, advanced technology, and capacity-building initiatives that address historical inequalities. This is

crucial because inconsistent policies, such as fluctuating trade rules, hinder fair and balanced growth. A steadfast commitment to indigenous rights and environmental sustainability is essential.

Hence, this chapter extends a fervent call to action to policymakers, academics, global citizens, and individuals worldwide to collaborate on developing a new model for future development that rectifies historical injustices. Overcoming intellectual and psychological forms of neocolonialism is key to eliminating the obstacles that hinder the achievement of a just and sustainable world. The path to restoring justice is filled with challenges, yet it holds the potential for a future that reflects our collective determination, learning and relearning, and, most importantly, our efforts to correct past mistakes and renew faith in humanity.

PART III.

STATES AND ENVIRONMENTAL POLITICS

THE US IN EFFORTS TO ENSURE ENVIRONMENTAL SECURITY ON A GLOBAL SCALE

Sibel Kavuncu*

Introduction

Within the framework of the title "The US in Efforts to Ensure Environmental Security on a Global Scale", the policies determined by the US to solve environmental problems on a global scale will be analyzed. Evaluating the policies of the US in this context towards ensuring global environmental security will enable us to observe the attitude of the US, which is the "global power" in today's international system, in the face of a global problem regarding global security, and the extent of its efforts in seeking a solution to the problem. In other words, evaluating the US policies towards ensuring environmental security on a global scale will also enable the evaluation of the extent to which the US policies towards the solution of the problem have an impact on ensuring global environmental security.

Based on this, in the study, when "The US in Efforts to Ensure Environmental Security on a Global Scale" is mentioned, what will be evaluated is; in the face of environmental problems on a global scale, these are the policies determined by the US to solve these problems. We can say that by evaluating the US policies towards ensuring global environmental security, the role and influence of the US, which is a global power in today's international system, in ensuring global environmental security can be evaluated.

However, in order to make these evaluations, it is necessary to first clarify what is understood by "environmental security".

Environmental Security

When it comes to environmental security; The environment, threats and problems to the environment, and the search for solutions to these threats and problems can be stated as the basic elements in explaining what is understood by environmental security.

But what is meant by what is defined as "environment"? What do we mean by this structure that we describe as "environment" and that environmental risks, threats and problems occur within? At this point, it is a priority to specify what is defined when "environment" is mentioned, that is,

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to define "environment".

Faruk Sönmezoğlu defines the environment in a very general evaluation with the words:[1]

> *"When the concept of environment is perceived in its most general sense, it covers all the general living conditions of humans, both biological (that is, related to all other living things) and non-biological (that is, related to natural elements such as air and water)"*

When an evaluation is made in line with the association of "environment" with security, which Faruk Sönmezoğlu explains in general terms in this way, it can be mentioned that environmental problems began to be included in the field of security in the 1970s.[2] Even as Buzan stated: "*In the case of the environment, the securitization process can be traced back to the 1960s…*"[3]

The evaluation of the "environment", whose relationship with the security issue dates back to the 1960s, among the security problems at the top of the international security agenda, gained momentum in the 1990s, following the Cold War period.

It can be said that since the 1990s, and especially today, the issue of "environmental security" has been one of the top issues of the international security agenda, which has a global dimension, within the framework of both the threats of environmental problems to global security and the search for solutions to these problems.

As Barry Buzan stated; security issues related to economic, social and environmental issues were moved to the top of the international security agenda after the Cold War as well as military issues and political issues.[4]

Barry Buzan says: "The security of human collectivities is affected by factors in five major sectors: military, political, economic, societal and environmental."[5] In this context, looking at what Buzan means by "environmental security", Buzan defines environmental security as follows:[6]

> *"Generally speaking, … Environmental security concerns the maintenance of the local and the planetary biosphere as the essential support system on which all other human enterprises depend."*

[1] Faruk Sönmezoğlu, Uluslararası Politika ve Dış Politika Analizi, gözden geçirilmiş ve genişletilmiş yedinci baskı, İstanbul, Der Yayınları, 2019, p.684.
[2] Başar Baysal, Uluç Karakaş, "Climate Change and Security: Different Perceptions, Different Approaches", Uluslararası İlişkiler, Volume 14, No. 54, 2017, p.23.
[3] Barry Buzan, "Rethinking Security after the Cold War", National and International Security, Michael Sheehan (Ed.), London and New York, Taylor and Francis Group, 2000, p.331.
[4] Barry Buzan, "New Patterns of Global Security in the Twenty-First Century.", International Affairs, Vol.67, No.3, July 1991, p.433.
[5] Barry Buzan, People, States & Fear An Agenda for International Security Studies in the Post-Cold War Era, 25th anniversary, Colchester, United Kingdom, ECPR Press, 2016, p.38.
[6] *Ibid.*, p.38.

In her evaluation of the expanded understanding of security in the 1990s, Emma Rothschild discusses the relationship between "environment" and "security" with the following words:[7]

> *"The ubiquitous idea, in the new principles of the 1990s, is of security in an "extended" sense. The extension takes four main forms. … In the second, it is extended from the security of nations to the security of the international system, or of a supranational physical environment: it is extended upwards, from the nation to the biosphere. … In the third operation, the concept of security is extended horizontally, or to the sorts of security that are in question. Different entities (such as individuals, nations, and "systems") cannot be expected to be secure or insecure in the same way; the concept of security is extended, therefore, from military to political, economic, social, environmental, or "human" security. …"*

With Gearóid Ó Tuathail's words:[8]

> *"Initially an issue of little concern, the "environment" has over the last few decades emerged as an object of considerable focus and concern, an objectified externality in need of study and management and a dynamic system that is the source of many of our newest discourses of threat and danger."*

Based on this assessment of Tuthail, it can be stated that today, among global-scale security problems, especially environmental problems are among the top issues on the global security agenda, the solution of which is urgent.

As Ole Weaver emphasizes: *"In recent years, presentation of environmental degradation as a security problem has become increasingly common."*[9]

In this regard, when we look at Robert Kaplan's evaluation, Robert Kaplan, in his study drawing attention to "environment", says the following:[10]

> *"It is time to understand "the environment" for what it is: the national security issue of the early twenty-first century. The political and strategic impact of surging populations, spreading disease, deforestation and soil erosion, water depletion, air pollution and, possibly, rising sea levels in critical, overcrowded regions … will be the core foreign policy challenge from which most others will ultimately emanate, arousing the public and uniting assorted interests left over from the Cold War."*

As Faruk Sönmezoğlu and Özgün Erler Bayır stated: "... environmental problems do not recognize borders between countries and continents."[11] *So, it can be easily stated that environmental problems have gained a global character today. As Faruk Sönmezoğlu*

[7] Emma Rothschild, "What is Security?", International Security, Vol.III (Widening Security), Barry Buzan and Lene Hansen (Ed.), SAGE Publications, London, 2007, p.2.
[8] Gearóid Ó Tuathail, "INTRODUCTION Thinking critically about geopolitics", The Geopolitics Reader, Gearóid Ó Tuathail, Simon Dalby and Paul Routledge (Ed.), London, Routledge, 1998, p.7.
[9] Ole Waever, "Securitization and Desecuritization", International Security, Vol.III (Widening Security), Barry Buzan and Lene Hansen (Ed.), SAGE Publications, London, 2007, p.79.
[10] Robert D. Kaplan, " "The Coming Anarchy" from The Atlantic Monthly (1994)" , The Geopolitics Reader, Gearóid Ó Tuathail, Simon Dalby and Paul Routledge (Ed.), London, Routledge, 1998, p. 190.
[11] Faruk Sönmezoğlu, Özgün Erler Bayır, "Çevre Sorunlarına İlişkin Uluslararası Rejimler", İstanbul Üniversitesi Siyasal Bilgiler Fakültesi Dergisi, No.47, Ekim 2012, p.249.

stated:[12]

> *"Nowadays, an environmental problem related to a country or region often concerns other countries or regions, in other words, it has an international dimension. Air pollution of a country often goes beyond its own borders and affects other geographies. Acid rain, which may occur as a result of industrialization in a country, knows no borders and reaches different geographies. The negative effects of chlorofluorocarbon gases used in many areas of modern life damage the ozone layer in the atmosphere and go far beyond the concepts of country/geography. Again, as a result of the greenhouse effect created by carbon dioxide and similar gases causing global warming, the melting of glaciers at the poles and the islands and coastal areas with lands close to sea level are likely to face the threat of rising waters. It is seen that all these environmental problems do not recognize political boundaries and generally affect the entire planet (though to different extents)…"*

Besides, it can be said that in the new international environment of the post-Cold War period, where environmental problems constitute one of the prominent security problems, the search for solutions to these problems has become intense. As environmental problems gradually gain a global dimension, the search for solutions to the problem has also moved to a global scale. In this context, it is important to evaluate the initiatives and efforts on a global scale towards the solution of environmental problems, which is one of the top issues on today's global security agenda, in terms of presenting the course of the problem.

The Approach of the US to Global Environmental Problems

As Kenneth Waltz states as: "*So long as the major states are the major actors, the structure of international politics is defined in terms of them.*"[13] Based on these words of Waltz, it can be said that in evaluating the situation of the search for solutions to environmental problems on a global scale, it is important to look at the efforts of the countries considered to be great powers in this direction.

Joseph Nye evaluates that the United States (US) is the greatest power of the international system in both the 20th and 21st centuries.[14] Regarding the US being the greatest power of the international system, Nye refers especially to the post-Cold War period and says:[15]

> *"From 1945 to 1991, the global balance of power was described as bipolar, with two superpowers standing well above the rest. The United States and the Soviet Union had disproportionate shares of power resources and alliance spheres of influence, and competed for advantage in the non-aligned world. The two giants engaged in a nuclear arms race, and balanced each other's power. But after the fall of the Berlin Wall in 1989 and the*

[12] Sönmezoğlu, Uluslararası Politika ve Dış Politika Analizi, p.698.
[13] Kenneth N. Waltz, Theory of International Politics, Addison-Wesley Publishing Company, United States of America, 1979, p.94.
[14] Joseph S. Nye, Jr., "Limits of American Power", Political Science Quarterly, Vol. 117, No. 4, Winter 2002-2003, p.555.
[15] Joseph S. Nye Jr., "Is the American Century Over?", Political Science Quarterly, Vol. 130, No. 3, Fall 2015, p.396.

> *collapse of the Soviet Union … in1991, the United States become the world's only superpower."*

Faruk Sönmezoğlu also makes the following evaluation in the context of the US being the greatest power in today's international system:[16]

> *"… today's international system has a structure in which hierarchical and polycentric relationship patterns are intertwined and function together. When these two levels are considered together, it can be said that today's international system is determined, or at least controlled, by an oligarchy of powerful states under the "guiding leadership" of the United States."*

Based on these assessments, it is important to evaluate how the US acts in the face of environmental problems, which are global problems, in the context of its being the powerful country in the international system today. To consider what policies the US adopts against a global problem, to examine how a power like the US behaves in dealing with a problem that threatens the entire world's security, could think as an example in terms of understanding the behavior and attitudes of countries with global powers in the face of global problems.

We can say that, despite the existence of great powers that are on their way to becoming countries that can be described as power centers in today's international system, which can be said to be evolving towards multipolarity, the US still maintains its position as the only superpower of the international system in this sense.

"Great power" is defined by James M. Goldgeier and Michael McFaul: "as a country possessing the will and the capability to alter events throughout the international system."[17]

Based on this definition, it can be said that the analysis of the course of the attitude of the global great power US towards global environmental problems is important in terms of setting an example for understanding the attitude of the US as a global power towards global problems on a global scale.

It should be noted at this point that it is not new for the US to put global environmental problems on its agenda. As Rita Floyd notes, although the issue of environmental security was present on the US agenda before and during the Cold War, the issue came to the fore after the Cold War.[18]

[16] Faruk Sönmezoğlu, "Amerika Birleşik Devletleri'nin Dış Politikası", Dış Politika, Karşılaştırmalı Bir Bakış, Der. Faruk Sönmezoğlu, Özgün Erler Bayır, Der Yayınları, İstanbul, 2014, p.210.
[17] James M. Goldgeier, Michael McFaul, "A Tale of Two Worlds: Core and Periphery in the Post-Cold War Era", International Organization, Vol. 46, No. 2, Spring 1992, p.467.
[18] Rita Floyd, Security and the Environment Securitisation Theory and US Environmental Security Policy, Cambridge University Press, Cambridge, 2010, p.68.

In the 1991 US National Security Strategy document, the US's approach to "environmental security" is stated under the title of "*The Environment*" as follows:[19]

> *"We must manage the Earth's natural resources in ways that protect the potential for growth and opportunity for present and future generations. The experience of the past half-century has taught that democratic political institutions and free market economies enhance human well-being. But even as we experience political and economic success, we cannot ignore the costs that growth, unguided by wisdom, can impose on our natural environment. A healthy economy and a healthy environment go hand-in-hand. Solutions must be found that protect our environment while allowing for the economic development needed to improve the living standards of a growing world population.*
>
> *Global environmental concerns include such diverse but interrelated issues as stratospheric ozone depletion, climate change, food security, water supply, deforestation, biodiversity and treatment of wastes. A common ingredient in each is that they respect no international boundaries. The stress from these environmental challenges is already contributing to political conflict. Recognizing a shared responsibility for global stewardship is a necessary step for global progress. Our partners will find the United States a ready and active participant in this effort.*

It can be seen that in these sentences, the US emphasizes global cooperation against environmental problems.

With the presidency of Bill Clinton in the US in 1993, the environmental security issue became frequently emphasized by President Clinton. In Clinton's first "Inaugural Address" at 20 January 1993, Clinton pointed out that environmental problems are not problems outside the US, but also problems of the US, with the following words:[20]

> *"… To renew America we must meet challenges abroad as well as at home. There is no longer a clear division between what is foreign and what is domestic. The world economy, the World environment, the world AIDS crisis, the world arms race -- they affect us all. …"*

Emphasizing that environmental problems are the problems of the whole world, President Clinton also made an emphasis in the same tone in his 1993 Earth Day speech. Clinton drew attention to the fact that environmental problems are the problem of the whole world with the following words in

[19] National Security Strategy of the United States, White House, August 1991, p.22, https://history.defense.gov/Historical-Sources/National-Security-Strategy/ (Access 04.10.2023) ; https://history.defense.gov/Portals/70/Documents/nss/nss1991.pdf?ver=3sIpLiQwmknO-RplyPeAHw%3d%3d (Access 04.10.2023).

[20] "Clinton - Inaugural Address [January 20, 1993]", National Archives, Clinton Digital Library, https://clinton.presidentiallibraries.us/items/show/48462 (Access 05.11.2023) ; "42nd President of the United States: 1993 - 2001 Inaugural Address", https://www.presidency.ucsb.edu/documents/inaugural-address-12 (Access 05.09.2023).

his speech:[21]

> *"… If there is one commitment that defines our people, it is our devotion to the rich and expansive land we have inherited. From the first Americans to the present day, our people have lived in awe of the power, the majesty, and the beauty of the forest, the rivers, and the streams of America. That love of the land, which flows like a mighty current through this land and through our character, burst into service on the first Earth Day in 1970. When I traveled the country last year, I saw and spoke of how much had been accomplished by the environmental movement since then and how much still remains to be done. For all that has been done to protect the air and the water, we haven't halted the destruction of wetlands at home and the rain forest abroad. For all that has been learned, we still struggle to comprehend such dangers to our planet's delicate environment as the shroud of greenhouse gases and the dangerous thinning of the ozone layer. … Unless we act and act now, we face a future where our planet will be home to 9 billion people within our lifetime, but its capacity to support and sustain our lives will be very much diminished. Unless we act, we face the extinction of untold numbers of species that might support our livelihoods and provide medication to save our very lives. Unless we act now, we face a future in which the sun may scorch us, not warm us; where the change of season may take on a dreadful new meaning; and where our children's children will inherit a planet far less hospitable than the world in which we came of age … we want to protect the environment at home and abroad. In an era of global economics, global epidemics, and global environmental hazards, a central challenge of our time is to promote our national interest in the context of its connectedness with the rest of the world. We share our atmosphere, our planet, our destiny with all the peoples of this world. … Now, we are taking steps to defend our people and our environment and the environment of the World. …"*

It can be seen in this speech that while Clinton drew attention to the importance of environmental security, he also pointed out that with his presidency, he would adopt a global approach to environmental security not only in the US but also towards ensuring environmental security.

And in 1994 National Security Strategy under the title of "*The Environment*" it is stated as follows:[22]

> *"The more clearly we understand the complex interrelationships between the different parts of our world's environment, the better we can understand the regional and even global effects of local changes to the environment. Increasing competition for the dwindling reserves of uncontaminated air, arable land, fisheries and other food sources, and water, once considered "free" goods, is already a very real risk to regional stability around the world. The range of environmental risks serious enough to jeopardize international stability extends to massive population flight from man- made or natural catastrophes, such as Chernobyl or the East African drought, and to largescale ecosystem damage caused by industrial pollution, deforestation, loss of biodiversity, ozone depletion, and ultimately climate change. Strategies dealing with environmental issues of this magnitude will require*

[21] "Remarks on Earth Day April 21, 1993", pp.630-631, 633., https://www.govinfo.gov/ content/pkg/WCPD-1993-04-26/pdf/WCPD-1993-04-26-Pg630.pdf (Access 07. 08.2023).

[22] A National Security Strategy of Engagement And Enlargement, The White House, July 1994, p.15., https://history.defense.gov/Portals/70/Documents/nss/nss1994.pdf (Access 16. 08.2023).

partnerships between governments and nongovernmental organizations, cooperation between nations and regions, and a commitment to a strategically focused, long-term policy for emerging environmental risks. …"

It can be seen that, just like in the 1991 National Security Strategy of the US, the 1994 strategy also emphasizes the global dimension of environmental problems and points out the necessity of international cooperation in solving the problem.

In 1995 National Security Strategy, the issue of environment evaluated under the headline of "*The Environment and Sustainable Development*"with the words:[23]

"The more clearly we understand the complex interrelationships between the different parts of our world's environment, the better we can understand the regional and even global effects of local changes to the environment. Increasing competition for the dwindling reserves of uncontaminated air, arable land, fisheries and other food sources, and water, once considered "free" goods, is already a very real risk to regional stability around the world. The range of environmental risks serious enough to jeopardize international stability extends to massive population flight from man-made or natural catastrophes, such as Chernobyl or the East African drought, and to large-scale ecosystem damage caused by industrial pollution, deforestation, loss of biodiversity, ozone depletion, desertification, ocean pollution and ultimately climate change. Strategies dealing with environmental issues of this magnitude will require partnerships between governments and nongovernmental organizations, cooperation between nations and regions, and a commitment to a strategically focused, long-term policy for emerging environmental risks. …"

In the 1995 strategy, which seems to be a repetition of the statements regarding the environment in the 1994 strategy, it is pointed out that environmental problems are the problems of the whole world, and attention is drawn to international cooperation in the fight against this problem.

When we look at the 1996 National Security Strategy, we see that environmental issues are evaluated under the title of "*The Environment and Sustainable Development*" in this strategy, just as they were emphasized in 1994 and 1995 strategies.[24]

It can be said that the scope of these evaluations constitute important data sources regarding the relationship between "environment" and "security" and how the US evaluates the reasons why environmental problems pose a threat at the global level, and what policies will be followed by the US on the subject.

[23] A National Security Strategy Of Engagement And Enlargement, The White House, July 1994, p.18., https://history.defense.gov/Portals/70/Documents/nss/nss1995.pdf?ver=pzgo9pkDsWmIQqTYTC6O-Q%3d%3d (Access 16. 08.2023).
[24]A National Security Strategy of Engagement and Enlargement, The White House, February 1996, p.26., https://history.defense.gov/Portals/70/Documents/nss/nss1996.pdf?ver=4f8riCrLnHIA-H0 it YUp6A%3d%3d (Access 16. 08.2023).

It is seen that from the point of view of the United States, the issue of "environment" has been considered throughout the 1990s as an issue that should be evaluated not only from the point of view of the security of the United States, but also from the point of view of the security of the whole world. Assessments in this context have often been brought up in statements made by both the president and other officials of the administration.

As the remarks that Deputy Secretary of State Strobe Talbott made before the Environmental Issues in American Foreign Policy Seminar at the National Foreign Affairs Training Center in September 10, 1996. In this speech Talbott said that:

"… in January 1993, I joined an Administration that has given special priority to environmental issues. In the earliest days of his campaign for the Presidency, Bill Clinton called for "a new covenant for environmental progress," and in a defining moment both for his candidacy and his presidency, he chose as his running mate Al Gore, who has argued that saving a planet at risk must become the "central organizing principle for civilization." My boss, Warren Christopher, has undertaken to move environmental issues into the mainstream of American foreign policy. … it's because the health and welfare of Americans are bound up with the quality of the land, air, and water everywhere in the world; the extinction of species in the tropics, the spread of pollutants through acid rain, the decline of stocks of fish in our oceans. All these are apparent in tangible, troublesome ways here at home. But struggles over land, water, and other natural resources affect our national interests overseas as well, since they can lead to instability in regions of critical importance to the United States. Because threats to the environment are so often international in scope, no nation can, on its own, achieve lasting solutions. In the past twenty-five years the United States has made important progress toward putting its own environmental house in order, but even our best efforts will be insufficient if our neighbors do not or cannot do the same. The State Department, as the agency of the U.S. government responsible for relations with other countries, obviously has a crucial role to play. …'[25]

It can be said that, especially during Clinton's first presidency, evaluating environmental security in the context of global security has been at the forefront of the new administration. Such that statements in this context were frequently made by Secretary of State Christopher Warren at that time.[26]

In February 1996, in the "memorandum" to all State Department under-secretaries and assistant secretaries, "*Integrating Environment Issues Into the Department's Core Foreign Policy Goals,*" it was seen that Secretary Christopher placed the environment at the top of the U.S. national security interests.[27] In

[25] "The Global Environment and the National Interest", U.S. Department of State Archive, https://1997-2001.state.gov/global/oes/960910.html (Access 16.09.2023).
[26] "Climate Change International Environmental Security: Christopher [Warren] 4-9-96", National Archives, Clinton Digital Library, https://clinton.presidentiallibraries.us/items/show/96436 (Access 16.09.2023).
[27] "Secretary Christopher's Memorandum to All Under and Assistant Secretaries on Complete Text: "Integrating Environment Issues into the Department's Core Foreign Policy Goals", February 14, 1996",

his remarks setting out the Clinton Administration's policy on environmental security, Christopher said:

> *"… America's national interests are inextricably linked with the quality of the earth's environment. … Those threats affect broad national economic and security interests, as well as the health and well-being of individual citizens. Worldwide environmental decay threatens U.S. national prosperity. Severe pollution directly affects cropland, livestock, fisheries, and other biological resources essential to global prosperity. … In an integrated world economy, environmental degradation in one part of the globe can affect economies everywhere. … Changes in major ecological systems have real consequences for our nation. Changing weather patterns could lead to the re-emergence and migration of dangerous diseases, potentially affecting all Americans. … Environmental and resource issues can also have an important effect on political stability in regions key to U.S. interests. …"*[28]

As Thomas W. Lippman emphasized, Warren Christopher in March 1996, in his statement during a trip to the Amazon, pointed to the policy that "*he has declared to be a new fundamental principle of U.S. foreign policy, protection of the environment*"[29] with the words: "*I am here because the United States recognizes that protecting the environment is essential to the health, security and prosperity of not only the American people but peoples all around the world.*"[30]

The other example, as stated in Frank Clifford's assessment of Warren Christopher's speech on April 9, 1996:[31]

> *"Signaling a new priority for U.S. foreign policy, Secretary of State Warren Christopher in a speech at Stanford University … called for a special emphasis on environmental protection, arguing that global peace and national security are increasingly dependent on the health of the world's natural resources."*

When we look at Warren Christopher's mentioned speech, we see that he stated the following about the relationship between environment and global security:[32]

> *" … With strong leadership from President Clinton and Vice President Gore, our Administration has recognized from the beginning that our ability to advance our global interests is inextricably linked to how we manage the Earth's natural resources. That is why we are determined to put environmental issues where they belong: in the mainstream of American foreign policy. I appreciate and value this opportunity to outline our far-*

Environmental Change and Security Project Report, İssue 2, P.J. Simmons (Ed.), Spring 1996, The Woodrow Wilson Center, p.77-80.

[28] İbid.

[29] Thomas W. Lippman, "On Amazon, Christopher Stands Up For Environment", The Washington Post, 5 March 1996, https://www.washingtonpost.com/archive/politics/1996/03/05/on-amazon-christopher-stands-up-for-environment/cddabb02-0980-484f-b05e-9bb76539a830/ (Access 23.10.2023).

[30] *Ibid.*

[31] Frank Clifford, "Christopher Calls Resources Key", Los Angeles Times, 10 April 1996, https://www.latimes.com/archives/la-xpm-1996-04-10-mn-56866-story.html (Access 23.10.2023).

[32] "Secretary Christopher: American Diplomacy and the Global Environmental Challenges of the 21st Century", 9 April 1996, U.S. Department of State Archive, https://1997-2001.state.gov/ global/ oes/ speech.html (Access 18. 11.2023).

> *reaching agenda to integrate fully environmental objectives into our diplomacy, and to set forth our priorities for the future. The environment has a profound impact on our national interests in two ways: First, environmental forces transcend borders and oceans to threaten directly the health, prosperity and jobs of American citizens. Second, addressing natural resource issues is frequently critical to achieving political and economic stability, and to pursuing our strategic goals around the world. The United States is providing the leadership to promote global peace and prosperity. We must also lead in safeguarding the global environment on which that prosperity and peace ultimately depend. …"*

This speech made by Secretary Christopher was important as it showed the importance of the environmental issue in the policies of the Clinton administration. Geoffrey D. Dabelko and P. J. Simmons evaluated this importance with the following words:[33] "*In April 1996, former Secretary of State Warren Christopher announced an unprecedented initiative to put environmental issues near the top of the foreign policy agenda.*"

On November 17, 1997, Undersecretary for Global Affairs Timothy E. Wirth, in his speech, at the Forum on International Geosciences at the National Academy of Sciences, said the following about Secretary Christopher's speech, as similar with Dabelko and Simmons's assestment:[34] "*The link between the environment and U.S. national interests prompted Secretary Christopher in 1996 to announce an Environmental Initiative to institutionalize the central role of environment in the daily conduct of our diplomacy.*"

It can be said that, towards the end of the 1990s, the importance given by the US to environmental security did not change, and environmental security continued to be among the top issues of policies regarding both the national and global security agenda.

As then-Vice President Albert Gore, Jr. stated in a letter in the report of the State Department's 1st annual environmental report:[35]

> *"We have moved beyond Cold War definitions of the United States' strategic interests. Our foreign policy must now address a broad range of threats--including damage to the world's environment--that transcend countries and continents and require international cooperation to solve. Environmental problems such as global climate change, ozone depletion, ocean and air pollution, and resource degradation--compounded by an expanding world population--respect no border and threaten the health, prosperity, and jobs of all Americans. All the missiles and artillery in our arsenal will not be able to*

[33] Geoffrey D. Dabelko, P. J. Simmons, "Environment And Security: Core Ideas And US Government Initiatives", SAIS Review (1989-2003), Vol. 17, No. 1 (Winter-Spring 1997), p. 127.

[34] "Under Secretary for Global Affairs Timothy E. Wirth Remarks at the Forum on International Geosciences at the National Academy of Sciences", "International Environmental Cooperation", Washington DC, November 17, 1997, U.S. Department of State Archive, https://1997-2001.state.gov/global/oes/971117tw.html (Access 18.11.2023).

[35] "Environmental Diplomacy The Environment and U.S. Foreign Policy", "The U.S. State Department's first annual report on the environment and foreign policy represents a new way of looking at the world.", United States Department of State, https://1997-2001.state.gov/global/oes/earth.html#gore (Access 18.11.2023).

protect our people from rising sea levels, poisoned air, or foods laced with pesticides. Our efforts to promote democracy, free trade, and stability in the world will fall short unless people have a livable environment. We have an enormous stake in the management of the world's resources. … Our children's future is inextricably linked to our ability to manage the earth's air, water, and wildlife today. This first State Department report details the Clinton Administration's priorities for working globally, regionally, and bilaterally to combat serious and growing international environmental threats. It documents an important turning point in U.S. foreign policy …"

In the Press Remarks on Earth Day, Secretary of State Madeleine K. Albright stated as:[36]

"… The report reflects the Department's decision, initially reached by Secretary Christopher, to integrate the environment and other global concerns into American foreign policy. … The report we release today is a reflection of a long term commitment to incorporate environmental goals into American foreign policy. …"

According to the State Department's 1997 report, there were three reasons of the integration of the environmental issues into foreign policy:[37] "*… To help stabilize a region where pollution or the scarcity of resources contributes to political tensions. … To enable the nations of one region to work cooperatively to develop initiatives to attack regional environmental problems. …*" And thirdly; to strengthen the US's relationship with its allies by working together on internal environmental problems.[38] Based on this, it can be said that during Clinton's presidency, environmental security was an issue that the administration always put on its agenda. In this context, it can be seen that the issue was evaluated under the "*Environmental and Security Concerns*" subheading in the 1997 US National Security Strategy as follows:[39]

"Environmental threats do not heed national borders and can pose long-term dangers to our security and well-being. Natural resource scarcities often trigger and exacerbate conflict. Environmental threats such as climate change, ozone depletion and the transnational movement of dangerous chemicals directly threaten the health of U.S. citizens. We must work closely with other countries to respond aggressively to these and other environmental threats. < Decisions today regarding the environment and natural resources can affect our security for generations; consequently, our national security planning is incorporating environmental analyses as never before. In addition, we have a

[36]"Secretary of State Madeleine K. Albright, Under Secretary for Global Affairs Timothy Wirth, and Assistant Secretary for Oceans and International Environmental Scientific Affairs Eileen Claussen Press Remarks on Earth Day Washington, D.C., April 22, 1997", US Department of State, https://1997-2001.state.gov/statements/970422a.html (Access 22.11.2023).

[37] "Environmental Diplomacy The Environment and U.S. Foreign Policy", "The U.S. State Department's first annual report on the environment and foreign policy represents a new way of looking at the world.", United States Department of State, https://1997-2001.state.gov/global/oes/earth.html (Access 12.10.2023).

[38] İbid.

[39] A National Security Strategy for A New Century, May 1997, https://history.defense.gov/Portals/70/Documents/nss/nss1997.pdf?ver=2whGiEUYiceAyme45GiJzA%3d%3d (Access 20.10.2023).

full diplomatic agenda, working unilaterally, regionally and multilaterally to forge agreements to protect the global environment."

And in the 1998 strategy, under the subtitle "*Environmental Initiatives*", it was evaluated as follows:[40]

"Decisions today regarding the environment and natural resources can affect our security for generations. Environmental threats do not heed national borders and can pose long-term dangers to our security and well-being. Natural resource scarcities can trigger and exacerbate conflict. Environmental threats such as climate change, ozone depletion and the transnational movement of hazardous chemicals and waste directly threaten the health of U.S. citizens. We have a full diplomatic agenda, working bilaterally and multilaterally to respond aggressively to environmental threats. …"

And in 1999 strategy, under the "*Environmental and Health Initiatives*"subtitle the issue was evaluated as:[41]

"Decisions today regarding the environment and natural resources can affect our security for generations. Environmental threats do not heed national borders; environmental peril overseas can pose long-term dangers to Americans' security and well-being. Natural resource scarcities can trigger and exacerbate conflict. Environmental threats such as climate change, stratospheric ozone depletion, introduction of nuisance plant and animal species, overharvesting of fish, forests and other living natural resources, and the transnational movement of hazardous chemicals and waste directly threaten the health and economic well-being of U.S. citizens. We have a full diplomatic agenda to respond aggressively to environmental threats. …"

And in the strategy of 2000 year, the last strategy of Clinton Administration, under the subtitle "*Environmental and Health Initiatives*" the issue was stated as follows:[42]

"The President has said, "Our natural security must be seen as part of our national security." Decisions today regarding the environment and natural resources can affect our security for generations. Environmental threats do not heed national borders; environmental perils overseas and environmental crime pose long-term dangers to U.S. security and well being. Natural resource scarcities can trigger and exacerbate conflict, and phenomena such as climate change, toxic pollution, ocean dumping, and ozone depletion directly threaten the health and well-being of Americans and all other individuals on Earth. Responding firmly to environmental threats remains a part of mainstream American foreign policy. …"

[40] A National Security Strategy for A New Century, The White House, October 1998, p.13, https://history.defense.gov/Portals/70/Documents/nss/nss1998.pdf?ver=zl1p-sJtgDvXOM01YVnfqA%3d%3d (Access 18.10.2023).

[41] A National Security Strategy for A New Century, the White House, December 1999, p.13, https://history.defense.gov/Portals/70/Documents/nss/nss1999.pdf?ver=SLo909OTm5lAh0LQWBrRHw%3d%3d (Access 18.10.2023).

[42] A National Security Strategy For A Global Age, The White House, December 2000, https://history.defense.gov/Portals/70/Documents/nss/nss2000.pdf?ver=vuu1vGIkFVV1HusDPL21Aw%3d%3d (Access 18.10.2023).

In the 2000 year's strategy, which can be considered as a summary of the previous National Security Strategies of the Clinton administration, as in other strategies, it was emphasized that environmental problems are not only the problems of the US but also of the whole world, and therefore, the need for international cooperation on a global scale in solving the problem.[43]

As a National Security Strategy document where the need for international cooperation on a global scale in solving the environmental problem issue is stated very clearly in this context; in the 1993 National Security Strategy document, this issue was evaluated as follows:[44]

> *"Environmental degradation is one of the most pressing global problems. Deforestation, climate change, air and water pollution, and depletion of water supplies have farreaching effects on the capacity of countries to sustain economic growth and ensure a healthy environment for their citizens. Environmental problems transcend national boundaries. Air and water pollution in one country can affect far distant countries as well as those nearby. Some problems, such as ozone depletion and climate change, can have a global impact. In many developing countries, environmental degradation is already causing serious health problems and limiting economic development. Addressing these environmental issues requires a global effort. The United States has established some of the strictest environmental standards in the world, and we need to live up to them. However, we are not immune to the effects of environmental degradation elsewhere. The United States is already playing an active role in supporting multinational environmental programs, population control initiatives, and research on global problems. We will continue to advance international cooperation on environmental issues and support this effort with adequate funding. We especially need to ensure that environmental concerns are integrated fully into our overall economic and trade policies. Economic growth and environmental protection can be made complementary objectives to be pursued together."*

The main emphasis on environmental problems has been placed by the US in its National Security Strategy documents of 1990s, stating that environmental problems are one of the most serious problems faced by the world, that this problem will continue to increase unless action is taken in cooperation, and that it may create serious consequences for the whole world in the future.[45]

It has been seen that, throughout the 1990s, the issue of environmental security has been a priority issue for the US in both national and global policies. However, it is a bit difficult to say the same for the 2000s. With the beginning of the 2000s, it can be said that environmental security issues have fallen lower in the list of priority security issues of the US compared to the

[43] *İbid.*
[44] National Security Strategy Of The United States, The White House, January 1993, p.11-12, https://history.defense.gov/Portals/70/Documents/nss/nss1993.pdf?ver=Dulx2wRKDaQ-ZrswRPRX9g%3d%3d (Access 26.11.2023).
[45] National Security Strategy, Historical Office Office of the Secretary of Defense, https://history.defense.gov/Historical-Sources/National-Security-Strategy/ (Access 10.09.2023).

1990s. In the 2000s, "environmental security" took its place in US foreign policy priorities only after a long period of time. When the issue is considered in the context of the process, it is obvious that administrations always look at the issue from different perspectives during changing presidential periods. While the environmental problem is among the main issues on the agenda as a global and serious problem by some administrations, it has been observed that this is not the case in every administration period.

During the George W. Bush administration, which came to power in 2001, until Barack Obama took office as president, environmental security was not among the priority security issues on the US agenda. In fact, in the 2002 strategy, the first National Security Strategy document of George W. Bush's presidency, the issue of environment was mentioned only as a concept in a few places in the strategy document. It has been seen that environmental problems or what strategies will be followed by the US to solve these problems were not among the issues emphasized in the strategy.[46]

In the 2006 National Security Strategy, just like in the 2002 strategy, the environmental issue was not addressed under a separate heading, unlike in the 1990s strategies. However, it is seen that the environmental issue is mentioned in two places in the 2006 strategy, within the context of security problems and environmental degradation. In the 2006 strategy, the issue of environment was first mentioned in the section where relations with China were discussed:[47] "… *We will work to increase our cooperation to combat disease pandemics and reverse environmental degradation.* …" And secondly mentioned under the title of *"Engage the Opportunities and Confront the Challenges of Globalization"* with the words:[48]

> *"… Globalization has exposed us to new challenges and changed the way old challenges touch our interests and values, while also greatly enhancing our capacity to respond. Examples include: … Environmental destruction, whether caused by human behavior or cataclysmic mega-disasters such as floods, hurricanes, earthquakes, or tsunamis. …"*

When it comes to the 2010 Strategy, which is the first National Security Strategy document of the presidency of Barack Obama, who took over the presidency after George W. Bush, it is seen that the environmental issue is relatively more included in this strategy compared to the 2006 strategy. However, it has been observed that the environmental issue is not included

[46] The National Security Strategy Of The United States of America, The White House, September 2002, https://history.defense.gov/Portals/70/Documents/nss/nss2002.pdf?ver=oyVN99aEnrAWij A c _O5eiQ%3d%3d (Access 10.09.2023).
[47] The National Security Strategy Of The United States of America, The White House, March 2006, p.41, https://history.defense.gov/Portals/70/Documents/nss/nss2006.pdf?ver=Hfo1-Y5B6 CMl8 yHp X4x6IA%3d%3d (Access 10.08.2023).
[48] İbid., p.47.

as widely in this strategy as it was in the strategies of the 1990s.[49] Even though the environmental issue was not included in detail in the context of threats to security in the 2010 strategy, the issue of climate change in the context of environmental problems was evaluated quite extensively in this strategy. Although climate change is mentioned in many parts of the strategy in the context of posing a threat to the security of the United States and other countries in the world, the part where climate change is emphasized more is under the title of "*Sustain Broad Cooperation on Key Global Challenges*". Under that title it has been stated as follows how climate change poses a serious problem for the security of the US and the entire World:[50]

> *"… Many of today's challenges cannot be solved by one nation or even a group of nations. The test of our international order, therefore, will be its ability to facilitate the broad and effective global cooperation necessary to meet 21st century challenges. … In addition, other key challenges requiring broad global cooperation include:*
>
> *Climate Change: The danger from climate change is real, urgent, and severe. The change wrought by a warming planet will lead to new conflicts over refugees and resources; new suffering from drought and famine; catastrophic natural disasters; and the degradation of land across the globe. The United States will therefore confront climate change based upon clear guidance from the science, and in cooperation with all nations—for there is no effective solution to climate change that does not depend upon all nations taking responsibility for their own actions and for the planet we will leave behind. …"*

In the 2015 National Security strategy, the focus was on climate change rather than environmental security. In fact, climate change was also mentioned in the strategy as one of the most important strategic risks to US interests.[51] And under the title "*Confront Climate Change*", the issue of climate change was addressed as follows:[52]

> *"Climate change is an urgent and growing threat to our national security, contributing to increased natural disasters, refugee flows, and conflicts over basic resources like food and water. The present day effects of climate change are being felt from the Arctic to the Midwest. Increased sea levels and storm surges threaten coastal regions, infrastructure, and property. In turn, the global economy suffers, compounding the growing costs of preparing and restoring infrastructure. America is leading efforts at home and with the international community to confront this challenge…"*

In the 2017 strategy, which is the first National Security Strategy document of Donald J. Trump's presidency, it was seen that neither environmental problems nor climate change were among the issues that the

[49] National Security Strategy, The White House, May 2010, https://obamawhitehouse.archives.gov/sites/default/files/rss_viewer/national_security_strategy.pdf (Access 12.10.2023).
[50] *İbid.*, p.47.
[51] National Security Strategy, The White House, February 2015, p.2, https://history.defense.gov/Portals/70/Documents/nss/NSS2015.pdf?ver=TJJ2QfM0McCqL-pNtKHtVQ%3d%3d (Access 23.11.2023).
[52] *İbid.*, p.12.

strategy drew attention to.[53]

During Trump's presidency, unlike the Obama era policies regarding environmental problems or climate change were not at the top on the agenda. However, after Trump, with Joe Biden's presidency, it can be said that the environment and climate change issues have quickly entered the agenda as the priorities of the new administration. It can be said that Biden has had an attitude towards re-joining the Paris Agreement since the first days of his presidency. Rejoining the Paris Agreement, which the United States withdrew from during Trump's presidency[54], has been an issue that Biden has focused on since the first days of his presidency.[55]

On 27 January 2021, at "Remarks of President Before Signing Executive Actions on Tackling Climate Change, Creating Jobs, and Restoring Scientific Integrity" Biden has emphasized the priority of climate change as follows:[56]

> *"… When we think of climate change, we think of it — this is a case where conscious and convenience cross paths, where dealing with this existential threat to the planet and increasing our economic growth and prosperity are one in the same. When I think of climate change, I think of — and the answers to it — I think of jobs. … climate change will be at the center of our national security and foreign policy. …"*

And the US officially rejoined the Paris Agreement on 19 February 2021.[57] Secretary of State Antony Blinken stated it with the following words:[58]

> *"On January 20, on his first day in office, President Biden signed the instrument to bring the United States back into the Paris Agreement. Per the terms of the Agreement, the United States officially becomes a Party again today. The Paris Agreement is an unprecedented framework for global action. … Its purpose is both simple and expansive: to help us all avoid catastrophic planetary warming and to build resilience around the world to the impacts from climate change we already see. Now, as momentous as our joining the Agreement was in 2016 — and as momentous as our rejoining is today — what we do in the coming weeks, months, and years is even more important. You have*

[53] National Security Strategy Of The United States Of America, The White House, December 2017, https://history.defense.gov/Portals/70/Documents/nss/NSS2017.pdf?ver=CnFwURrw09pJ0q5EogFpwg%3d%3d (Access 23.11.2023).
[54] Matt McGrath, "Climate change: US formally withdraws from Paris agreement", 4 November 2020, BBC, https://www.bbc.com/news/science-environment-54797743 (Access 16.10.2023).
[55] Oliver Milman, "Biden returns US to Paris Climate Accord hours after becoming president", 20 jan 2021, The Guardian, https://www.theguardian.com/environment/2021/jan/20/paris-climate-accord-joe-biden-returns-us (Access 16.10.2023).
[56] "Remarks by President Biden Before Signing Executive Actions on Tackling Climate Change, Creating Jobs, and Restoring Scientific Integrity", The White House, 27 January 2021, https://www.whitehouse.gov/briefing-room/speeches-remarks/2021/01/27/remarks-by-president-biden-before-signing-executive-actions-on-tackling-climate-change-creating-jobs-and-restoring-scientific-integrity/ (Access 18.10.2023).
[57] "The United States Officially Rejoins the Paris Agreement, Press Statement Antony J. Blinken, Secretary of State", U.S. Department of State, 19 February 2021, https://www.state.gov/the-united-states-officially-rejoins-the-paris-agreement/ (Access 18.10.2023).
[58] İbid.

> *seen and will continue to see us weaving climate change into our most important bilateral and multilateral conversations at all levels. In these conversations, we're asking other leaders: how can we do more together? Climate change and science diplomacy can never again be "add-ons" in our foreign policy discussions. Addressing the real threats from climate change and listening to our scientists is at the center of our domestic and foreign policy priorities. …"*

And when we look at the 2022 strategy, which is the second National Security Strategy of Biden's presidency after the 2021 Interim National Security Strategic Guidance[59], we see that the strategy draws attention to the issue of environmental protection with the following words under the title "*Protect Sea, Air, and Space*":[60]

> *"People around the world depend on the sea, air, and space for their security and prosperity. … They contain biodiversity vital to food security, clean air and water, a stable climate, and health and wellbeing. Threats to these systems—including excessive maritime and airspace claims, pollution and unregulated deforestation, and wildlife trafficking and illegal, unreported, and unregulated fishing—impact governments' abilities to meet basic human needs and contribute to political, economic, and social instability. …"*

And in the same strategy under the title "*Climate and Energy Security*", the fact that climate change is a vital problem for the whole world is evaluated with the following words:

> *"The climate crisis is the existential challenge of our time. A warming planet endangers Americans and people around the world—risking food and water supplies, public health, and infrastructure and our national security. Without immediate global action to reduce emissions, scientists tell us we will soon exceed 1.5 degrees of warming, locking in further extreme heat and weather, rising sea levels, and catastrophic biodiversity loss. …"*[61]

Conclusion

Among the global security problems in the 2020s, environmental problems are the problems for which the search for solutions has increased on a global scale. When the diversity of environmental problems and the extent of their impacts are considered, it is clear that efforts to solve these problems require international cooperation with broad participation. In the face of global problems, in the search for solutions to problems, in the efforts and initiatives in this direction, the attitudes of the countries, which are described as the global powers of the international system, towards the problems, the policies they follow, have great importance within the context of the impact of great powers on other countries. From this point of view, it

[59] Interim National Security Strategic Guidance, The White House, March 2021, https://www.whitehouse.gov/wp-content/uploads/2021/03/NSC-1v2.pdf (Access 12.11.2023).
[60] National Security Strategy, The White House, October 2022, p.45, https://www.whitehouse.gov/wp-content/uploads/2022/10/Biden-Harris-Administrations-National-Security-Strategy-10.2022.pdf (Access 20.11.2023).
[61] Ibid., p.27.

can be thought that analyzing whether the attitude, behavior and orientation of the US, which can be considered as the top global power in today's international system, towards environmental problems, and whether its policies have changed with the process is important in two respects. It is important in terms of understanding both the approach of a global power to global problems and the effect of this approach on the other countries attitute to global problems.

In this regard, while evaluating what kind of attitude the US has adopted towards global environmental problems and whether this attitude has changed over time, it has been seen that the attitude of the US towards environmental problems has differed in almost every presidential term. With regard to environmental problems, which began to be among the issues considered at the top of the international security agenda in the 1990s after the Cold War period, each US president's approach to the problem has differed from 1990 to the present. While some administrations describe environmental problems as vital security problems, some do not consider these problems within the scope of the same vitality.

However, the point that all administrations, which consider environmental problems as threats to the security of the world, have emphasized and highlighted is that global cooperation for the solution of environmental problems is essential.

CLIMATE CHANGE AND THE GREAT POWER COMPETITION: A FOCUS ON CHINA'S ENVIRONMENTAL STRATEGY

Haşim Türker[1]

Introduction

In an era where the imperatives of climate change are reshaping global politics, the traditional contours of great power competition are being redrawn. Once dominated by military might and economic prowess, the arena of international relations is increasingly influenced by a new, yet critical determinant: environmental strategy. This reconfiguration of global dynamics is nowhere more apparent than in the rise of China, a nation that stands at the crossroads of environmental challenge and geopolitical ambition.

China's ascent to global prominence is not just a story of economic success; it is also a tale of an environmental paradox. As the world's largest emitter of greenhouse gases, China's environmental footprint is colossal, casting a long shadow over global efforts to combat climate change. Yet, simultaneously, China has emerged as a global leader in renewable energy investment, channeling vast resources into green technologies. This dichotomy places China at the heart of a complex nexus where environmental policy intersects with the pursuit of great power status.

The strategic implications of China's environmental policies extend far beyond its borders. In the grand chessboard of international relations, climate change policies are not mere domestic concerns; they are instruments of diplomacy, tools of soft power that shape and are shaped by the tussle for global influence. China's approach to tackling environmental issues thus becomes a lens through which to view its broader geopolitical strategies, offering insights into its role in an evolving world order.

This chapter seeks to unravel the multifaceted role of environmental policy in the context of great power competition, with a focus on China. It will delve into the nation's environmental challenges and its strategies to address them, exploring how these efforts are intertwined with its global ambitions. In doing so, the chapter aims to illuminate the broader implications of China's environmental strategy for international relations, examining the potential for cooperation, conflict, and competition in a world where climate change is as much a political issue as it is an environmental

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one.

The significance of this exploration cannot be overstated. Understanding China's position and actions in the realm of environmental politics is crucial, not just for academic discourse, but also for shaping effective and informed global policy responses. As the world grapples with the pressing challenges of climate change, the intersection of environmental strategy and great power competition emerges as a pivotal domain, one that will undoubtedly shape the future of international relations.

Theoretical Framework

The intersection of environmental policy and great power politics represents a complex and multifaceted domain within the realm of International Relations. This complexity is especially pronounced when examining the strategies of emerging global powers, such as China, whose ascendancy on the world stage is intricately linked to its approach to environmental challenges. The significance of environmental issues in the 21st century, marked by global climate change, resource scarcity, and environmental degradation, necessitates a deeper understanding of how these challenges are navigated by major powers within the international system.

The objective of this theoretical framework is two-fold. First, it aims to elucidate the dynamics of environmental policy as a strategic element in the broader schema of great power politics. Second, it seeks to specifically analyze China's environmental strategies through the lens of key International Relations theories. These theories provide distinct perspectives and insights, enabling a more nuanced understanding of China's actions and policies in the environmental domain.

In this context, the relevance of incorporating theoretical perspectives from Political Science and International Relations is paramount. Theories such as Realism, Liberalism, and Constructivism offer valuable tools for dissecting and interpreting state behavior, particularly in areas where geopolitical interests intersect with global environmental concerns. By applying these theories to China's environmental policy, this section aims to unravel the complex interplay of power, cooperation, norms, and identity that shapes the nation's approach to environmental issues.

In doing so, this framework not only contributes to the academic discourse on environmental policy in the realm of great power politics but also provides insights into the practical implications of these strategies. As the world grapples with mounting environmental challenges, understanding the strategic calculations and normative considerations of major powers like China is crucial in anticipating future trends and formulating effective responses at both the national and international levels.

Realism and Environmental Policy

Realism, as a predominant theory in International Relations, posits that states are primarily concerned with their own survival and power within an anarchic international system. This perspective views states as rational actors, seeking to maximize their power and security in a competitive global arena. Realism, therefore, provides a lens through which state behavior can be understood, particularly in terms of strategic calculations and power dynamics.[2]

In the context of environmental policy, a Realist approach suggests that states will engage in environmental initiatives when they perceive it to be in their strategic interest. This could be driven by the desire to secure access to natural resources, maintain geopolitical stability, or enhance their international standing. From this viewpoint, environmental policy is not just a matter of ecological concern but also a strategic tool in the pursuit of national interests.[3]

Under the Realist perspective, China's environmental strategies can be seen as a strategic extension of its pursuit for national power and security. This approach is evident in how China's environmental policies are closely linked to securing vital resources and ensuring geopolitical stability, particularly in securing energy and water resources and mitigating resource-related conflicts. Furthermore, China's active participation in international environmental initiatives, like the Paris Agreement, can be interpreted as a strategic move to enhance its international standing and exert influence in global governance. These actions align with the Realist view that states, driven by self-interest, engage in environmental policies when they align with their broader objectives of national security and power enhancement. This perspective provides a critical understanding of how power dynamics and security concerns influence China's environmental policy decisions.[4]

While Realism offers valuable insights into the strategic dimensions of environmental policy, it is important to acknowledge its limitations. Realism may overlook the complexities of environmental issues, which often require cooperation and collective action beyond mere power calculations. It also tends to downplay the role of non-state actors and international institutions in shaping state behavior in the environmental realm.

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[2] Duncan Bell, "Political Realism and International Relations," Philosophy Compass, Vol. 12, no. 2, e12403, https://doi.org/10.1111/phc3.12403.
[3] Anatol Lieven, "Climate Change and the State: A Case for Environmental Realism," in Survival: Global Politics and Strategy, Routledge, 2020, p.7–26.
[4] Muzhi Luo, Hongyi Sun, and Zhekai Zhang, "Analysis of China's Role and Motivation in the Global Environmental Governance System Based on Neo-Liberalism and Realism," Journal of Education, Humanities and Social Sciences, no. 6, 2022, p.9–14.

Liberalism and Global Environmental Cooperation

Liberalism in International Relations posits that states are not just concerned with power and security, but also seek to maximize their absolute gains through cooperation and participation in international institutions. This theory underscores the significance of interdependence, international norms, and the role of global governance structures in facilitating cooperative solutions to shared problems.[5]

In the realm of environmental policy, Liberalism suggests that global environmental challenges are best addressed through collaborative efforts and adherence to international agreements and norms. This perspective recognizes the transboundary nature of environmental issues and the necessity of coordinated global responses.[6]

In applying Liberalism to China's environmental strategy, we observe a distinct alignment with international cooperation and institutional participation. China's active engagement in global environmental agreements, such as the Paris Agreement, exemplifies its commitment to collaborative international efforts in addressing climate change and related challenges. This approach is further reinforced by China's integration into global supply chains, emphasizing the interdependent relationship between environmental sustainability and economic development. Additionally, China's cooperative ventures with various non-state actors, including multinational corporations, NGOs, and international organizations, reflect a Liberal perspective that recognizes the importance of diverse actors in environmental governance. This multifaceted engagement highlights the significance of cooperation and institutional frameworks in shaping China's environmental policies, in line with Liberal theories of international relations.[7]

While Liberalism sheds light on the cooperative aspects of environmental policy, it is important to recognize its limitations. Liberalism can sometimes underestimate the persistent role of power politics and the difficulties in achieving effective international cooperation. Moreover, it may not fully account for instances where state interests clash with global environmental needs or the unequal influence of states in shaping international environmental policies.

[5] Andrew Moravcsik, Liberalism and International Relations Theory, Center for International Affairs, Harvard University Cambridge, MA, 1992.
[6] David J. Sousa and Christopher McGrory Klyza, "New Directions in Environmental Policy Making: An Emerging Collaborative Regime or Reinventing Interest Group Liberalism," Nat. Resources J., 47, 2007, p.377.
[7] Yixian Sun, "The Changing Role of China in Global Environmental Governance," Rising Powers Quarterly, Vol. 1, no. 1, 2016, p.43–53.

Constructivism and Environmental Norms

Constructivism in International Relations argues that state behavior is not solely driven by material interests but also by ideational factors such as norms, values, and identities. This theory suggests that the international system is socially constructed, and states' actions are influenced by these social structures and shared understandings.[8]

In the context of environmental policy, Constructivism posits that global environmental norms and the identity of states as responsible global actors play a significant role in shaping their environmental strategies. This perspective highlights how states internalize and respond to evolving global norms regarding environmental responsibility and sustainability.[9]

From a Constructivist viewpoint, China's environmental strategies are significantly shaped by global environmental norms and its evolving international identity as a responsible global power. This approach is reflected in China's adoption of sustainable practices and its efforts to align its national policies with international environmental expectations. China's environmental initiatives are also influenced by its desire to project a positive image on the global stage and to be perceived as a leader in environmental stewardship. Furthermore, the perceptions of both its domestic populace and the international community play a critical role in shaping China's environmental policies. This orientation towards global norms and identity illustrates how China's environmental actions are not only about pragmatic interests but also about aligning with the expectations and standards of the international community, showcasing the influence of ideational factors in its policy decisions.[10]

While Constructivism provides valuable insights into the role of norms and identities in shaping environmental policies, it is important to acknowledge its limitations. Constructivism may sometimes overlook the tangible power dynamics and material interests that also play a crucial role in state behavior. Additionally, it might overemphasize the malleability of state identities and the ease with which global norms are internalized.

China's Environmental Challenges

As we delve deeper into the specifics of China's environmental narrative, it becomes crucial to dissect the myriad ecological challenges it confronts,

[8] Ted Hopf, "The Promise of Constructivism in International Relations Theory," International Security, Vol. 23, no. 1, 1998, p.171–200.
[9] Peter M. Haas, "Social Constructivism and the Evolution of Multilateral Environmental Governance," in Globalization and Governance, Routledge, 2003, p.103–33.
[10] Steven Jackson, "Greening the Belt While Paving the Road? China's Environmental Diplomacy Challenge," American Political Science Association, 2020, https://preprints.apsanet.org/engage/apsa/article-details/5f6cdcecb155680019126169 (Access 01.12.2023).

beginning with the pervasive issue of air pollution and extending to water scarcity, land degradation, and the broader impacts of climate change. These challenges are not isolated concerns; they reflect the broader environmental cost of China's meteoric rise as an industrial powerhouse. From the smog-laden cities to its parched farmlands, China's environmental predicaments symbolize the delicate equilibrium it must maintain between sustained economic growth and environmental responsibility. These issues not only bear domestic significance but also carry profound international implications, influencing China's global standing, public health priorities, and strategic decisions in the arena of global environmental governance. By exploring the origins, consequences, and policy responses to these multifaceted environmental challenges, we gain critical insights into China's approach to balancing its economic ambitions with its environmental and global commitments—a balancing act that is increasingly central to the dynamics of great power competition. This comprehensive examination begins with an exploration of air pollution, a pressing and visible challenge that epitomizes the complex environmental issues at the heart of China's rapid development and its evolving role in the global environmental order.

Air Pollution in China: Current Challenges

China's remarkable economic ascent since the late 1970s, a period characterized by rapid industrial expansion, has been accompanied by significant environmental costs, notably in air quality deterioration. This development phase, while lifting 800 million people out of poverty and driving an average annual GDP growth of around 10%, has led to severe air pollution issues across the nation.[11]

The air quality in many of China's cities falls far below the World Health Organization's (WHO) standards. In East Asia, about 11% of the cities, all in China, have reported annual average PM2.5 concentrations that are seven times greater than WHO guidelines. Shenyang, located in northeastern China, has been identified as having the highest level of pollution in China.[12]

The health implications of China's air pollution are staggering, with an estimated average of 1.2 million premature deaths annually attributed to poor air quality.[13] The key drivers of this environmental issue are the country's significant increase in coal-powered industrial production and electricity demand, alongside a rise in private vehicle usage. Approximately 48% of

[11] Ruoqi Li et al., "Balance between Poverty Alleviation and Air Pollutant Reduction in China," Environmental Research Letters 16, no. 9, 2021: 094019.
[12] "World Air Quality Index (AQI) Ranking | IQAir," November 30, 2023, https://www.iqair.com/world-air-quality-ranking (Access 01.12.2023).
[13] Qingli Zhang et al., "Overview of Particulate Air Pollution and Human Health in China: Evidence, Challenges, and Opportunities," The Innovation, 2022, https://www.cell.com/the-innovation/pdf/S2666-6758(22)00108-4.pdf (Access 23.09.2023).

China's CO2 emissions are attributed to the industrial sector, with coal power and transportation being significant contributors.[14]

Despite its pledge for net-zero emissions before 2060, China remains the world's largest coal consumer and producer, with coal accounting for 60% of its electricity demand. In response to the post-pandemic economic recovery and an energy crisis, there has been an increase in coal power capacity, leading to a near-record level of CO2 emissions.[15]

Encouragingly, there has been a significant improvement in air quality in recent years. Major Chinese cities have seen a 21% reduction in annual PM2.5 concentrations since 2018. Notably, Beijing met its air pollution targets for the first time in 2021, indicating progress in the nation's efforts to combat air pollution.[16]

Tackling air pollution is a top priority for the Chinese government. President Xi Jinping has labeled this issue as one of China's 'three tough battles,' with the long-term strategy focusing on carbon emission intensity reduction through non-fossil fuel energy sources.[17] Significant investments have been made in clean energy technologies, including wind and solar power. Additionally, smart city initiatives in urban areas like Beijing and Nanjing are being implemented to reduce pollution from industries and traffic, adopting technologies to identify various pollutants and develop green infrastructure.[18]

This detailed exploration into the issue of air pollution in China highlights the severity of the environmental challenge and the strategic initiatives undertaken by the government to address it. These efforts reflect China's broader environmental and geopolitical strategy, demonstrating its commitment to balancing economic growth with environmental sustainability.

Water Scarcity and Pollution in China: A Critical Environmental Challenge

In the wake of China's rapid industrialization and urban expansion, the nation confronts a critical environmental challenge: water scarcity and

[14] International Energy Agency, An Energy Sector Roadmap to Carbon Neutrality in China, OECD Publishing, 2021.
[15] World Economic Forum, "Fostering Effective Energy Transition 2023," World Economic Forum, https://www.weforum.org/publications/fostering-effective-energy-transition-2023/in-full/china/ (Access 30.11.2023).
[16] Martina Igini, "5 Environmental Issues in China in 2023," Earth.Org, March 10, 2023, https://earth.org/environmental-issues-in-china/ (Access 27.10.2023).
[17] China Daily, "President Renews His Call to Win '3 Tough Battles,"', https://www.chinadaily.com. cn/a/201804/30/WS5ae65326a3105cdcf651b435.html (Access 30.11.2023).
[18] Zhengge Tu, Jiayang Kong, and Renjun Shen, "Smart City Projects Boost Urban Energy Efficiency in China," Sustainability, Vol. 14, no. 3, 2022, 1814.

pollution. This dual crisis, marked by regional disparities, not only threatens public health and ecosystems but also bears significant implications for food security and economic stability.[19]

China's northern region, a hub for agricultural and industrial activity, struggles with severe water scarcity, receiving a meager 20% of the country's water resources. Simultaneously, other areas are plagued by water pollution, primarily due to unchecked industrial discharge and agricultural runoff. Factories often release untreated effluents into water bodies, while excessive use of fertilizers in agriculture leads to nutrient pollution, jeopardizing both surface and groundwater sources. This situation is distressing for the millions who rely on these contaminated sources for their daily needs.[20]

In response, the Chinese government has initiated a range of measures. One notable project is the South-North Water Transfer Project, designed to alleviate the water shortage in the north by diverting water from the south. Additionally, the "Action Plan for Water Pollution Prevention and Control" aims to reduce contaminants in key river basins and enhance wastewater treatment processes.[21]

Despite these efforts, the implementation of water policies faces hurdles. The enforcement of regulations is often inconsistent, and the vast and complex water management system demands substantial investments, especially in rural wastewater facilities. Balancing the water needs for various sectors while ensuring ecological conservation remains a complex task.[22]

The water crisis in China transcends its borders, influencing global food security and economic stability. Effective water management is pivotal for China's sustainable development and its global environmental commitments. The country's approach to addressing water scarcity and pollution is not only a domestic concern but also a strategic element in its larger environmental and geopolitical narrative. How China navigates these water challenges offers insights into its broader environmental strategies and its role in the international arena of sustainable resource management.[23]

[19] Ting Ma et al., "Pollution Exacerbates China's Water Scarcity and Its Regional Inequality," Nature Communications, Vol. 11, no. 1, 2020, 650.
[20] Jennifer Bradley, "Water: The Dragon's Achilles Heel: How Water Insecurity Will Prevent the PRC from Maintaining Global Preeminence," Comparative Strategy, Vol. 39, no. 3, 2020, p.261–276, https://doi.org/10.1080/01495933.2020.1740571.
[21] Hou Li'an et al., "Comprehensive Evaluation on China's Law on Water Pollution Prevention and Control," Strategic Study of Chinese Academy of Engineering, Vol. 24, no. 5, 2022, p.126–136, https://doi.org/10.15302/J-SSCAE-2022.05.015.
[22] Shikun Cheng et al., "Development and Application of Biogas Project for Domestic Sewage Treatment in Rural China: Opportunities and Challenges," Journal of Water, Sanitation and Hygiene for Development, Vol.7, no. 4, 2017, p.576–588.
[23] Hilmi S. Salem, Musa Yahaya Pudza, and Yohannes Yihdego, "Water Strategies and Water–Food Nexus:

Land Degradation and Deforestation

In tackling the intertwined challenges of land degradation and deforestation, China faces a complex environmental dilemma that is deeply rooted in its rapid economic development and urban expansion. This multifaceted issue not only impacts the nation's ecological health but also has significant implications for agricultural productivity, biodiversity, and broader global environmental concerns.

China's vast landscapes have been significantly altered by human activities, leading to extensive land degradation and deforestation. Overcultivation, overgrazing, and deforestation, driven by the demands of agricultural expansion and urban development, have resulted in widespread soil erosion, loss of fertility, and a reduction in forest cover. These changes have profound effects on the environment, with about 40% of China's land area suffering from degradation, thus posing threats to agricultural output and food security.[24]

The causes of this degradation are varied, encompassing rapid industrialization that necessitates the conversion of forest and agricultural land for industrial and urban use. In addition, unsustainable agricultural practices, such as the overuse of chemical fertilizers and pesticides, contribute to soil degradation. Deforestation, primarily for timber and agricultural land clearance, exacerbates loss of biodiversity and impacts climate change, given the crucial role of forests in carbon sequestration.[25]

In response, the Chinese government has undertaken several initiatives aimed at combating these issues. Programs like the "Grain for Green" initiative have been pivotal in converting degraded farmland into forest and grassland, helping to restore ecological balance. Furthermore, the establishment of protected areas and large-scale tree-planting campaigns are part of efforts to improve forest cover and combat deforestation.[26]

Despite these initiatives, the challenge of effectively managing land resources and ensuring sustainable land use practices remains daunting. The balance between economic development and environmental conservation is a key issue, and future strategies will need to incorporate sustainable agricultural methods, effective land-use planning, and community

Challenges and Opportunities towards Sustainable Development in Various Regions of the World," Sustainable Water Resources Management, Vol.8, no. 4, 2022, p.114, https://doi.org/10.1007/ s40899-022-00676-3.
[24] Dehua Mao et al., "Land Degradation and Restoration in the Arid and Semiarid Zones of China: Quantified Evidence and Implications from Satellites," Land Degradation & Development, Vol. 29, no. 11 (November 2018): 3841–51, https://doi.org/10.1002/ldr.3135.
[25] *ibid.*
[26] Sijing Qiu and Jian Peng, "Distinguishing Ecological Outcomes of Pathways in the Grain for Green Program in the Subtropical Areas of China," Environmental Research Letters, Vol. 17, no. 2, 2022, 024021.

involvement to successfully tackle land degradation and deforestation.

Moreover, the issue transcends national boundaries, having global environmental implications. Land degradation and deforestation in China are closely linked to worldwide issues such as climate change and biodiversity loss. Consequently, China's approach to these challenges is critical not only for its own ecological and food security but also in terms of its contribution to global environmental governance and adherence to international environmental agreements.

China's handling of land degradation and deforestation reflects the intricate relationship between local actions and global environmental sustainability. It underscores the nation's broader environmental strategies and its evolving role in the international context, highlighting the interconnected nature of environmental stewardship across scales.

Climate Change Impacts

In grappling with the impacts of climate change, China confronts a series of environmental challenges that are both complex and far-reaching. As the world's largest emitter of greenhouse gases, the nation's experiences with climate change are not only significant for its vast population and diverse landscapes but also have global ramifications.

China is increasingly feeling the tangible effects of climate change. Rising sea levels pose a direct threat to its populous coastal cities, while the interior regions face the growing frequency of extreme weather events such as droughts and floods. These climatic shifts have profound implications for agriculture, often exacerbating existing water scarcity issues and threatening food security. Additionally, rural communities, which are more vulnerable to climate-related disruptions, face unique challenges, including displacement and livelihood uncertainties.[27]

In urban areas, the impacts of climate change are manifesting through increased air pollution and heatwaves, exacerbating public health crises and straining infrastructure. The interplay between urbanization and climate change further complicates efforts to maintain sustainable cities. As climate change continues to alter weather patterns, the reliability of renewable energy sources like hydroelectric power is also affected, posing challenges for China's energy transition goals.[28]

The Chinese government has recognized the severity of these challenges and is taking steps to mitigate and adapt to climate change. This includes

[27] Yong-Jian Ding et al., "An Overview of Climate Change Impacts on the Society in China," Advances in Climate Change Research, Vol. 12, no. 2, 2021, p.210–223.
[28] Li Liang et al., "Assessment of the Impact of Climate Change on Cities Livability in China," Science of the Total Environment, no.726, 2020, 138339.

ambitious policies aimed at reducing greenhouse gas emissions, increasing the use of renewable energy, and investing in climate-resilient infrastructure. These actions are in line with China's commitments under international climate agreements and are crucial in its journey towards a more sustainable and environmentally responsible future.[29]

However, the path forward is fraught with challenges. Balancing economic growth with environmental sustainability remains a key dilemma. The effectiveness of China's response to climate change impacts will not only determine the future well-being of its population but will also significantly influence global efforts to address this critical issue. As such, China's strategies and actions in response to climate change are closely watched by the international community, reflecting its growing role and responsibility in global environmental governance.

Policy Responses and Challenges

China's policy responses to its significant environmental challenges reveal a nation actively grappling with the dual imperatives of ecological stewardship and economic development. The Chinese government's approach, marked by a series of ambitious policies and initiatives, reflects its commitment to addressing the pressing issues of air pollution, water scarcity, land degradation, and the impacts of climate change.

At the forefront of these efforts is China's pledge to achieve carbon neutrality by 2060, a commitment that underscores its role in global climate politics. This ambitious target is backed by substantial investments in renewable energy, including wind and solar power, and initiatives to enhance energy efficiency across various sectors. Policies aimed at reducing reliance on coal and transitioning to cleaner energy sources are crucial elements of China's strategy to lower its carbon footprint.[30]

In addressing water scarcity and pollution, China has implemented significant measures such as the South-North Water Transfer Project, aimed at redistributing water resources, and stringent regulations to control industrial and agricultural water pollution. These are complemented by efforts to improve water conservation and wastewater treatment, particularly in urban and industrial areas.[31]

[29] "China's Mid-Century Long-Term Low Greenhouse Gas Emission Development Strategy," October 1, 2021, https://www.fao.org/faolex/results/details/en/c/LEX-FAOC207443/ (Access 29.10.2023).
[30] Yiqun Yang and Kevin Lo, "China's Renewable Energy and Energy Efficiency Policies toward Carbon Neutrality: A Systematic Cross-Sectoral Review," Energy & Environment, April 5, 2023, 0958305X2311674, https://doi.org/10.1177/0958305X231167472.
[31] Jichuan Sheng and Wenge Qiu, "Inter-Basin Water Transfer Policies and Water-Use Technical Efficiency: China's South-North Water Transfer Project," Socio-Economic Planning Sciences 85 (2023): 101432.

To combat land degradation and deforestation, China has launched reforestation programs and initiatives to convert degraded land back to forests and grasslands. The government has also established protected areas and strict regulations to curb illegal logging and promote sustainable forest management. However, the implementation of these policies is not without challenges. Enforcement inconsistencies and the need for balancing economic growth with environmental conservation present ongoing difficulties. The vast scale of China's environmental issues necessitates significant investments in infrastructure, technology, and human resources. Additionally, effective policy execution requires coordination across different government levels and sectors, along with active engagement with local communities and stakeholders.[32]

The Role of Climate Change in Great Power Dynamics

Climate change has emerged as a pivotal factor in the dynamics of great power relations, significantly reshaping traditional geopolitical landscapes. In this evolving scenario, the way major powers address climate change has become a critical element of their global strategy, influencing international relations and power balances. For China, as the world's largest emitter of greenhouse gases, its approach to climate change transcends beyond a mere domestic environmental concern; it is a vital component of its international strategy, impacting its diplomatic relations, economic interests, and global influence.

China's response to climate change is intricately linked to its broader aspirations of becoming a global leader. This involves not only substantial domestic policy shifts towards sustainability and green technology but also active participation in international climate agreements and initiatives. China's leadership in global climate discussions and its investments in renewable energy projects worldwide position it as a key player in shaping the global climate agenda. This strategic positioning in climate diplomacy offers China an avenue to bolster its soft power and enhance its image as a responsible global leader.

Moreover, the geopolitics of climate change has brought new dimensions to great power competition. China's initiatives in renewable energy technologies, such as solar panels and electric vehicles, are not only aimed at reducing emissions but also at gaining a competitive edge in emerging markets. This economic dimension intertwines with the strategic aspects of climate policy, where control over renewable energy resources and technologies becomes a factor in geopolitical power.

[32] Hui Wang et al., "China's Key Forestry Ecological Development Programs: Implementation, Environmental Impact and Challenges," Forests, Vol. 12, no. 1, 2021, p.101.

Additionally, China's response to climate change is seen as a barometer of its willingness and ability to lead on global issues. How China balances its rapid economic growth with environmental sustainability is closely watched by other nations, shaping perceptions and influencing diplomatic relations. The country's actions in this realm are thus a litmus test for its role in the international system and its capacity to contribute to global governance.

Climate Change as a Strategic Priority

China's climate strategy has historically emphasized adaptation over mitigation. This approach, driven by the realization that the country will face the brunt of climate change regardless of mitigation efforts, focuses on preparing for the inevitable impacts of a warming world. This adaptation strategy is extensive, encompassing initiatives like constructing massive water transfer systems, enhancing coastal defenses, and relocating populations vulnerable to climate impacts. [33]

However, this focus on adaptation over mitigation has drawn criticism. China's key mitigation targets, including peaking greenhouse gas emissions by 2030 and achieving carbon neutrality by 2060, are seen as less ambitious compared to its potential for centralized decision-making and resource mobilization. This stance is partly rooted in Beijing's argument that advanced industrial nations, due to their historical carbon emissions, should bear a larger share of mitigation responsibilities.[34]

Behind China's rhetoric of promoting an "ecological civilization" and "ecological security" lies a pragmatic, engineering-based approach to dealing with the growing impacts of climate change. This approach capitalizes on China's unique political economy, enabling it to mobilize vast resources for infrastructure development, land use changes, and focused industrial policies, vital for its adaptation plans.[35] China's prioritization of climate change in its strategic agenda reflects a complex balancing act between domestic adaptation needs and global mitigation responsibilities. This approach, integral to China's domestic stability and global standing, underscores the nation's evolving role in the landscape of great power dynamics, where climate change is increasingly a central element.

Competing with the West in Climate Leadership

The global race for clean energy technology has become a pivotal aspect

[33] Mallie Prytherch, Kenneth G. Lieberthal, and Ryan Hass, "Unpacking China's Climate Priorities," Brookings, https://www.brookings.edu/articles/unpacking-chinas-climate-priorities/ (Access 01.12.2023).
[34] Bo Wang, Junping Yu, and Rui Wu, "Achieving Carbon Neutrality in China: Legal and Policy Perspectives," Frontiers in Environmental Science, no.10, 2022, 2436.
[35] Justin Joseph and Joe Thomas Karackattu, "State Actions and the Environment: Examining the Concept of Ecological Security in China," Environment, Development and Sustainability, Vol. 24, no. 11, 2022, p.13057–13082, https://doi.org/10.1007/s10668-021-01982-0.

of great power competition, particularly between China and Western nations like the United States. China's strategic shift toward leading in low-carbon industries and dominating critical mineral markets for energy transition has redefined its role in this domain. It has become a major player in the global supply chain for solar photovoltaics, lithium-ion batteries, and wind manufacturing, challenging Western dominance in these sectors.[36]

China's approach to the energy transition is not merely industrial but also a broader strategic maneuver. Its substantial investments in renewable energy and dominance in low-carbon technology markets have significant implications for global energy systems and geopolitical dynamics. The U.S., in response, has ramped up its investments in clean energy, indicating a growing recognition of the strategic importance of leading in this sector. However, challenges remain, particularly in the face of China's established lead in the market and supply chain for clean energy technologies.[37]

The competition between the U.S. and China in the realm of clean energy technology extends beyond technological advancements, encompassing vast economic opportunities in the burgeoning market for low-carbon goods. In 2022, global investment in low-carbon energy transition projects and products exceeded $1 trillion for the first time, underscoring the significant economic potential of this market.[38]

The strategic question for the U.S. and other Western powers is not just about competing with China's current dominance in clean energy sectors but also about securing future technological and economic leadership in an increasingly low-carbon global economy. China's success in this arena showcases its strategic foresight in aligning its economic development with global environmental trends, positioning it as a central player in the transition to a green economy.

China's climate diplomacy, particularly with the European Union (EU), has remained a stable aspect of its foreign policy, despite fluctuations in other areas of China-EU relations. The focus on climate change has led to a consensus on deepening cooperation in this field. However, occasional frictions arise, especially regarding green industry development and technology cooperation. These dynamics underline the complexity of China's

[36] Sara Schonhardt, "'It's Just Crazy': How the U.S.-China Energy Race Imperils the Climate Fight," May 18, 2023, https://www.politico.com/news/2023/05/18/us-china-energy-fossil-fuels-00097207# (Access 29.10.2023).
[37] Nikos Tsafos, "China's Climate Change Strategy and U.S.- China Competition," March 17, 2022, https://www.csis.org/analysis/chinas-climate-change-strategy-and-us-china-competition (Access 30.10.2023).
[38] Li Cheng and Zao Xiuye, "Renewable Energy Should Not Be the next Semiconductor in US-China Competition," Brookings, accessed December 4, 2023, https://www.brookings.edu/articles/renewable-energy-should-not-be-the-next-semiconductor-in-us-china-competition/ (Access 04.12.2023).

relationship with the EU, balancing collaboration and competition in green technologies and supply chains.[39]

The diplomatic engagements between China and various countries, including high-profile state visits from France, Brazil, and Gabon, have highlighted climate change as a central theme. These interactions have showcased China's expanding influence in global climate change partnerships. For instance, the joint statements with France and Brazil reflect a deepening commitment to addressing climate issues, with China expanding its cooperation in areas such as nuclear energy and biofuels. These partnerships not only emphasize China's growing role in global climate diplomacy but also highlight its strategic approach to enhancing economic integration and political trust through environmental cooperation.[40]

In the broader context of global climate efforts, China's role has been pivotal, especially in relation to the United States. Their relationship in the context of climate change is characterized by a mix of competition and collaboration. The 28th United Nations Conference of the Parties (COP28) in Dubai serves as a significant platform where global leaders, including China and the U.S., gather to review and establish new climate commitments and strategies. The discussions at COP28, featuring experts and diplomats, highlight the importance of the China-U.S. relationship in shaping global climate efforts. Despite geopolitical tensions, the two countries' cooperation in climate change mitigation and adaptation is seen as crucial for the success of global climate initiatives. This cooperative aspect is particularly significant given the substantial influence both nations wield as the largest producers of greenhouse gas emissions. [41]

Domestic Challenges and Global Perceptions

China's environmental policy faces a multitude of domestic challenges while its actions and commitments significantly influence global perceptions. According to a World Bank Group report, China is in a crucial position to meet its climate commitments and transition to a greener economy, despite facing significant threats from climate change. This transition is essential not only for China's long-term prosperity but also for achieving global climate goals, given China's substantial contribution to global carbon emissions. The challenges are manifold, affecting densely populated and economically vital

[39] Global Times, "China-EU Green Cooperation Carries Great Potential in 2024 despite EV Dispute: Experts," December 1, 2023, https://www.globaltimes.cn/page/202312/1302841.shtml (Access 04.12.2023).
[40] Chris Qihan Zou, "China's Climate Diplomacy Surge," May 6, 2023, https://thediplomat.com/2023/05/chinas-climate-diplomacy-surge/ (Access 01.12.2023).
[41] Saira Bano, "COP28: A Better Climate for US-China Relations? | Lowy Institute," December 1, 2023, https://www.lowyinstitute.org/the-interpreter/cop28-better-climate-us-china-relations (Access 01.12.2023).

low-lying coastal cities, with potential GDP losses estimated between 0.5 and 2.3 percent as early as 2030 due to climate impacts.[42]

China's path to a low-carbon economy is pivotal in the global context and requires massive shifts in resources, innovation, and new technologies. The country's advanced technological capabilities open new avenues for development, but this transition will require significant investments, especially in green infrastructure and technology in the power and transport sectors. The private sector's role is highlighted as crucial in this journey towards carbon neutrality. [43]

The comprehensive set of policy recommendations for various sectors, including energy, industry, building, agriculture, and transport, demonstrates the depth and complexity of China's approach. These recommendations range from accelerating the power sector transition to ensuring a just transition for affected communities. China's efforts in this regard are not without challenges, including the need for public and private collaboration and significant financial investment. Moreover, the transition's impact on employment, especially in emission-intensive sectors like coal, necessitates targeted assistance and policies to ensure a just transition.[44]

Implications for Future Geopolitical Dynamics

The implications of China's environmental policies on future geopolitical dynamics are multifaceted, characterized by a blend of cooperative and competitive elements, particularly in its relations with the United States. Climate action is increasingly influenced by the volatile dynamics of great power competition, with China-U.S. relations acknowledged as crucial for international climate change efforts. However, this cooperation is often impacted by broader geopolitical rivalries, including technological and geostrategic competition and the prospect of military confrontation in regions like the Indo–Pacific.

The approach of both China and the U.S. to climate finance, a crucial aspect of climate action, has significant implications for developing countries. These countries, often the least culpable for climate change but most vulnerable to its impacts, depend on climate finance from industrialized nations. Despite declarative commitments, neither China nor the U.S. has shown significant leadership in concrete terms of climate finance. The discrepancy between their commitments and actual disbursement highlights

[42] World Bank, "China's Transition to a Low-Carbon Economy and Climate Resilience Needs Shifts in Resources and Technologies," World Bank, October 12, 2022, https://www.worldbank.org/ en/ news/press-release/2022/10/12/china-s-transition-to-a-low-carbon-economy-and-climate-resilience-needs-shifts-in-resources-and-technologies (Access 01.12.2023).
[43] *ibid.*
[44] *ibid.*

a gap in global climate financing.[45]

Furthermore, the future of China-U.S. cooperation in climate finance will be influenced by the broader context of their bilateral relations, which have recently been strained. The potential for cooperation in this area exists but is contingent upon the willingness of both nations to separate climate issues from wider tensions. However, this rivalry also presents opportunities to generate positive externalities for developing countries, increasing the flow of bilateral assistance earmarked for climate-friendly projects.

China's Belt and Road Initiative (BRI) has also spurred efforts by the U.S. and others to match China's infrastructure financing in the Global South. Initiatives like the U.S.-led Build Back Better World and the Partnership for Global Infrastructure and Investment are responses to the BRI. These efforts, while heightening geopolitical tensions, also have positive implications for developing countries by increasing funding for climate-resilient infrastructure.[46]

Implications and Strategic Considerations

China's environmental strategies and their execution have far-reaching implications, extending beyond its national borders and influencing the dynamics of global power and international relations. This section delves into the strategic considerations arising from China's environmental policies.

Geopolitical Implications of China's Environmental Policy

China's environmental policies have significant geopolitical implications, reflecting a complex interplay between cooperative global governance and great power competition, particularly in its relations with the United States. This dynamic is evident in the arena of climate finance, where the actions of China and the U.S. have far-reaching impacts on developing countries most vulnerable to climate change. To date, climate finance has been a tangential aspect of the China–U.S. climate dialogue, but it presents an opportunity for cooperative leadership, despite the strategic rivalry between the two powers.[47]

Despite commitments to climate finance, neither China nor the U.S. has shown significant leadership in concrete terms. However, their competition for leadership as development donors has led to pledges of billions to the developing world in increasingly climate-friendly terms. There is an official and unofficial consensus that climate financing could be a promising area for

[45] Zhou Jiayi and Zha Daojiong, "Climate Finance and Geopolitics: The China–US Factor," November 28, 2023, https://www.sipri.org/commentary/essay/2023/climate-finance-and-geopolitics-china-us-factor (Access 01.12.2023).
[46] Patsy Widakuswara, "'Build Back Better World': Biden's Counter to China's Belt and Road," Voice of America, November 4, 2021, https://www.voanews.com/a/build-back-better-world-biden-s-counter-to-china-s-belt-and-road/6299568.html (Access 02.12.2023).
[47] Jiayi and Daojiong, *ibid.*

China-U.S. cooperation, with the potential to channel the turbulence of their relations into positive outcomes globally.[48]

Engagement in multilateral forums such as the UN and G20, and in key international financial institutions like the World Bank, offers a more collaborative environment for prioritizing climate finance. This joint engagement could stimulate wider global ambitions, encouraging other economies to close the gap between obligations and actions. Additionally, BRI has prompted concerted efforts by the U.S. and others to match China's infrastructure financing in the Global South, leading to initiatives aimed at sustainable infrastructure development. China's adherence to its promise not to build coal-fired power plants abroad and the increase in clean and renewable energy projects it funds also contribute to its global environmental influence.[49]

China's Role in Setting Global Environmental Standards

China's role in setting global environmental standards is increasingly influential, reflecting its strategic ambitions and technological advancements. The launch of the China Standards 2035 strategy in 2018, following the 'Made in China 2025' strategic plan, aims to set global standards for emerging technologies such as 5G, IoT, and AI. This strategy covers a range of sectors, including carbon standardization and ecosystem protection, with a focus on promoting high-quality economic and social development services and enhancing government-coordinated development of standards.[50]

The strategy emphasizes empowering Chinese enterprises to participate in standardization, potentially gaining economic benefits from licenses and royalties. By improving efficiency across supply chains and driving innovation, Chinese companies can gain comparative advantages globally. This is especially critical in setting norms and standards in key sectors. China views standardization as a way to strengthen its R&D ecosystem, particularly in critical and emerging industries. Streamlining and integrating sector standard codes is seen as a way to reduce complexity and improve management efficiency. [51]

China's increasing role in international standard-setting bodies demonstrates its growing involvement in shaping the future direction of technological development. Being able to determine standards allows China

[48] Jiayi and Daojiong, *ibid.*
[49] Archana Chaudhary, "The G20 Delhi Declaration Set the Climate Finance Agenda For COP28," September 14, 2023, https://thediplomat.com/2023/09/the-g20-delhi-declaration-set-the-climate-finance-agenda-for-cop28/ (Access 02.12.2023).
[50] Wu Yi, "The China Standards 2035 Strategy: Analyzing Recent Developments," China Briefing News, July 26, 2022, https://www.china-briefing.com/news/china-standards-2035-strategy-recent-developments-and-their-implications-foreign-companies/ (02.12.2023).
[51] *ibid.*

more control over system design and rulemaking, granting a premium position in global markets. The growth in China's ISO and IEC proposals and technology patent applications showcases its expanding influence in the standard-setting arena. Significant investments in advancing technologies, particularly in the digital economy, underscore China's commitment to maintaining a leading role in the global economy.[52]

A significant aspect of China's strategy involves green and sustainable development. The Action Plan underlines the importance of carbon-neutral standards to regulate large-scale energy consumption and maintain energy efficiency, aligning with China's dual carbon goals. China's head start in the renewable energy market, particularly in solar power and EV batteries, and its growing energy storage market position it as a global leader, influencing international environmental standards and creating new opportunities in the green economy.[53]

Socio-Economic Transformations Within China:

China's transition to a more sustainable economy involves significant socio-economic transformations, affecting industries, labor markets, and social structures. This transition is essential for maintaining social stability and economic growth while addressing environmental concerns.

China's economic development, historically manufacturing-driven and export-oriented, faces challenges such as sluggish external demand and the potential automation of labor-intensive jobs. The Asia-Pacific region, including China, is grappling with how to balance economic growth with social inclusiveness and environmental sustainability. The traditional growth model is being reevaluated in favor of a more holistic approach that integrates innovation, inclusivity, and sustainability.[54]

The implementation of the China National Sustainable Communities (CNSCs) policy over 30 years provides insights into China's approach to sustainable development. The selection of SDGs by local governments in China reflects regional disparities, with economically stronger areas focusing more on human well-being, while less developed regions prioritize economic development, infrastructure, and industrialization. Research on SDGs categorizes into debates on the scientific rationality of SDGs and assessments of trade-offs and synergies between them. In China's context, policies to

[52] John Seaman, "China and the New Geopolitics of Technical Standardization," Notes de l'Ifri, no.34, 2020, p.20–21.
[53] Colleen Howe, "Explainer: The Numbers behind China's Renewable Energy Boom", November 15, 2023, https://www.reuters.com/sustainability/climate-energy/numbers-behind-chinas-renewable-energy-boom-2023-11-15/ (Access 02.12.2023).
[54] ESCAP, "Towards a Sustainable Future: The Case of China's Economic Transformation," ESCAP, https://www.unescap.org/blog/towards-sustainable-future-case-china-s-economic-transformation (Access 03.12.2023).

reduce carbon emissions are more effective when combined with new technologies and innovation improving resource efficiency.[55]

China's sustainable communities show a spatial and temporal trend in their focus on SDGs. Economic development and urban infrastructure (SDG 8 and SDG 11) have been primary focuses, with an increasing emphasis on environmental protection and law-based governance (SDG 15 and SDG 16) over time. This indicates a shift towards balancing economic growth with environmental and social considerations.[56]

The effective implementation of sustainable communities in China demonstrates strong enforceability of policies, with most achieving their development goals. The focus on poverty alleviation, infrastructure, and innovation underscores China's commitment to sustainable development within its unique socio-economic context.

China's Influence in Developing Countries

China's expanding influence in developing countries, particularly through its environmental strategy, is a multifaceted phenomenon with significant implications. Central to this strategy is the BRI, a massive infrastructure and investment project spanning Asia, Africa, and Europe. The BRI, in its essence, is an extension of China's domestic environmental policies and technologies to the global stage. Through the BRI, China exports not only its environmental technologies but also its standards and practices. This exportation is instrumental in shaping the developmental trajectories of participating countries. For instance, Chinese investments in renewable energy projects, such as solar and wind farms in Africa or hydroelectric power plants in Southeast Asia, have the dual effect of addressing energy needs and promoting sustainable development.[57]

However, it is essential to recognize that this influence is not unilateral in nature. The recipient countries, often grappling with development challenges, are seeking to balance their immediate economic needs with long-term sustainability goals. China's approach offers a model that ostensibly aligns economic growth with environmental consciousness, an appealing prospect for these nations. Moreover, China's role in green infrastructure development abroad is indicative of its aspirations to lead in shaping global development models. By positioning itself as a champion of sustainability and climate resilience, China is not only expanding its geopolitical influence but also

[55] Bingsheng Liu et al., "Sustained Sustainable Development Actions of China from 1986 to 2020," Scientific Reports, Vol. 11, no. 1, 2021, 8008.
[56] *ibid*.
[57] Andrew Hayley, "China's Belt and Road Energy Projects Set for 'Greenest' Year, Research Shows," August 2, 2023, https://www.reuters.com/business/energy/chinas-belt-road-energy-projects-set-greenest-year-research-2023-08-02/# (Access 20.10.2023).

contributing to the global discourse on environmental governance.[58]

This strategy, however, is not without its critics. Questions arise regarding the long-term implications of China's investments and whether they truly align with the sustainability goals of the developing countries or serve more to advance China's strategic interests. Furthermore, the environmental standards applied in these projects are often scrutinized, with concerns about whether they meet the highest international benchmarks or primarily reflect China's domestic priorities.[59]

Future Trajectory and Challenges:

The future trajectory of China as a global power is inextricably linked to the effectiveness and credibility of its environmental policies. This trajectory is shaped by a confluence of domestic imperatives and international commitments, presenting both opportunities and challenges.

Firstly, balancing domestic environmental goals with international commitments is a critical aspect. Domestically, China faces significant environmental challenges, including air and water pollution, and the need for a sustainable energy transition. Addressing these issues is vital for maintaining social stability and economic growth. Internationally, China's commitments under agreements such as the Paris Accord place it at the forefront of global climate action. The congruence of its domestic actions with its international pledges will be a litmus test of its sincerity and effectiveness in environmental stewardship.

Secondly, technological and infrastructural challenges are pivotal in this equation. China's ability to innovate and deploy clean technologies at scale is crucial. Its leadership in sectors such as solar energy and electric vehicles is notable, but expanding these successes to other areas of environmental technology is imperative. The development of green infrastructure, both domestically and as part of initiatives like the Belt and Road, requires not only substantial investment but also technological sophistication to ensure sustainability and minimal ecological impact.

Furthermore, navigating the complexities of global environmental governance is a formidable challenge. The international environmental landscape is characterized by a multitude of actors, conflicting interests, and varying levels of development and commitment. China's role as a responsible global leader is contingent on its ability to engage constructively in this arena, fostering collaboration, addressing disparities in development and capacity,

[58] Tola Amusan, "The Belt and Road Initiative's Impact Depends on the Recipient Country," December 2, 2023, https://thediplomat.com/2023/12/the-belt-and-road-initiatives-impact-depends-on-the-recipient-country/ (02.12.2023).
[59] "China's BRI Negatively Impacting The Environment," The ASEAN Post, December 29, 2016, https://theaseanpost.com/article/chinas-bri-negatively-impacting-environment (Access 02.12.2023).

and contributing to the evolution of a fair and effective global environmental governance framework.

In sum, the future trajectory of China as a global power is significantly influenced by its environmental policies and actions. The interplay of domestic imperatives with international commitments, the overcoming of technological and infrastructural hurdles, and effective participation in global environmental governance are key determinants in this journey. How China navigates these complex dynamics will not only shape its own future but also have profound implications for global environmental sustainability and geopolitical order.

Conclusion

As we stand in 2023, the implications of China's environmental policies and strategies extend far beyond its national boundaries, playing a pivotal role in shaping the global environmental landscape and influencing the dynamics of international relations. The trajectory China takes in addressing its vast environmental challenges and in fulfilling its commitments to sustainable development will have lasting implications on a global scale.

China's approach to environmental issues reflects a strategic integration of ecological sustainability into both its domestic agenda and its foreign policy. The nation's efforts to combat climate change, transition to renewable energy sources, and lead in green technological innovation position it as a key player in setting global environmental standards. This role is crucial not only for shaping the future direction of global climate policy but also for influencing sustainable development practices worldwide.

At the same time, China's environmental initiatives significantly impact its relations with Western powers, especially the United States and the European Union. The nuanced relationships with these global actors are characterized by a complex mixture of cooperation and competition. While climate change presents a common ground for collaboration, it also opens arenas for strategic rivalry, particularly in the realms of technological advancements and seizing economic opportunities in the burgeoning green sector. How China manages these relationships and navigates the fine line between cooperation and competition will be critical in shaping the future of global environmental politics.

Domestically, the implementation of China's ambitious environmental policies necessitates profound socio-economic transformations. Managing these changes equitably and effectively is paramount for maintaining social stability and ensuring continued economic growth. The success of these domestic initiatives will also influence China's global image as an environmental leader or laggard. Moreover, China's expanding global influence, particularly through initiatives like the Belt and Road, extends its

environmental impact worldwide. Its ability to export environmental technologies and standards to developing countries influences their developmental paths and underscores the interconnectedness of global sustainability efforts.

Looking ahead, the effectiveness of China's environmental policies will significantly determine its standing as a global power. Balancing its domestic environmental goals with international commitments, overcoming technological and infrastructural challenges, and effectively participating in global environmental governance are key challenges that China faces. The nation's strategies and actions in addressing these challenges will not only shape its own ecological and economic future but will also have a profound impact on global efforts to tackle climate change and environmental degradation.

In conclusion, China's role in the realm of environmental policy is a testament to its growing influence and responsibility on the global stage. As the world continues to confront the pressing challenges of climate change and environmental sustainability, China's actions, policies, and strategies will remain central to the collective global effort to secure a more sustainable and environmentally resilient future.

RUSSIAN FEDERATION'S ENVIRONMENTAL SECURITY POLICY

Ahmet Sapmaz[1]

Introduction

Security studies, which generally focused on military security within the framework of the bipolar balance of power during the Cold War, have started to expand and deepen since the 1980s. In this context, the world ecosystem has become one of the reference objects of security. One of the actors affected by this situation was the Union of Soviet Socialist Republics (USSR), the leader of the Eastern bloc in the bipolar system. Especially after the Chernobyl nuclear power plant accident in 1986, environmental security became more important for the USSR and subsequently for the Russian Federation (RF). RF's environmental security is of great importance both for itself and for the world for various reasons. First of all, the RF is the largest country in terms of area in the world with 11 time zones. On the other hand, it is second only to the United States of America (USA) in terms of greenhouse gas emissions per capita in 2018. Again, the RF has the highest greenhouse gas intensity as a percentage of gross national product (GDP) in 2018.[2] It is one of the most important countries causing regional and global environmental degradation. The RF is among the countries with the largest reserves of natural resources in the world. For example, some of the Boreal forests, which constitute 20% of the world's forests, are located in the RF. These forests are of great importance as they are the world's carbon sinks. Lake Baikal, which contains 20% of the world's fresh water, is located in the RF. The RF is also a major fishing power and holds the majority of the world's oil and natural gas reserves. It is home to rich mineral resources including coal, gold, diamonds and iron.[3] All these factors allow the RF to gain an important place in the environmental policy of the region and the world. This study argues that although the RF considers environmental security an important issue for itself and the world, it has failed to prioritize environmental security within the framework of its dense legal regulations,

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[2] "Global Emissions", Center for Climate and Energy Solutions, https://www.c2es.org/content/international-emissions/#:~:text=Most%20of%20the%20world's%20greenhouse,the%20United%20States%20and%20Russia. (Accessed 23.12.2023).

[3]Anna Korppoo, Nina Tynkkynen, Geir Hønneland, "Russia and the Politics of International Environmental Regimes", Russia and the Politics of International Environmental Regimes, Edward Elgar Publishing, Massachusetts, 2015, pp.1-2; Odelia Funke, "Russian environmental security issues: competing frameworks for the future", Int. J. Environmental Technology and Management, 5(2/3), 2005, p.250.

its complex organizational structure, its natural resource-oriented economy, and its intensifying political, military, and economic confrontation with the West. The study will first examine the history of the USSR's environmental security practices, followed by an analysis of the RF's environmental security problems and the RF's environmental security policy. It will end with an evaluation in the conclusion section.

History of Union of Soviet Socialist Republics Environmental Security Activities

After the Bolshevik revolution, Soviet theorists argued that environmental problems and deterioration were caused by individual property ownership and a profit-oriented approach, so the USSR would not have such a problem. However, after the Bolshevik revolution, the USSR was a non-industrialized country. Therefore, the leaders of the USSR prioritized large-scale heavy industry over other areas in order to increase their economic power against the capitalist West as soon as possible and to ensure the continuity of the country and the regime.[4] Especially during the Stalin era, the intensive exploitation of natural resources for military and economic development in an environmentally destructive manner increased, causing the Soviet people to face serious environmental problems in the future.[5] During this period, USSR economic planners viewed natural resources such as air and water as unlimited and worthless, and the common ownership of energy resources reduced the interest of individuals and firms in environmental issues.[6] In addition, the absolute dominance of the Communist Party prevented debate on the environment.

During the USSR, environmental safety issues were the responsibility of more than 15 ministries. Within the framework of the glastnost policies implemented by Mikhail Gorbachev, the accident at the Chernobyl Nuclear Power Plant led to a public debate on environmental problems and a large part of the public expressed its discontent with the USSR's environmental policies. The State Committee on Environmental Protection [Goskomekologiya] was established in 1988. The main task of the Committee was to conduct environmental assessments for new projects.[7] In 1987, the USSR also submitted a draft resolution entitled "International Environmental Security" to the United Nations General Assembly.[8]

[4] Laura A. Henry, Vladimir Douhovnikoff, "Environmental Issues in Russia", The Annual Review of Environment and Resources, 2008, pp.438-439.
[5] Paul Josephson, et al., An Environmental History of Russia, Cambridge University Press, New York, 2013, p.2.
[6] Henry, Douhovnikoff, op.cit., pp.438-439.
[7] Henry, Douhovnikoff, op. cit., p.439.
[8] Vladimir Kotov, Elena Nikitina, "Mechanisms of Environmental Security in Russia: Out of Order?", Responding to Environmental Conflicts: Implications for Theory and Practice, Eileen Petzold-Bradley, Alexander Carius and Arpad Vincze (Eds.), Kluwer Academic Publishers, 2001, p.209.

Gorbachev was the first statesman among the leaders of the USSR to draw attention to environmental security at the highest level. Defining ecological security as an important part of world security and ecological threats as real threats, Gorbachev stated that the USSR had painfully experienced this situation with Chernobyl.[9] At that time, 15% of the USSR's territory and 20% of its population were located in areas of environmental disaster.[10] Shortly before the collapse of the USSR, the Ministry of Environmental Management and Nature Protection was established in November 1991, which included departments such as geology, mining, forestry and water.[11]

Russian Federation Environmental Problems

Throughout the 1990s, the RF faced serious environmental problems. Of the 89 federal administrative units of the RF, 26 faced serious problems related to uncontrolled discharge of polluted waters, 30 with air emissions, 38 with high levels of air pollution, 28 with pollution and depletion of groundwater, 36 with radioactive pollution, and 37 with toxic waste treatment. In addition, new ecological risks have emerged in the RF, such as the disposal of chemical weapons, decommissioning of nuclear submarines and ships, storage and processing of spent nuclear fuel.[12] Between 1990 and 1998, air emissions decreased by 45% and discharges of polluted sewage by 21%. However, this decline was not due to the RF's increased environmental safety measures, but to the RF's poor economic situation and the 50% reduction in industrial production.[13]

The situation of the RF in terms of environmental security has not improved significantly in the following years. At a meeting on environmental protection held at Lake Baikal in 2010, when Putin was the RF Prime Minister, he stated that Russian factories have higher atmospheric emissions and wastewater disposal than their foreign counterparts. He also stated that the environmental-economic systems date back to the Soviet era and do not meet today's needs, that the environmental control system is below world standards, and that producers are not motivated to use environmentally friendly technologies and reduce emissions.[14] Putin also stated that in 2016, hazardous emissions are at critical level, half of the people living in cities

[9] "The Reality and Guarantess of a Secure World", Soviet News, September 23, 1987, p.339, https://www.marxists.org/history/ussr/publications/soviet-news/1987/sovietnews_6393_0987.pdf (Accessed 20.02.2024)
[10] Vladimir Kotov, Elena Nikitina, "Russia in Transition Obstacles to Environmental Protection", Environment: Science and Policy for Sustainable Development, 35(10), 1993, p.12.
[11] Josephson, et al., op. cit., p.295.
[12] Kotov, Nikitina, "Mechanisms of Environmental Security in Russia: Out of Order?", p.212.
[13] *Ibid*., p.212.
[14] "The Russian Prime Minister held a meeting on environmental protection and security", http://archive.government.ru/eng/docs/4664/print/ (Accessed 15.02.2024)

breathe highly polluted air, vehicles cause 50% to 90% of air pollution, most of the open water sources are classified as polluted or highly polluted, emissions and greenhouse gases will reach critical level by 2050.[15]

For the RF, the most important threat to environmental security today is climate change. After the collapse of the USSR, the RF's carbon dioxide emissions dropped dramatically. The overall poor state of the economy and the closure of a large number of factories led to a decline in carbon dioxide emissions. From 1992 to 1997, carbon dioxide emissions fell by 31%.[16] Compared to 1990, the RF's carbon dioxide emissions in 2022 are 15.5% lower. By 2022, the RF is the fifth largest emitter after China, the US, India and the EU27. As such, the RF is the source of 4.8% of global emission.[17]

Moscow recognizes that climate change poses a significant threat to both itself and the world. Due to climate change, permafrost is rapidly melting, fires, floods and other disasters are occurring more intensively and frequently in the RF. This has a negative impact on the social and economic life of society and the state, as well as on the health of individuals. At the environmental development meeting of the State Council in 2016, President Putin stated that environmental problems consume 6% of the RF's GDP each year, rising to 15% when health expenditures are included.[18] With the Climate Doctrine adopted in 2009, the RF identified climate change as one of its priority policy areas. As of 2018, 30 of 65 project plans to combat climate change have been completed. In 2009, a climate advisor was appointed to the RF President. However, the RF shows an ambivalent approach in recognizing the negative impacts of climate change. The opening of The Northern Sea Route in 2012 is considered as a factor contributing to the great power status of the RF.[19] On the other hand, the RF is increasingly militarizing the Arctic region.

The RF has turned to international cooperation in the field of climate change. In 1992, it signed the United Nations Framework Convention on Climate Change in Rio de Janeiro. Following this process, Moscow signed the Kyoto Protocol in 1997 and ratified it in 2004. With the Kyoto Protocol, states committed to reduce their greenhouse gases emissions by 5.2% from 1990 levels by 2008. According to this protocol, RF did not have to cut its

[15] "State Council meeting on Russia's environmental development for future generations", December 27, 2016, http://www.en.kremlin.ru/events/president/news/53602/print (Accessed 22.12.2023)
[16] "Russia: Environmental Issues", U.S. Energy Information Administration, 2004, p.2, https://www.lehman.edu/faculty/rwhittaker/Day02-Research/Russia_%20Environmental%20Issues.pdf (Accessed 15.12.2023)
[17] R. Risquez Martin, et al., "GHG emissions of all world countries", Publications Office of the European Union, Luxembourg, 2023, p.16, https://edgar.jrc.ec.europa.eu/report_2023 (Accessed 15.12.2023)
[18] "State Council meeting on Russia's environmental development for future generations", op. cit.
[19] D. Javeline, et al., "Russia in a changing climate", WIREs Climate Change, 15(2), 2024, pp.1-10.

emission.[20] The RF planned to sell its excess emissions to countries in need, such as the US. However, when the US withdrew from the Kyoto Protocol in 2001, RF was deprived of this opportunity. Putin demanded EU support for membership in the World Trade Organization to ratify the Kyoto Protocol. Moreover, the Paris Climate Agreement signed in 2015 was ratified by Moscow in 2019. Nevertheless, Moscow has refrained from making a significant commitment to reduce carbon emissions and has hesitated to take steps towards renewable energy. This is because fossil fuels are the mainstay of the Russian economy and an important component of great power thinking. Moscow argues that international climate policies should not harm the interests of energy producing countries.[21] Some Russian politicians see the climate change agenda as a "Western-led hegemonic project" that threatens Russia's sovereignty. Most RF citizens agree with Russian politicians that international climate diplomacy is shaped more by foreign policy interests than environmental concerns.[22]

In a survey conducted by the Levada Center between December 12-18, 2019, Russian citizens cited environmental pollution as the most important threat to humanity in the 21st century. In the same survey, air pollution was identified as the biggest environmental problem in the RF.[23] Air pollution in the RF is mostly caused by industry, energy production, power plants and transportation vehicles. Air pollution is a major problem in some large cities, including Moscow and St. Petesburg. Some industrial plants in smaller cities are also a problem in terms of air pollution as they lack the necessary environmental controls. In 1999, air pollution was found to be above national standards in 185 cities with more than 60 million inhabitants.[24] Pollution from a single facility accounts for a significant share of the RF's air pollution. For example, Lake Baikal, a UNESCO World Heritage site containing more than 1,500 indigenous species of flora and fauna, faced significant environmental problems due to runoff and air pollution from a cellulose factory in its vicinity.[25] This factory ceased production in 2013 as a result of the intense efforts of environmentalists.[26] In 2021, 13.4 million people living in 46 cities in the RF were found to be exposed to high or very high levels of air

[20] "Russia: Environmental Issues", p.4.
[21] Bobo Lo, "The Adaptation Game-Russia and Climate Change", Russie.Nei.Visions (Ifri), No. 121, March 2021, pp.7-11, https://www.ifri.org/sites/default/files/atoms/files/bobolo_russia_climate_change_2021.pdf (Accessed 12.12.2023)
[22] Javeline, op. cit., p.12.
[23] "Environmental Problems", Levada Center, 18.02.2020, https://www.levada.ru/en/ 2020/02/18/environmental-problems/ (Accessed 15.02.2024)
[24]David Lewis Feldman, Ivan Blokov, The Politics of Environmental Policy in Russia, Edward Elgar, Cheltenham, 2012, p.26.
[25] "Russia: Environmental Issues", pp.1-2.
[26] "Irkutsk administration to retrain workers dismissed in Baikal plant closure Business & Economy", TASS News Agency, https://tass.com/economy/700924/amp (Accessed 25.02.2024)

pollution.[27] According to IQAir, the RF was ranked as the 86th most polluted country in 2022, when the air pollution of 131 countries was evaluated.[28] Air pollution-related deaths in the RF are estimated to be between 80,000 and 140,000 per year. In addition, air pollution caused an economic loss of 4.1% of the RF's GDP in 2018.[29]

Another area of environmental safety concern in the RF is the oil and gas industry. In addition to causing air pollution, this industry also causes significant environmental pollution. In an environment of low environmental standards and weak supervision, leaks in pipelines and storage tanks occur frequently. Between 3% and 6% of the oil extracted in the RF until the early 2000s was found to have leaked into the ground.[30] Pipelines in the Tyumen region and Khanty-Mansiysk autonomous district have experienced significant oil spills.[31] These spills caused significant environmental problems, causing major damage to a total area of 1,000 hectares in the Nishnevartovsk region of Western Siberia.[32] The route of the 4,000 km long East Siberia-Pacific Ocean oil pipeline, originally planned to pass 900 m north of Lake Baikal, was rescheduled in 2006 to pass 40 km away from the lake by Putin's decision after pressure from environmentalists. This decision was taken due to a possible oil leak in the pipeline as Lake Baikal is located in a seismic zone.[33]

Today, 38 reactors are operating in 11 nuclear power plants in the RF.[34] Of these, 8 reactors are of the RBMK type, similar to the reactors at Chernobyl, and the last of these reactors is expected to remain in service until 2050.[35] The European Union considers RBMK type nuclear reactors to be defective due to the lack of a containment dome. Radioactive contamination has caused significant environmental problems in some regions of the RF.

[27]Alexey Gerasimenko, "Environmental safety regulation in Russia", E3S Web of Conferences 462, 2023, pp.4-5.
[28] "World's most polluted countries & regions", IQAir, https://www.iqair.com/world-most-polluted-countries (Accessed 16.03.2024)
[29] Igor A. Makarov, et. al., "Turning to Nature: Russia's New Environmental Policy in "Green" Transformation of the Global Economy and Politics", National Research University-Higher School of Economics Faculty of World Economy and International Affairs, p.98, https://eng.globalaffairs. ru/wp-content/uploads/2021/04/report_turning-to-nature.pdf (Accessed 14.02.2024)
[30] David Lewis Feldman, Ivan Blokov, The Politics of Environmental Policy in Russia, Edward Elgar, Cheltenham, 2012, p.31.
[31] "Russia: Environmental Issues", p.2.
[32]Feldman, Blokov, op. cit., p.31.
[33] "Piped away", DownToEarth, May 31, 2006, https://www.downtoearth.org.in/news/piped-away-7855 (Accessed 10.01.2024)
[34] "Power Generation", Rosatom, https://www.rosatom.ru/en/rosatom-group/power-generation/#:~:text=In%20total%2C%2038%20nuclear%20units,plant%2C%20based%20in%20Pevek). (Accessed 10.12.2023)
[35] "RBMK Reactors - Appendix to Nuclear Power Reactors", World Nuclear Association, https://www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-power-reactors/appendices/rbmk-reactors.aspx (Accessed 20.01.2024)

The most important of these is the radioactive contamination from the Mayak complex in Chelyabinsk.[36] The Mayak complex, which has caused three major radioactive contamination incidents, most recently caused the radioactive contamination of Lake Karachai.

The environmental problems of the RF are very diverse and can be illustrated by some examples. Soil pollution of hazardous and moderately hazardous nature was detected in 3.1% and 9.3% of the populated areas of the RF inspected in 2015-2019, respectively. In 55 regions of the RF, a large number of surface freshwaters, including the rivers Volga, Ob, Amur, Yenisei, Don, Ural, etc., were found to be highly or very highly polluted. In 2019, only 7% of garbage in the RF was recycled. In the same year, 14,000 forest fires were recorded in the RF, destroying 15 million hectares of forests, accounting for 1% of the RF forests.[37]

Russian Federation's Environmental Security Policy

According to the RF, environmental security is the state of preservation of ecological balance in the environment to prevent harm to the environment and humanity.[38] In the RF, environmental security includes the protection of the environment and, to this extent, people, society and the state from internal and external environmental impacts and risks. Within the scope of environmental impacts and risks, human health and existence, biodiversity and the proper functioning of the ecological system are taken into account. There are two main principles for ensuring environmental security in the RF. The first principle is to identify environmental risks at national, regional and global levels and to determine their impact. The second principle is to introduce mechanisms and tools for environmental risk management.[39] In the RF, the state's general approach to the environment focuses on the management of natural resources and prevention of deterioration of environmental quality.[40] In this framework, the official documents on the environment adopt the approach of balancing economic and environmental interests and guaranteeing environmental rights including individuals and companies.

During 1990s, The RF had problems related to the transition to

[36] "Environmental problems of Northern Eurasia: Radioactive Contamination-The Mayak Facility in the Southern Urals", Russian Nature, http://www.rusnature.info/env/19_4.htm https://www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-power-reactors/appendices/rbmk-reactors.aspx (Access 10.03.2024)
[37]Igor A. Makarov, et. all., op. cit., pp.99-101.
[38]Elena Voskresenskaya, et al., "Regional features of legislative framework for environmental security of the Russian Federation", E3S Web of Conferences 110, 2019, p.3.
[39]Kotov, Nikitina, "Mechanisms of Environmental Security in Russia: Out of Order?", p.211.
[40]"Environmental Policy and Regulation in Russia: The Implementation Challenge", Organisation for Economic Co-Operation and Development, 2006, p.5, https://www.oecd.org/env/ outreach/38118149.pdf (Accessed 20.01.2024)

democracy and free market economy, loss of central authority and control after the collapse of the USSR, corruption, the emergence of oligarchs, economic and financial crisis, declining investments, lack of inter-institutional cohesion on environmental security, lack of social control over the environment, poverty, unemployment and inflation, which had negative effects on environmental security.[41]

The 1990s were also a problematic period for environmental security monitoring mechanisms. The meteorological and natural resource monitoring satellites lost during these years were only activated in 2009. The number of observation points monitoring the pollution of surface waters decreased from 3295 in 1986 to 1815 in 2006. In the same period, the number of observation points for the marine environment decreased by 30%. In addition, the number of observation points for detecting air pollution decreased from 821 to 678 from 1991 to 2016, and the number of cities monitoring air pollution decreased from 337 to 243.[42]

The RF's top environmental priority in the 1990s was to establish an economically and socially sound environmental management system. First of all, the focus was on establishing the legal and institutional framework.[43] Steps were also taken towards international cooperation on the environment. In the RF, environmental security was addressed within the framework of disaster management, resource scarcity and management.

One of the first laws enacted in the RF in 1991 was the Federal Act of the Protection of Natural Environment. This law stipulated that the use of natural resources and environmental security in the RF should be ensured by law. With this law, the principles that economic activities should not harm the internal and external environment of the country, that no activity with unpredictable environmental impacts can be accepted, and the establishment of local, regional and global control mechanisms regarding the environment and its impacts were adopted.[44] Within the framework of the law, federal, regional and local environmental units were established and, in a way, the powers of the federal government were shared with federal units. In 1991, there were 157 local institutions related to environmental management in the RF.[45] Commission on Environmental Expertise conducted environmental assessment of 55.000 projects in 1992 and approved 60% of them with

[41]Kotov, Nikitina, "Mechanisms of Environmental Security in Russia: Out of Order?", p.214.
[42]V. I. Danilov-Danilyana, N. N. Klyuevb, V. M. Kotlyakov, "Russia in the Global Natural and Ecological Space", Regional Research of Russia, 13(1), 2023, p.37.
[43]"Environmental Policy and Regulation in Russia: The Implementation Challenge", op. cit., p.5.
[44]Vladimir Kotov and Elena Nikitina, "Russia and International Environmental Cooperation", Green Globe Yearbook of International Cooperation on Environment and Development, Helge Ole Bergesen, Georg Parmann, Øystein B. Thommessen (eds.), Oxford University Press, Oxford, 1995, p.19.
[45]Kotov, Nikitina, op. cit., p.13.

amendments.[46] Article 42 of the 1993 Constitution of the Russian Federation, in the section entitled "Rights and Freedoms of Man and Citizen", states that, with regard to environmental safety, everyone has the right to a favorable environment and the right to compensation for damage to health and property caused by ecological violations. [47]Article 58 of the Constitution reads: "Everyone shall be obliged to preserve nature and the environment, carefully treat the natural wealth."

The RF Security Council identified environmental security and, in this context, climate change, water, food and energy security among its priorities. In 1993, a special commission on environmental security was established under the Security Council. Until the mid-1990s, it was chaired by Professor Alexei Yablokov, a well-known Russian environmentalist.[48] The tasks of the commission were to assess internal and external environmental threats and develop policy recommendations to address them. The Commission is composed of representatives from institutions such as the Ministry of Defense and the Russian Foreign Intelligence Service. The issues addressed by the Commission are diverse and include the de-monopolization of waste management services by organized crime, bioterrorism, environmental risks posed by the oil and gas sector, climate change, water scarcity and deforestation. The Commission focused on the Baikal, Ladoga and Onega lakes, the Arctic, Volga and Ural regions.[49] The position of special representative of the president for environment and transport was also created. The special representative was a permanent member of the Security Council.[50]

The 1990s were a difficult period for environmental security in the RF. Environmental security was under-resourced and under-emphasized. The RF Minister of Environment stated that in 1993 the ministry received only 66.8% of the budget allocated to it.[51] Between 1991 and 1993, various international organizations, including the EU, provided $432 million in support for RF environmental projects.[52] In 1997, 480 million dollars, 0.5% of the Russian Federal budget, was allocated for the environment.[53] Lobbying by large industry groups and constant changes in the bureaucratic structure have

[46]Barbara Jancar-Webster, "Russian Environmental Policy in Transition", The Journal of Environment & Development, 3(2), 1994, p.113.
[47]The Constitution of the Russian Federation, http://www.constitution.ru/en/10003000-01.htm (Access 23.02.2024)
[48]Kotov, Nikitina, "Mechanisms of Environmental Security in Russia: Out of Order?", p.210.
[49] "How Russia approaches the environment, peace and security", Conflict and Environment Observatory, 2021, p.57, https://ceobs.org/wp-content/uploads/2021/01/CEOBS_How_Russia_approaches_environmental_security.pdf (Accessed 23.12.2023)
[50] "How Russia approaches the environment, peace and security", op. cit., p.57.
[51]Barbara Jancar-Webster, op. cit., p.110.
[52] *Ibid.*, p.117.
[53] "The Environmental Outlook in Russia", National Intelligence Council, 1999, https://irp.fas.org/nic/environmental_outlook_russia.html (Access 31.12.2023)

created problems in the field of environmental security.[54]

In the RF, two opposing views on environmental legislation have been in competition. One camp, consisting mainly of academics and non-governmental organizations, advocates for maintaining high environmental standards, while the other camp, consisting of politicians and business people, wants to relax environmental standards for more intensive use of natural resources and sees high standards as an obstacle to economic development.[55]

On the other hand, there have been problems especially in the implementation of environmental policies and regulations. The RF has a large number of laws and regulations on environmental protection and safety at the strategic level. They are numerous, complex and contain relatively high standards. However, they are weak at the implementation level. There is also a lack of clarity as to which agency has jurisdiction over environmental safety.[56] The sudden proliferation of environmental regulations has led to a loss of coherence in this area.[57] The fragmentation of environmental security legislation has led to a failure to adequately define environmental threats and to put in place effective mechanisms for protecting the environment and eliminating threats.[58]

In 1996 Yeltsin abolished the Ministry of Environment and re-established the State Committee on Environmental Protection. Thus, environmental protection no longer had a first-hand voice in the government. This situation showed that the RF was paying less and less attention to environmental security and more and more attention to the revenue from the extraction and export of natural resources. In parallel, the number of personnel in charge of environmental security also declined. While there were 1,500 personnel working in the field of environmental safety in 1991, this number dropped to 630 in 1993, 421 in 1996 and 483 in 1998. In contrast, the State Committee on Environmental Protection and Natural Resources has conducted more environmental inspections since 1996. While a total of 20,000 environmental inspections were carried out in the first half of the 1990s, this figure increased to 360,000 between 1996 and 2000.[59]

In May 2000, Putin, who succeeded Yeltsin as president, abolished the State Committee for Environmental Protection and Natural Resources and the Federal Forestry Service and transferred their powers to the Ministry of

[54] Henry, Douhovnikoff, op. cit., p.439.
[55] "Environmental Policy and Regulation in Russia: The Implementation Challenge", op. cit., p.24.
[56] Joshua P. Newell, Laura A. Henry, "The state of environmental protection in the Russian Federation: a review of the post-Soviet era", Eurasian Geography and Economics, 57(6), 2016, p.782.
[57] "Environmental Policy and Regulation in Russia: The Implementation Challenge", op. cit., p.5.
[58] Voskresenskaya, et al., op. cit., p.4.
[59] Josephson, et al., op. cit., pp.295-296.

Natural Resources. He also abolished the previously mandatory state requirement to conduct environmental impact assessments.[60] Putin's decisions pointed to the processes of "deinstitutionalization and de-environmentalization" in terms of the environment.[61] Putin's main motivation for these decisions was to re-stabilize the Russian economy by using energy resources after the economic crisis in 1998. Within this framework, the share of oil and natural gas export revenues in the federal budget increased from 10% in 2000 to over 40% on average in the following years.[62] It was only in 2008, when the word "environment" was added to the Ministry of Natural Resources, that the environment was addressed at the level of a ministry in the RF, in the form of the Ministry of Natural Resources and Environment.[63]

Non-governmental organizations, some government officials and industry representatives have tried to fill the environmental security vacuum that emerged in the RF. Another actor contributing to this process was the World Bank. The World Bank stopped supporting some projects unless the Russian government provided guarantees for environmental security. For example, the World Bank suspended a loan of 60 million dollars to the RF for forests.[64] As a result of the work between the World Bank and the Russian government, a consensus was reached on the benefits of environmental safety and its positive effects on the investment climate.[65] In 2001, the Duma adopted a law allowing the import, processing and long-term storage of other countries' nuclear fuel waste.[66] In 2000, responsibility for environmental management was transferred to federal departments without strengthening the federal government's oversight and coordination powers.[67] This led to a confusion of authority between the federal government and federal departments on environmental security, and both levels were unable to fully fulfill their mandates.

Regulations and policies on environmental security in the RF are mostly borrowed from the West.[68] The January 10, 2002 Federal Law on Environmental Protection defines ecological security as "the state of

[60] Oleg N. Yanitsky, "The Shift of Environmental Debates in Russia", Current Sociology, 57(6), 2009, p.755.
[61] Ellie Martus, "Policymaking and Policy Framing: Russian Environmental Politics under Putin", Europe-Asia Studies, 2021, p.5.
[62] Vitaly Yermakov, " Follow the Money: Understanding Russia's oil and gas revenues", The Oxford Institute for Energy Studies, 2024, p.9, https://www.oxfordenergy.org/wpcms/wp-content/uploads/2024/03/Follow-the-Money-Russian-Oil.pdf (Accessed 14.3.2024)
[63] Makarov, et al., op. cit., p.98.
[64] D. J. Peterson, Eric K. Bielke, "The Reorganization of Russia's Environmental Bureaucracy: Implications and Prospects", Post-Soviet Geography and Economics, 42(1), 2001, p.70.
[65] Josephson, et al., op. cit., pp.297-298.
[66] Henry, Douhovnikoff, op. cit., pp.439-440.
[67] "Environmental Policy and Regulation in Russia: The Implementation Challenge", op. cit., p.11.
[68] Kotov, Nikitina, "Mechanisms of Environmental Security in Russia: Out of Order?", op. cit., p.215.

protection of the natural environment and vital human interests, economic and other activities against the possible negative effects of natural and man-made emergencies, as well as their consequences."[69] With this law, the principles of "polluter pays, potential environmental hazards, full compensation for environmental damage and environmental impact assessment" were adopted.[70] A new fund for environmental security was established outside the federal budget with the polluter pays principle. In the 1990s, fines for air, water and solid waste pollution were collected in environmental safety funds.[71] The share of these funds in the part of the federal budget allocated for the environment was very limited. Fines were not effective in reducing pollution and increasing funding. Fines were eroded in the face of inflation, were paid in goods and services rather than cash, and mostly exempted companies from fines. In the RF, the largest country in the world, at the end of the 1990s, 200 million dollars a year was transferred to environmental safety funds. In 1996, the contribution of environmental funds transferred from federal units to the federal government to the environmental sphere of the federal budget amounted to 5%.[72]

In addition, a mandatory environmental impact/review system has been established for all industrial projects and facilities. The environmental impact/review system is stipulated in both the Federal Law on Environmental Protection and the Federal Environmental Review Law of 1995. Experts appointed by the state prepare a mandatory report on the conditions under which a proposed/planned project can proceed in terms of environmental impact during design and planning.[73] In this context, financing and implementation of projects that will have harmful effects on the environment are prevented.[74] In addition, the "end-of-pipe" approach is applied in the RF for industrial facilities to comply with environmental safety. According to this approach, each industrial facility is required to obtain special permits for air emissions, water discharge and waste disposal.[75]

While the budget allocated by the RF for environmental protection remained below 0.5% of the total budget between 2008 and 2016, it started to increase especially after 2017 and reached 1.63% in 2021 (Table-1). Putin

[69] "Federal Law on Environmental Protection No. 7-FZ", https://faolex.fao.org/docs/pdf/rus52751E.pdf (Access 22.02.2024)
[70] Daria N. Ratsiborinskaya, "Russian Environmental Law - An Overview For Businesses", Erasmus University Rotterdam, p.12, https://repub.eur.nl/pub/31019/RussEnvironLaw.pdf (Access 15.02.2024)
[71] Josephson, et al., op. cit., p.298.
[72] Kotov, Nikitina, "Mechanisms of Environmental Security in Russia: Out of Order?", op. cit., p.216.
[73] Aleg Cherp, Svetlana Golubeva, "Environmental assessment in the Russian Federation: evolution through capacity building", Impact Assessment and Project Appraisal, 22(2), 2004, p.122.
[74] "Russia: Environmental Issues", op. cit., p.1.
[75] Ratsiborinskaya, op. cit., p.13.

declared 2017 as the year of the environment with a decree signed in 2016.[76] The decree stated that the environmental year aims to draw public attention to environmental problems and raise awareness in the fields of biodiversity and ensuring environmental safety.

Environmental security policies in the RF have been reactive rather than preventive. For example, environmental damage is often deterred by fines, while incentives for clean technology and prevention mechanisms remain low.[77] In 2022, 282,000 violations of environmental safety were identified in the RF, of which around 57,300 were fined and 52,000 were found administratively responsible.[78] In 2016, Putin stated that the RF should aim for "environmentally sustainable development" beyond "sustainable development". According to Putin, the industry in particular needs to be re-equipped with advanced technologies for environmental safety. [79]

The environmental institutional structure of the RF was largely determined in 2004. Today, the main responsibility for environmental safety in the RF lies with the Ministry of Natural Resources and Environment. The Ministry manages and coordinates the activities of the Federal Environmental, Industrial, and Nuclear Supervision Service, the Federal Service for Hydrometeorology and Environmental Monitoring, the Federal Service for Supervision of Natural Resource Management, the Federal Agency for Water Resources, and the Federal Agency for Subsoil Management. The Ministry of Natural Resources and Environment issues licenses on environmental issues and submits draft laws to the State Duma.[80] The Ministry has departments at federal, regional and municipal levels.[81] In addition to the Ministry of Natural Resources and Environment, other environment-related ministries such as the Ministry of Health, Ministry of Economic Development, Ministry of Industry and Trade also play a role.

[76] Martus, op. cit., p.15.
[77] "Report finds that Russia securitises the environment - but on its terms", Conflict and Environment Observatory, 20.01.2021, https://ceobs.org/report-finds-that-russia-securitises-the-environment-but-on-its-terms/ (Access 02.01.2024)
[78] Gerasimenko, op. cit., p.1.
[79] "State Council meeting on Russia's environmental development for future generations", op. cit.
[80] Ratsiborinskaya, op. cit., pp.5-6.
[81] Anna Korppoo, Nina Tynkkynen, Geir Hønneland, op. cit., pp.15-16.

Table 1. Total Budget of the RF, Environmental Protection Expenditures and Ratio to the Federal Budget (bln. rub.)[82]

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total Expenditure	7.570	9.660	10.117	10.925	12.895	13.342	14.831	15.620	16.416	16.420	16.713	18.214	22.821	24.762
Environment Protection	0,2	3,0	3,5	7,6	2,5	24,3	46,4	49,7	63,1	92,4	116,0	197,6	260,6	405,1
Percentage of environmental expenditure to total expenditure	0,13	0,13	0,13	0,16	0,17	0,18	0,31	0,31	0,38	0,56	0,69	1,08	1,14	1,63

Especially in the 1990s, the integration of the RF with the world in terms of environmental security has been a priority. The RF joined and became a party to numerous international environmental agreements. It has also actively participated in a number of international environmental initiatives. However, the RF's environmental security policy has been directly affected by political and economic developments as well as relations with other countries and international organizations. Although the RF is a party to multilateral agreements and participates in activities on environmental protection and security, it is in favor of maintaining the status quo. It is suspicious that these agreements may be used against its interests. In particular, the economic and political sanctions imposed on the RF due to the Ukraine War, including environmental cooperation and technical assistance, may create significant negative consequences for environmental security.[83] Kremlin has at times linked its environmental policies with other developments and used them instrumentally. For example, the RF ratified the Kyoto Protocol in 2004 in order to gain the EU's support for its membership in the World Trade Organization.[84] Following its ratification, the Kyoto

[82] "Brief annual information on federal budget execution (bln. rub.)", The Ministry of Finance of the Russian Federation, 27.02.2024, https://minfin.gov.ru/en/statistics/fedbud?id_4=119255-brief _annual_information_on_federal_budget_execution_bln._rub. (Accessed 10.03.2024)

[83] Ekaterina Polyakova, Larisa Gorina, "Environmental security and sustainable development of large urban centres", E3S Web of Conferences 250, 2021, p.5

[84] Toğrul Ismayıl, Ali Necefoğlu, "Environmental Security Policies of the Russian Federation", Journal of

Protocol entered into force in 2005.

Another actor that has been active on environmental security in the RF, but has recently lost its effectiveness, is non-governmental environmental organizations. These organizations are defined by Putin as instruments supported by foreign governments that try to limit the RF in certain areas, especially in infrastructure projects.[85] Through regulations such as NGO Law, Foreign Agent Law and Undesirable Organizations Law, non-governmental environmental organizations have been tried to be controlled and limited.[86] Most of the non-governmental environmental organizations in the RF are included in the list of foreign agents of the Ministry of Justice.[87]

Conclusion

The USSR, and subsequently the RF, is an important actor in environmental security from national, regional and global perspectives due to being the largest country in the world and having very high levels of energy and natural resource reserves. The accident at the Chernobyl nuclear power plant and the environmental problems caused by this accident led the USSR to attach importance to environmental security in the recent period. Legal regulations and institutional structure were established for environmental security. However, the political, economic and social problems in the 1990s after the collapse of the USSR prevented the RF from prioritizing environmental problems. In particular, the uncertainty created by the enactment of a large number of environmental laws in this period and the confusion of authority between institutions had a negative impact on the solution of environmental problems. Differences emerged in the roles and approaches of the federal, regional and municipal levels towards environmental security. The RF's policy of overcoming its economic problems by focusing on oil and natural gas production and exports has caused environmental security to take a back seat. In particular, the RF has approached international policy initiatives on climate change cautiously in terms of its national interests. In this context, the Kyoto Protocol was ratified after receiving support from the EU for RF's membership in the WTO. In today's world of increasing geopolitical competition between the RF and the West, the RF has fewer opportunities for international cooperation and support in the field of environmental security. However, despite all this, the

Russian Studies, 8, 2022, pp.95-96; Nick Paton Walsh, "Putin throws lifeline to Kyoto as EU backs Russia joining WTO", The Guardian, 22 May 2004, https://www.theguardian.com/world/2004/may/22/environment.russia (Access 22.02.2024)

[85] Martus, op. cit., p.13.

[86] Maria Chiara Franceschelli, "From Environmentalism to Ethnonationalism: Center-Periphery Relations in Pre-War and Wartime Russia", Russian Environmentalism During The War, Russian Analytical Digest, 2024, pp.7-8, https://css.ethz.ch/content/dam/ethz/special-interest/gess/cis/center-for-securities-studies/pdfs/Russian_Analytical_Digest_311.pdf (Accessed 21.03.2024)

[87] Martus, op. cit., p.13.

RF state and people seem to have realized the seriousness of environmental problems and security.

THE POLITICS OF NATURE IN TURKEY: CLIMATE CHANGE, ENVIRONMENTAL LAW, AND DEMOCRACY

Ahmet Emre Köker*

Introduction

Scientific research in recent years reveals that the world is getting warmer. In this framework, it has become a necessity to study climate change and to make recommendations by determining the social and economic impacts of climate change. Under the title of the study, which is "The Politics of Nature in Turkey: Climate Change, Environmental Law and Democracy", the cause and effect relationship of the developments regarding the political, legal, democratic, economic, and humanitarian processes of climate change in Turkey is taken as a basis. For this reason, important scientific studies that explain the factors affecting climate and environmental issues in Turkey with the relevant theoretical components are analyzed.

From a general point of view, the study examines the political and democratic processes carried out for environmental problems in Turkey, analyzes the decision-making processes, and evaluates the efforts to identify long-term strategies together with institutionalization efforts. Thus, the implementation of the decisions taken by the political mechanism and the bureaucracy dimension are evaluated in this study. Within the framework of these evaluations, it is seen that solving problems requires multi-actor and multi-level governance.

Furthermore, in this chapter, a compilation of the theoretical approaches to the multidimensional framework of the concept of security created by the environmental problems experienced in Turkey based on climate change has been realized. Therefore, it focuses on Turkey's diplomatic activities, strategic policies, institutional mechanisms, legal arrangements, and possible scenarios for the climate change process.

The scenarios mentioned in the study are based on the various climatic risks and threats that Turkey has in terms of climate diversity and global warming, and these problems can be reduced in terms of cooperation and adaptation to global policies.

In this context, the article consists of two parts. In the first part of the article, the theoretical and conceptual framework of Turkey's national legal,

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democratic, and climate process literature, priorities, duties, and tasks are presented. In the second part of the article, Turkey's role in the national and international dimensions is revealed by taking into account Turkey's statistical data. As a result of the study, it is seen that global warming, climate change, and the increase in carbon dioxide emissions create environmental problems and their effects on the climate system will continue to increase. In this framework, the study was concluded with recommendations on the strategy and activities to be followed in the future within the framework of legal and institutional practices carried out by Turkey.

NATIONAL AGENCY OF TURKEY: AREAS, TASKS, PRIORITIE

Basic Dynamics of Turkey's National Climate Change, Environmental Law and Democracy

Combating Global Warming and Climate Change from The Point of View of The Basic Dynamics of Turkish Foreign Policy

Turkey's national security is ensured within the framework of foreign policy dynamics that are designed for national interests, especially in order to protect and develop economic and social welfare. Among the main elements of Turkish Foreign Policy, which is determined within the framework of national interests, is the ideal and principle of Westernization. As a result, cooperation and integration with Western countries is realized. Turkey's policy of integration with the European Union aims to make Turkey an actor in the Western world. Cooperation with the United States, a global actor, is also among the important political goals.1 In addition, Turkey sees the European Union's decisions as an important element in the relationship of Westernization, Modernization, and Civilization, which is at the basis of the vision and revisions in Turkish Foreign Policy.[2]

Like every state, there are some basic factors that play a role in the formation and implementation of Turkish Foreign Policy. In particular, factors that can be categorized as Ottoman past, national power, and international system show Turkey's position in world politics.3 In this context, Turkey's policies and strategies towards environmental problems and global warming should be evaluated accordingly.

Turkey is geographically located in the middle of Europe and Asia. For this reason, Turkey is at risk of being affected by the negative effects of global warming due to its geographical location. With the impact of the possible threats brought by its geography, Turkey may face more problems arising

[1] Ramazan Gözen, Turkey's Foreign Policy from Empire to Becoming a Global Actor, Ankara, Palme Publishing, 2009, pp.50.
[2] Gözen, op.cit, p. 457-470.
[3] Gözen, op.cit, p. 35.

from climate change in the near future. Another geography that Turkey is connected to outside Europe is the Middle East. Turkey is the only country in the Middle East with self-sufficient fresh water (drinking water) resources. Despite being a developing country, it has closely followed climate and global warming initiatives from day one and has pursued a policy of cutting emission volumes.

Because of its geographical location, Turkey is open to being affected by climate change due to many risks such as its coasts and water resources, and its mountainous structure that is prone to landslides in rainy regions.[4] For this reason, Turkey has made numerous attempts to prevent global warming within the framework of strategies pursued since the 1970s. Both globally and in terms of Turkish Foreign Policy, the United Nations Framework Convention on Climate Change (UNFCCC) is very important. Signed on May 9, 1992, in New York, the UNFCCC is the world's first climate convention. Two years after it was opened for signature, the Convention was ratified by 189 countries, including the United States and Australia, and entered into force on March 21, 1994. In the early years, Turkey adopted a distant attitude towards the UNFCCC. Turkey's accession process to the UNFCCC was quite painful. Considered a member of the Organization for Economic Cooperation and Development (OECD) and treated as a developed country, Turkey is a member of both Annex I (which refers to the developed countries that are parties to the agreement. These countries, which have stricter mitigation obligations, are held responsible for limiting their emissions and improving their sinks) and Annex II (which means that developed countries on the list are obliged to help developing countries fulfill their responsibilities arising from the convention, to provide financial support and technology transfer). Turkey, which stated that it was unfairly treated due to this situation, did not become a party to the agreement.

Subsequently, the Kyoto Protocol was signed as an annex to the agreement. The Kyoto Climate Protocol is a start for taking concrete measures against climate change. Countries that signed the protocol agreed to a certain level of emission restrictions. Kyoto Protocol introduced three flexible options. These include the introduction of an international transfer of emission quotas, the development of common practices, and finally the creation of a clean development mechanism.[5] However, the Kyoto Protocol did not solve the problems. At first, although Turkey actively participated in meetings and summits related to climate change, it chose not to become a party to the Kyoto Protocol immediately, waiting to see how the

[4] İsmail Köse, "Negotiations On Climate Change: The Process For Turkey To Sign Paris Agreement", Aegean Journal of Strategic Studies, Vol. 9, No. 1, 2018, p. 55-81.
[5] UNFCCC Process-And-Meetings, "The Kyoto Protocol", 2022, https://unfccc.int/process-and-meetings#:2cf7f3b8-5c04-4d8a-95e2-f91ee4e4e85d (Access 20.12.2022).

industrialized countries would react. In the following process, Turkey changed its attitude and joined the Kyoto Protocol on February 5, 2009, with the Law of ratification numbered 5836 in order to fight against Global Warming and Climate Change.[6]

One of the most important innovations brought by Kyoto is institutionalization. Within the framework of the Kyoto Protocol, the Parties established a single body fully responsible for national inventories and registries in order to institutionalize data collection, processing, and selection methods. Turkey has already made most of the required institutionalization and reporting arrangements before becoming a party to Kyoto. In addition, Turkey approved and put into force the Climate Change Action Plan (CCAP) on May 3, 2010, as part of its greenhouse gas mitigation obligations.[7]

From a general perspective, Turkey is among the risk group countries in terms of the potential impacts of global climate change. There are many disasters that are projected to increase in Turkey due to climate change. These include natural disasters such as extreme weather events, forest fires, storms, floods, hail, heat waves, landslides, and avalanches. Therefore, the most important problem in combating climate change is to understand the impacts of climate change, identify strategies for solutions, and transform them into rational policies. The signing of Kyoto has shown Turkey's sensitivity to this issue.

On the other hand, environmental pressures are increasing in the world. New markets and scarce resources resulting from increasing pressures redefine the development and economic growth processes of all countries. In this context, climate change emerges as a sustainable development issue. Therefore, the effects of climate change are a serious pressure factor on the determination of democratic, social, and employment processes in Turkey.[8]

In terms of the basic dynamics of Turkish Foreign Policy, it is seen that Turkey's solution steps to climate events and environmental problems are public-based. In this structure where the state is at the forefront, the private sector's projects for the problems started to be seen after 2010. Turkey's foreign policy behavior is a natural consequence of the determinism of its state-centered approach. In this context, with the Montreal Protocol to the Vienna Convention in 1991, Turkey became a party to an agreement on the environment for the first time in the international arena. While signing this

[6] 3 from, https://www.resmigazete.gov.tr/eskiler/2009/05/20090513-1.htm
[7] Ministry of Environment and Urbanization, "Republic of Turkey Climate Change Action Plan 2011 – 2023"
https://webdosya.csb.gov.tr/db/iklim/editordosya/file/eylem%20planlari/Iklim%20Degisikligi%20Eylem%20Plani_TR.pdf (Access 26.12.2022).
[8] United Nations, "Social and Employment Impacts of Climate Change and Green Economy Policies in Türkiye", 28.06.2022, https://www.undp.org/turkiye/publications/social-and-employment-impacts-climate-change-and-green-economy-policies-t%C3%BCrkiye (Access 28.12.2022).

protocol, Turkey, within the framework of the economic interests and foreign policy understanding of the period, applied a septic perspective on the one hand and a wait-and-see policy on the other.

In the following process, after the signing of the Paris Agreement, Turkey closely followed the foreign policy positions of other countries. The best example of this is Turkey's preparation of a report titled "Turkey's Decarbonization Roadmap: Net Zero by 2050".[9] This report has been prepared in line with the goal of keeping the global temperature increase below 1.5 degrees Celsius. In this framework, the scenarios that will be put forward for the realization of the Net Zero Scenario between 2018 and 2050 include policy changes such as the transition from fossil fuels to renewable energy in electricity generation, energy efficiency, electric transportation, measures to be taken in buildings and industry, and how long, how and how fast carbon dioxide emissions should be reduced, based on scientific modeling results.

Following the global principles contained in the Paris Agreement, to which Turkey is also a party, the European Green Deal has been signed by many countries. The agreement includes commitments to take measures to reduce carbon emissions. The main issue in the Green Deal Action Plan is to ensure sustainable growth by taking into account climate and environmental risks, to develop policies that will ensure more careful use of limited natural resources, to use methods that will ensure environmentally friendly transformation in production and investment, and to provide financing for the investment of these methods.[10] In addition, with the European Green Deal announced on December 11, 2019, the European Union aims to reduce greenhouse gas emissions by 55 percent by 2030 and become carbon neutral by 2050. This directly affects the goals, targets, and practices of Turkey's climate policies. It also offers many opportunities for the development of renewable energies.[11]

As a result, the concepts of environment and climate change are among the topics that are frequently brought together by the public in Turkey, even though the solution to the problems should be at the global level.[12] For this reason, Turkey, together with international organizations and many countries, has endeavored to redesign and implement climate and

[9] Cobenefits Study, "Increasing Industrial Competitiveness And Hedging Against Fossil Price Volatility With Renewables In Turkey Assessing The Co-Benefits Of Decarbonising Turkey's Power Sector", June 2022, https://ipc.sabanciuniv.edu/Content/Images/CKeditorImages/20220624-16064995.pdf (Access 28.12.2022).
[10] Alpaslan Çakar, Eko İklim Economy and Climate Change Summit, Ankara, 31.03.2022, p.1-5. https://www.tbb.org.tr/Content/Upload/Dokuman/8834/TBB_YKB_310322.pdf
[11] NTV News, "The European Green Deal includes both risks and opportunities for Turkey", 08.04.2021, https://www.ntv.com.tr/ekonomi/avrupa-yesil-mutabakati-turkiye-icinrisk-de-firsat-da-barindiriyor,JnIzawhMPEGnPdSa7ClqPw (Access 04.05.2022).
[12] Yunus Emre Özer, Analysis Of Actors In Climate Change Governance And The Situation Of Turkey, Int. Journal of Management Economics and Business, Vol. 13, No. 4, 2017, p.833-851.

environmental policies and production structures from a centrist perspective in order to protect the environment by taking measures against global warming. Within the framework of this effort, Turkey announced the general strategy and steps of the green transformation with the Green Deal Action Plan published in July 2021. In this process, the Ministry of Trade took a leading role and prepared the "Green Deal Action Plan" as of 2021. The Action Plan, which will serve as a roadmap, includes a total of 32 targets and 81 actions under 9 main headings.[13] Within the framework of these actions and targets, Turkey has committed to a 21% reduction in greenhouse gas emissions by 2030 over the business-as-usual growth rate. Furthermore, plans and policies on energy, manufacturing industry, transportation, buildings, urban transformation, agriculture, forestry, and waste have been announced to achieve this target.

Institutions and Voluntary Organizations in Turkey

There are many institutions and voluntary organizations in Turkey to raise environmental awareness. The most important of these organizations is the Turkish Environment Agency (TÜÇA).[14] The working principles of the Turkish Environment Agency were determined.[15] However, it is not known what kind of effective authority this institution will have in terms of environmental management. Therefore, it is not clear how the authority to supervise or regulate will function. Within these uncertainties, when the current organizational structure, purpose, and mission of the institution are evaluated, it is seen that it will operate as an institution affiliated with the Ministry of Environment and Urbanization.[16] However, expectations about the future are very high for this institution. [17]

It is necessary to be prepared for the consequences of climate change and minimize its negative impacts. In this direction, it is imperative to predict how the changes and trends observed in the climate will be in the future. In this context, the General Directorate of Meteorology comes to the forefront. Climate events are observed by the General Directorate of Meteorology. At

[13] Kargo Haber, "Effects of the European Green Deal on the Transport Sector", 07.10.2021, https://www.kargohaber.com/avrupa-yesil-mutabakatinin-tasimacilik-sektorune-etkileri-6478h.htm (Access 04.05.2022).
[14] T.R. Official Newspaper, (31455, 15.04.2021), "From the Ministry of Environment and Urbanization: Regulation on the Organization and Working Principles and Procedures of the Environment Agency of Turkey", Date of Accession: 02.02.2023 from, https://www.resmigazete.gov.tr/ eskiler/ 2021/ 04/ 20210415-3.htm
[15] T.R. Official Newspaper, (31350, 24.12.2020), "Law on the Establishment of the Turkish Environment Agency and Amendments to Certain Laws", Date of Accession: 02.02.2023 from, https://www.resmigazete.gov.tr/eskiler/2020/12/20201230-10.htm
[16] T.R. Official Newspaper, (31455, 15.04.2021), "Regulation on the Organization and Working Principles and Procedures of the Environment Agency of Turkey", Date of Accession: 02.02.2023 from, https://www.resmigazete.gov.tr/eskiler/2021/04/20210415-3.htm
[17] Ayşe Şensoy Boztepe, "Turkish Environment Agency established", Anatolian Agency, 30.12.2020, https://www.aa.com.tr/tr/turkiye/turkiye-cevre-ajansi-kuruldu/2093383(Access 01.01.2023).

the same time, scenarios are constantly produced to understand the past climate regime and to predict future climate changes.[18]

Global warming and climate problems are directly related to energy resources. For this reason, an energy efficiency law was enacted.[19] Within the framework of the law, the Energy Market Regulatory Authority (EMRA) was authorized to regulate energy markets.

On the other hand, a survey was conducted by the OECD to monitor climate change adaptation behaviors in Turkey. According to the results of the survey, it is understood that the level of willingness to switch to electric vehicles is high in Turkey. It was also found that the level of willingness to reduce flight or car use is relatively low, and the level of willingness to limit home heating or cooling is relatively weak. Finally, it was found that those with better financial status were more willing to adapt to climate change.[20] In this context, the National Sustainable Development Coordination Board was established to monitor and coordinate the implementation of sustainable development goals at the national level.[21]

In addition to these organizations, twenty thousand of the approximately one hundred thousand associations in Turkey are dedicated to environmental issues. The first of these organizations is the Turkish Association for the Conservation of Nature (TTKD), founded in 1955. It was followed by the Association for the Protection of Air Pollution, founded in 1969, the Association for the Protection of Natural Life, founded in 1975, and the Turkish Foundation for Environmental Problems, founded in 1978. In the 1990s, one of the most important associations established in Turkey was the Turkish Foundation for Combating Soil Erosion, for Reforestation and the Protection of Natural Habitats (TEMA), founded in 1992. TEMA prioritizes the protection of natural assets and environmental health through its activities. TEMA also takes an active role in the fight against erosion, soil protection, and afforestation. In particular, it has played an active role in issues such as the declaration of the Belek-Acısı and Göksu Delta coasts as special environmental protection zones and the enactment of the pasture law

[18] General Directorate of Meteorology, "IPCC Climate Change Scenarios and Historical Development", https://www.mgm.gov.tr/iklim/iklim-degisikligi.aspx?s=senaryolar(Access 01.01.2023).
[19] T.R. Official Newspaper, (5627, 18.04.2007), "Energy Efficiency Law", Date of Accession: 02.02.2023 from https://mevzuat.gov.tr/MevzuatMetin/1.5.5627.pdf
[20] Antoine Dechezlepr'etre, Adrien Fabre, Tobias Kruse, Bluebery Planterose, Ana Sanchez Chico, and Stefanie Stantcheva, Supplement for "Fighting Climate Change: International Attitudes Toward Climate Policies", p.1-17. https://www.oecd.org/climate-change/international-attitudes-toward-climate-policies/Turkiye.pdf(Access 06.01.2023).
[21] T.R. Official Newspaper, (31897, 19.07.2022), "National Sustainable Development Coordination Board", Date of Accession: 01.01.2023 from, https://www.resmigazete.gov.tr/ eskiler/ 2022/07/ 20220719-3.pdf

announced in 1998.[22]

As a result, combating climate change should be carried out with the collective action of all stakeholders of the society such as non-governmental organizations and public institutions. For this purpose, there is the EU4ETTR project that contributes to the preparation of Sustainable Energy and Climate Action Plans (SECAP) by municipalities. 42 municipalities from Turkey participated in this project.[23] In addition to the municipalities, thanks to the support provided by these institutions and organizations, the "Climate Council"[24] will be held in January and February 2022 and the "Eco Climate Summit"[25] in March. Thus, civil society and think tanks operating in the climate-specific field have expressed their aspirations.[26] Many of these democratically defined demands have still not been realized.

Literature On Environment, Climate Change, and International Relations Theory

In order to fully understand the environment and global warming, concepts such as climate, climate change, and global warming should be known.

Climate is defined as the average temperature, humidity, atmospheric pressure, wind, precipitation, and other meteorological events over a certain period of time. The concept of "Climate Change", on the other hand, refers to the change in climate systems caused by global warming as a result of human-induced greenhouse gas emissions that directly or indirectly disrupt the composition of the global atmosphere, in addition to the natural climate change observed in comparable time periods. Finally, the concept of "Global Warming" refers to the increase in the average surface temperature of the earth as a result of the rapid increase in the accumulation of greenhouse gases emitted into the atmosphere by human activities such as the use of fossil fuels, land use changes, deforestation, and industrial processes, and the strengthening of the natural greenhouse effect.[27]

When the environmental problem is analyzed within the framework of these concepts, it is seen that there is no common view in the international

[22] Gülizar Çakır Sümer, "Turkish Environmenttal Foundation From The Perspective Of Its Contributions To The Development Of Level Of Environmental Consciousness In Turkey", Süleyman Demirel University Faculty of Economics and Administrative Sciences, Vol. 12, No. 2, 2017, p.279-297.
[23] For its website, see; https://www.covenantofmayors.eu/about/covenant-initiative/origins-and-development.html (Access 02.11.2022).
[24] For its website, see; https://iklimsurasi.gov.tr/sayfa/sonuc-bildirgesi (Access 02.11.2022).
[25] For its website, see; https://ekoiklim.com/ (Access 02.11.2022).
[26] Sustainable Economy and Finance Research Association, "Which demands of civil society were met in the Climate Council Recommendations?", 09.03.2022, https://sefia.org/haberler/iklim-surasi-tavsiye-kararlarinda-sivil-toplumun-hangi-talepleri-karsilandi/(Access 02.01.2023).
[27] Climate Change and Agriculture Assessment Report, Ministry of Agriculture and Forestry General Directorate of Agricultural Reform, Ankara, 2021, p.17.

arena. Many decision-makers and thinkers differ due to some arguments. At this point, the determining factors consist of issues such as how the environmental issue is put on the international agenda, which actors bring it to the forefront, and what kind of solutions are proposed. For these reasons, the theories that influence and inspire decision-makers become very important.[28]

Within the framework of the above-mentioned concepts and arguments, the theoretical approach to environmental and climate issues in international relations varies greatly. Therefore, each different model has different implications for how social and political life is organized.[29] In this framework, some argue that environmental problems should exist, while others claim that they reveal what is hidden and that the focus should be on the political interests behind them. Climate change and environmental problems are therefore seen as one of the most complex global policy issues in international relations. The main creators of this complexity are the rich industrialized countries.

At the same time, climate change is global in both cause and effect. Its effects are being mitigated through international cooperation. Because the current climate regime seems to be a joint product of neoliberalism, regime theory, and institutional functionalism. However, the fact that it includes processes of insolubility, interest, conflict, etc. prevents us from considering it separately from realism. In this context, the main outlines of the study have been formed in light of concepts such as realism, liberalism, regime theory, and structuralism.

Realism is the most influential theory of international relations.[30] Realism is an approach that emphasizes factors such as anarchy, power, security, survival, and interests in the international system. It states that the primary priority of states is to ensure their own security and that the strong can do whatever they want. Within the framework of this theory, which states that the weaker states have to put up with this situation, whether environmental issues are considered a problem or not is shaped according to the interests of powerful states. According to realists, environmental issues fall under low-profile political issues.

The basic premise of this theory is that there is no order in an anarchic space. Thus, nations are guided as unitary rational actors by maximizing interests. According to this theory based on power politics, ethical values,

[28] Imam Bakır Kanlı and Gökhan Katıtaş, "Global Emissions Dilemma: Turkey Assessment", International Journal Of Afro-Eurasian Research, Vol. 5, No. 1, 2018, p.58-85.
[29] Gustavo Sosa-Nunez and Ed Atkins, Environment, Climate Change and International Relations, e-book, England, 2016, pp.14-29.
[30] Şaban Kardaş and Ali Balcı, Introduction to International Relations History, Theory, Concepts and Issues, İstanbul, Küre Publications, 2014, pp.119-135.

moral values, and justice have no place. The theory argues that nation-states are the central actors in the global world.[31] Therefore, it only looks at national interests. The US not signing the Paris Agreement is the best example of this theory. With this decision, the US decided to return to realism.

In general terms, realists overlook the potential for environmental issues to threaten national or international security.[32] The realists' approach to the environment was only possible during the Cold War's slowdown and detente periods.[33] However, over time, the environment-security relationship has taken an important place in theoretical approaches to international relations.[34] The expansion and multidimensionality of the concept of security have contributed to this situation.[35] The Copenhagen School has also contributed a lot to the multidimensional evaluation of the security dimension.[36]

On the other hand, there are four main theoretical frameworks that analyze the relationship between environmental and climate issues and security. The first is environmental security, which emphasizes the security of the entire planet. According to this view, the world as a whole must be protected. The second is human security. It is based on the achievement of a healthy environment for all humanity in an equitable and sustainable manner. The third is national environmental security. This approach is based on solving fundamental national and international problems. Finally, there are the rejectionists. These reject the combination of environment and security. Therefore, there is a significant link between the concepts of climate change and security in the modern international relations literature.[37] In the process of "broadening" and "deepening" the security agenda, it is widely discussed to combine environmental issues and the concept of human security. The concept of environmental destruction is particularly important. The consequences of the concept of destruction in every field, be it political, social, or economic, contribute to the broadening and deepening of security

[31] Scott Burchill and Andrew Linklater, Theories of International Relations, translated by Ali Aslan and Muhammed Ali Ağcan, İstanbul, Küre Publications, 2013, pp.50-70.
[32] Andrew Heywood, Introduction to Political Theory, Translated by:Hızır Murat Köse, İstanbul, Küre Publications, 6th Edition, 2014, p.19.
[33] Stephen Mcglinchey, Rosie Walters And Christian Scheinpflug, International Relations Theory, E-International Relations Publishin, Bristol, England, 2017, pp.15-22.
[34] Hülya Baykal and Tan Baykal, "Environmental Problems in A Globalized World", Mustafa Kemal University Journal of Institute of Social Sciences, Vol. 5, No. 9, 2014, pp.1-14. Retrieved from https://dergipark.org.tr/tr/pub/mkusbed/issue/19561/208526
[35] Barry Buzan, "New Patterns of Global Security in the Twenty-First Century", International Affairs (Royal Institute of International Affairs, Vol. 67, No.l, 1991, pp.431- 451.
[36] Ali Diskaya, "Towards a Critical Securitization Theory: The Copenhagen and Aberystwyth Schools of Security Studies," E-International Relations, 01.02.2013, https://www.e-ir.info/2013/02/01/towards-a-critical-securitization-theory-the-copenhagen-and-aberystwyth-schools-of-security-studies/ (Access 06.11.2022).
[37] Esra Pakin Albayrakoğlu, "Climate Change and Security: The Case for Turkey", Gazi Academic Review, Vol. 5, No.9, 2011, pp.59-73.

studies on the basis of climate and environmental issues.[38]

Liberalism and its later version, neo-liberalism, focus on the utility of nations.[39] The theory is based on cooperation in an atmosphere of peace and harmony.[40] Liberalism is based on freedom, individualism, private property, free market. The concept of private property rights is very important for liberals. The concept essentially states that individuals can use whatever they want in nature with a materialistic lifestyle. Industrialization has been an important factor in the development of the concept. This is why liberal theory forms the basis of the international capitalist economic system. Like any other theory, liberal theory has changed over time. In this context, neo-liberal understanding has developed as an extension of the liberal understanding. Neo-liberalism essentially advocates free market hegemony and is based on the importance of property rights. The UNFCCC, the Kyoto Protocol, and the Paris Conference decisions are the best examples of neoliberalism. These global agreements show cooperation on adaptation to the environment and climate. Thus, mutual risks and threats are mitigated in line with interests. On the other hand, regime theory defines regimes as a set of principles, norms, and rules. Young, Keohane, and Nye are prominent proponents of regime theory. In fact, regime theory is a reflection of liberal values. Another branch, cosmopolitanism, argues that non-state actors play an increasingly important role in the perspective. In this context, global institutions created to solve environmental problems come to the fore. Institutionalism, which sees international institutions as a force, shows that international organizations play an active role in these common issues.

In international relations, constructivists emphasize a move away from international relations.[41] Constructivist scholars rely more on discursive and intersubjective procedures developed by international governance.[42] Cox has played an important role in the importance of this concept as evidence of discursive power and intellectual elements in interstate relations. The views that the US has risen to global sovereignty and reproduced this sovereignty come to the forefront in solving problems such as environmental problems and climate change. In this framework, the leading role and support of the US in the development of environmental policies increases or decreases the interest of other countries in the issue.

[38] Barry Buzan, "People, States and Fear: International Security Studies in the PostCold War Era", Harvester Wheatsheaf, New York & London, pp.15.
[39] Scott Burchill and Andrew Linklater, International Relations Theories, Translated by Ali Aslan and Muhammed Ali Ağcan, Istanbul, Küre Publications, 2013, pp.81-115.
[40] Şaban Kardaş and Ali Balcı, Introduction to International Relations History, Theory, Concepts and Issues, İstanbul Küre Publications,2014, pp.135-155.
[41] Kardaş and Balcı, *ibid*., p. 227-230.
[42] Scott Burchill and Andrew Linklater, Theories of International Relations, Translated by Ali Aslan and Muhammed Ali Ağcan, İstanbul, Küre Publications, 2013, pp.243-270.

Moreover, "functionalists" argue that cooperation in low politics, such as on environmental issues, leads to rapprochement and cooperation between states in high politics. "Realists" respond with a counter-argument, arguing that a stalemate in low politics can lead to war.[43]

In light of all these theories, it can be easily said that Turkey is quite vulnerable to environmental problems and climate change. Therefore, theoretically, Turkey should not engage in exclusionary behavior in the face of climate-related problems. Because marginalization processes at the domestic or international level increase the security risks that arise with the problems. It is inevitable that Turkey will be affected by the negative consequences to a certain extent. Therefore, cooperation is a necessity in solving problems. The absence of climate-induced wars does not mean that there are no conflicts. With the increase in global warming and environmental problems, the current crises will lead all countries to a process where high-security measures need to be taken. Increasing high-security capacity shows that in the future, negotiations on climate change will be brought to the forefront of global diplomacy. Because it is seen that the point reached in international relations on climate change is not successful enough, especially in terms of emission reduction and environmental damage.[44] The policies pursued by Turkey in the face of this inadequacy are evaluated in the next section.

Bilateral Relations and Alliances of Turkey

Environmental issues are a relatively new phenomenon in international relations. Beginning with the 1960s, environmental concerns started to increase in developed countries and then spread to other countries as well. Since the 1970s, environmental problems started to be seen as an international issue.[45] With the increase in environmental awareness, the first World Environment Day was celebrated in 1970. The year 1972 was a turning point in the way environmental problems were addressed in the international system.

In 1972, the First World Environment Summit in Stockholm was the first international summit. After the World Environment Summit, it was declared that economic and social development was a prerequisite for protecting and improving the environment. It was also decided to establish the United Nations Environment Programme (UNEP) and the Environment Fund. Finally, it was stated for the first time that development should be realized by

[43] David Mitrany, "The Functional Theory of Politics", St. Martin Press, New York 1975; Mustafa Dolatyar-Tim S. Gray, "The politics of water scarcity in the Middle East," Environmental Politics, Vol 9, No 3, Autumn 2000, p. 65-88.
[44] Volkan Ediger, "International Relations Dimension of Global Climate Change and Turkey's Policies", Mülkiye, Vol. 32, No.259, pp.133-157.
[45] Kardaş and Balcı, op.cit, pp. 581-593.

protecting the environment.

In 1988, the Intergovernmental Panel on Climate Change (IPCC) was organized. IPCC, the United Nations' scientific assessment body on climate change, consists of three Working Groups and a Task Force. Working Group 1 examines the Physical Science Basis of Climate Change. Working Group 2 examines the Impacts of Climate Change. Finally, Working Group 3 works on Adaptation and Vulnerability and Mitigation of Climate Change.

The Second World Environment Summit, also known as the Rio Conference, was held in Brazil on June 3-14, 1992. Following the establishment of the United Nations Conference on Environment and Development (UNCED), the process turned into a global struggle carried out under the influence of the UN. The conference had five important outcomes. These are the Rio Declaration, Agenda 21, the Convention on Climate Change, the Convention on Biological Diversity, and the List of Principles for the Protection and Development of Forests.

Within the framework of the decisions taken at the Rio Conference, UNFCCC, which is the most important international step and legal basis of the global struggle against climate change, was signed. In the second article of the Convention, it is stated that the ultimate goal of the Convention is "to achieve, in accordance with the relevant provisions of the Convention, to keep the accumulation of greenhouse gases in the atmosphere at a level that will prevent dangerous anthropogenic impact on the climate system". Turkey became a party to the Convention on May 24, 2004.

At the same time, the UNFCCC Convention takes into account the development priorities and special conditions of countries for reducing greenhouse gas emissions. In this direction, the countries that are parties to the convention are divided into different categories by imposing different responsibilities according to their economic status. The Convention consists of four different categories: developed countries, countries in transition to a market economy, developing countries, and less developed countries. In the Convention, Turkey is considered both Annex 1 and Annex 2 country since it is a member of the OECD and G20. Turkey found it unfair to be in both categories and refused. It then requested to be removed from the Annex 2 list.[46] At the 7th Conference of the Parties (COP7) in Marrakech in 2001, Turkey became an Annex 1 country with special conditions.

In 2005, an article on greenhouse gases emitted to the atmosphere was added to the Kyoto Protocol signed internationally in 1997. Hence, countries

[46] Climate Change and Agriculture Assessment Report, Ministry of Agriculture and Forestry GeneralDirectorate of Agricultural Reform, Ankara, 2021, https://www.tarimorman. gov.tr/TRGM/Belgeler/IKLIM%20DEGISIKLIGI%20VE%20TARIM%20DEGERLENDIRME%20RAPORU.pdf (Access 06.11.2022).

emitting 55% of the greenhouse gases were required to sign this protocol. Turkey signed the protocol in 2009. However, Turkey does not have any quantified greenhouse gas reduction target in either period of the protocol.[47]

In 2015, the Kyoto Protocol expired. Then the 21st Conference of the Parties to the UNFCCC was organized in Paris. The current implementation tool of the international fight against climate change is the Paris Agreement. The Paris Agreement, which entered into force in 2016, plans to increase global socio/economic resilience against the threat of climate change and transition towards renewable energy by reducing the use of fossil fuels. Thus, it is aimed to keep the global temperature increase below 2°C. Turkey signed the Paris Agreement in New York on April 22, 2016.48 The Paris Agreement was ratified by the Grand National Assembly of Turkey on 06.10.2021 and entered into force.[49] After Turkey put the Paris Agreement into force, it launched initiatives to obtain loans from the international community to fulfill the activities identified.[50]

Another important global milestone on climate change is the announcement of the European Green Deal. The European Green Deal was announced in 2019. The Memorandum has two main sensitivities. The first one is to reduce the EU's greenhouse gas emissions. The second one improves sensitivities on the use of renewable energy. In addition, this agreement is a commitment to the steps that the EU will take on environmental and sustainability issues. Because the EU aims to be the first continent with zero carbon production by 2050.

Another political step taken by the European Union towards its climate-based goals is the European Climate Act. The Law, which aims to reduce greenhouse gas emissions by at least 55% compared to 1990 levels by 2030, was published in the Official Gazette on July 9, 2021. It entered into force on July 29, 2021. The climate-neutral target of the European Green Deal is written into binding legislation.

In light of all these explanations, it is seen that binding legislation in the international arena against environmental and climate problems is realized with the guidance of global actors such as the United Nations and the European Union. All countries, especially Turkey, direct their national

[47]UN Kyoto Protocol, https://unfccc.int/kyoto_protocol, (Access 06.11.2022).
[48] Ministry of Foreign Affairs of the Republic of Turkey, The Paris Agreement, Date of Accession: 27.06.2022 from http://www.mfa.gov.tr/paris-anlasmasi.tr.mfa
[49] T.R. Official Newspaper, (31621, 07.10.2021), "National Sustainable Development Coordination Board", Date of Accession: 01.01.2023 from https://www.resmigazete.gov.tr/eskiler/2021/10/20211007-7.pdf
[50] BBC News Turkey, Turkey to Receive €3.1 Billion Loan to Implement Paris Climate Agreement Provisions, Date of Accession: 14.10.2021 from https://www.bbc.com/turkce/haberler-turkiye-58917278

legislation according to the practices of these actors. For this reason, environmental problems will continue to be universally accepted in the future. Because of the effect of globalization, the impact and variety of environmental problems continue to increase. For example, many problems ranging from biodiversity to endangered species, from deforestation to acid rain, from water scarcity to air pollution have to be evaluated internationally. On the other hand, there are many reasons for the globalization of environmental problems that are evaluated internationally. Among these are the transboundary characteristics, interdependence, solidarity, and changes in the concept of national security.[51]

Within the framework of these reasons, the protection of the environment at the international level has become a necessity. Legal arrangements made at the national level for the protection of the environment are based on the protection or improvement of land, air, sea, rivers, and lakes. In this context, the aim of protecting and improving the country's flora and fauna, natural beauties, and natural monuments are other important points taken on a national basis. International law shapes the development of environmental problems in three dimensions. These are international responsibility, regulations on the regime of international spaces, and finally the interdependence of states with the environment of other states. At the same time, international law states that issues that do not fall within the national regimes of states should be resolved by international law. Therefore, states have to solve problems in cooperation by setting common rules and standards in an interdependent manner. In this context, the regulations realized by international law are realized under three headings.[52]

- Pollution

Sources that can cause environmental pollution are nuclear pollution, marine pollution, air pollution, and space pollution. The most dangerous of these is nuclear pollution. International agreements and institutions have been established by the UN to prevent nuclear pollution. Turkey first started as a party to a regional agreement on environmental sensitivity. The agreement in question was signed on 16.02.1976. The agreement is known as the Protocol for the Prevention of Pollution of the Mediterranean Sea from Ships and Aircraft. The agreement was updated in the following period and entered into force in the Official Gazette.[53]

When we look at the issue of pollution in terms of location, the most

[51] Ayşegül Kaplan, Global Environmental Problems and Policies, Mülkiyeliler Birliği Vakfı Publications Thesis Series: 3, Ankara, 1999, pp.23-38. For its website, see; https://xfs-1.ikon-x.com.tr:8880/mulkiye/2015/09/19.pdf
[52] Hüseyin Pazarcı, International Law, Ankara, Turhan Bookstore, 5th Edition, 2007, pp.308-318.
[53] T.R. Official Newspaper, (26939, 17.07.2008), "Regulation on Environmental Impact Assessment", Date of Accession: 01.01.2023 from https://www.resmigazete.gov.tr/eskiler/2008/07/20080717-3.htm

important one is marine pollution. Turkey, which is surrounded by seas on three sides, signed the "Barcelona Convention for the Protection of the Mediterranean Sea against Pollution" in 1976, which is one of the regional agreements to prevent marine pollution.[54] Turkey is also a party to the Antarctic Treaty and the Bucharest Convention, demonstrating its support for environmental cleanliness globally.[55] Another important agreement and protocols for Turkey were signed on 22.04.1992 and entered into force. This agreement signed between the Black Sea states includes the Convention on the Protection of the Black Sea against Pollution and its three supplementary Protocols. [56]

Air pollution endangers human health and the lives of living things. For this reason, Turkey has been sensitive to air pollution.[57] The Vienna Convention is the first application in the prevention of ozone layer pollution.[58] The second important development is the Kigali Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer. The Protocol was adopted in 2016 in Kigali, Rwanda. In 2021, Turkey became the 129th country to sign the Kigali Amendment. The Kigali Amendment entered into force in Turkey on February 8, 2022.[59] The Kigali Amendment aims to reduce the production and consumption of hydrofluorocarbons by more than 80% by 2045, preventing the emission of approximately 80 tons of CO2 equivalent. These targets are in line with Turkey's 2053 net zero emission and green development revolution targets.

For the time being, there is no consensus on the process in space, as control is still very difficult and costly. Article 7 of the 1967 UN Charter on "Principles Governing the Exploration and Use of Outer Space, Including the Moon and Celestial Bodies" is the most explicit statement. This article states that no state can claim sovereignty over space, the moon, and other celestial bodies and that no state can claim sovereignty over or occupy them.[60] In this context, Turkey is cooperatively approaching the process of environmental impact from space by complying with global standards.

[54] T.R. Official Newspaper, (17368, 12.06.1981), 1976 Barcelona Convention for the Protection of the Mediterranean Sea against Pollution,",Date of Accession: 01.01.2023 from, https://www.resmigazete.gov.tr/arsiv/17368.pdf

[55] Ministry of Foreign Affairs of the Republic of Turkey, Barcelona Convention, For its website, see; https://www.mfa.gov.tr/barselona-sozlesmesi.tr.mfa

[56] T.R. Official Newspaper, (21869, 06.03.1994), Measures for the Protection of the Marine Environment in the Black Sea, Date of Accession: 01.01.2023 from https://www.resmigazete.gov.tr/arsiv/21869.pdf

[57] T.R. Official Newspaper, (17996, 23.03.1983), "Convention on Long-Range Transboundary Air Pollution", Date of Accession: 01.01.2023 from https://www.resmigazete.gov.tr/arsiv/17996.pdf

[58] T.R. Official Newspaper, (20629, 08.09.1990), "Vienna Convention for the Protection of the Ozone Layer", Date of Accession: 01.01.2023 from https://www.resmigazete.gov.tr/arsiv/20629.pdf

[59] T.R. Official Newspaper, (5291, 12.03.2022), "Amendment to the Montreal Protocol (Kigali Amendment-2016) Agreed upon at the Twenty-Eighth Meeting of the Parties)", Date of Accession: 01.01.2023 from https://www.resmigazete.gov.tr/eskiler/2022/03/20220312-4.pdf

[60] Melda Sur, Principles of International Law, İstanbul, Beta Publications, 2006, pp.373.

As it is understood from these global agreements, Turkey directly supports the prevention of environmental pollution both regionally and globally.

- Maintaining Ecological Balance

Human intervention in climate problems that affect many problems, especially global warming and environmental problems, is evident. Anthropogenic greenhouse gas emissions are increasing day by day. These changes have serious impacts on both human and natural systems.[61] In this way, the ecological balance is disturbed.

Ecological balance is very important. Because it is necessary for human beings and other living things to continue their existence and development. International regulations include the 1946 founding treaty of the World Health Organization[62] and the founding treaties of the Food and Agriculture Organization.[63] The protection of livestock and vegetation in general is a consequence of the recognition of international ecological interdependence.

Therefore, it is definitely seen that humans are effective in the formation of the climate system that affects many problems, especially global warming and environmental problems. Anthropogenic greenhouse gas emissions are increasing day by day. These changes have a serious impact on both human and natural systems in Turkey.[64]

- Protection of Natural Beauties and Cultural Assets

The concept of environment covers a very wide area. In this context, natural beauties and cultural assets also constitute a part of the environment. Within this scope, the Convention on the Protection of the World Cultural and Natural Heritage dated 17-23.11.1972 is the most important global convention. The Convention was published in the Official Gazette on 14.02.1983 with the decision numbered 17959 and entered into force in Turkey.[65]

With the regulations set forth by international law, it has become very important to solve problems in cooperation within the framework of common rules and standards. In this context, the decisions taken by the

[61]Climate Change 2022, AR6 Synthesis Report, Date of Accession: 01.01.2023 from https://www.ipcc.ch/report/sixth-assessment-report-cycle/

[62] Ministry of Foreign Affairs of the Republic of Turkey, World Health Organization, For its website, see; https://www.mfa.gov.tr/who.tr.mfa

[63] Food and Agriculture Organization, For its website, see; https://www.tarimorman.gov.tr/ABDGM/Menu/66/Bm-Gida-Ve-Tarim-Orgutu-_fao_

[64] Climate Change 2022, AR6 Synthesis Report, Date of Accession: 01.01.2023 from https://www.ipcc.ch/report/sixth-assessment-report-cycle/

[65] T.R. Official Newspaper, (17959, 14.02.1983), ""Amendment to the Montreal Protocol (Kigali Amendment-2016) Agreed upon at the Twenty-Eighth Meeting of the Parties", Date of Accession: 01.01.2023 from https://www.resmigazete.gov.tr/arsiv/17959.pdf

United Nations and the European Union are globally influential in environmental problems that have increased in international dimension. This influence is also valid for Turkey's activities on climate and environmental issues. In this context, if we briefly look at the practices carried out by both institutions, the following points come to the fore.

Green economy involves the redesign of all economic activities for environmental purposes. Within this framework, the green economy is characterized by values that encompass and integrate social, economic, and environmental factors, as well as the determination of a new roadmap for sustainable development. After determining these values, the European Commission realized the green economic transformation in 2019. After the transformation, the European Green Deal was announced.

However, it is not possible for Europe to achieve this transformation alone. Because the drivers and consequences of climate change and biodiversity loss are global. This is why the European Green Deal document is so important. It should be seen as a roadmap for all international actors, including Turkey.[66]

Apart from the European Union, another important institution raising awareness of environmental issues globally is the United Nations. The UNFCCC's vision for 2022 strengthens the global response of parties to climate change. The commitments made by Parties leading up to COP 26 are strong, but there is still a gap in achieving the goals of the Paris Agreement. Climate action must remain at the forefront of the global agenda and deliver ambitious solutions. The urgency for action is clear and the UNFCCC is working with Parties to raise ambition, implement action, and be accountable.[67]

On the other hand, integrating climate and development into the global order is among the goals of the World Bank. In line with these goals, the 2021-25 Climate Change Action Plan has been determined. The Country Climate and Development Report contributes to the achievement of the country's development goals in line with Turkey's goal of achieving zero emissions.[68]

According to all these reports, Turkey is one of the most fragile countries to the impacts of climate change. Regulations on climate change issues are being updated, including the recently established Ministry of Environment.

[66] Funda H Sezgin, Esra Yüksel Acı and Rana Atabay Kuşçu, Green Economy within the Scope of the European Green Deal, Nobel Publishing, 2021, pp.1.
[67] Annual Report 2021, United Nation Climate Change, For its website, see; https://unfccc.int/es/node/499872
[68] Türkiye - Country Climate and Development Report, World Bank, Washington, 2022, For its website, see; https://openknowledge.worldbank.org/handle/10986/37521 License: CC BY 3.0 IGO."

However, global developments and practices are not fully implemented in domestic law.

An Overview of Turkey's Environmental Law and Democracy Process

Turkey's Climate Change Capabilities and National Law Regulate

Legal and Regulatory Provisions

Climate and environmental problems have a global impact as they have transboundary effects. Therefore, it is impossible to solve these climate problems with the individual efforts of states. This situation necessitates the establishment of cooperation among countries. Multilateral environmental agreements play an important role in the global cooperation of states.

Thanks to the multilateral agreements signed, global cooperation develops, a legally binding is provided for the solution of problems, and finally, a guide is created for the activities and practices to be carried out for the states. As a result of the multilateral agreements signed by Turkey, many practices are realized. Because multilateral environmental agreements signed for the solution of problems force states to act jointly. Thus, they impose certain limitations on the behavior of the state parties in line with the objectives agreed by the parties. At this point, although there are serious deficiencies in the transposition of international decisions into domestic law, most of the environmental agreements to which Turkey is a party have significant problems in terms of compliance.[69]

Turkey has always tried to remain neutral in all international negotiations and has adopted an attitude of non-commitment. This has led to Turkey being seen as intransigent by the international community. At the core of this process, which has put Turkey in a difficult position in many respects, is the fact that Turkey is an OECD country and has been included in both groups.[70] For this reason, Turkey's position in the Paris Agreement and other climate change regime agreements has always been painful.[71]

In response to this global problem, Turkey is trying to realize transformation in all areas, including political, economic, legal, cultural, and social, on climate and environmental issues. The practices and activities carried out and the agreements signed are promising for the future.

[69] Yasemin Kaya, "The Compliance Problem With Multilateral Environmental Agreements And An Analysis For Turkey", Suleyman Demirel University, The Journal of Faculty of Economics and Administrative Sciences, Vol.16, No.2, 2011, pp.439-462.
[70]For the Indc that Turkey Has Submitted to the Secretariat, See 30.09.2015 Http://Www4.Unfccc.İnt/Submissions/Indc/Published%20documents/Turkey/1/The_Indc_Of_Turkey_V.15.19.30.Pdf
[71] Etem Karakaya, "Paris Climate Agreement:An Evaluation Of Its Content And Impact On Turkish Economy", Adnan Menderes University, Journal Of Institute Of Social Sciences, Vol.3, No.1, pp. 1-12.

There are some rules regarding the entry into force of international agreements on climate and environment in terms of both domestic and international law. In terms of domestic law, for an agreement to enter into force, it must be published in the Official Gazette by a decree of the Council of Ministers. In international terms, the international binding of an agreement does not take place immediately upon its ratification by the President of the Republic. The Ministry of Foreign Affairs must then carry out the ratification procedures and keep the minutes of the binding treaty.[72]

There is also the question of the national competence of states and the competence they share with other states. National jurisdiction or exclusive jurisdiction covers matters that fall outside the scope of international law and are exclusively within the competence of a state. The exercise of certain powers by more than one state at the same time is called shared authority.[73] There are conflicts between states over national competence and shared competence. These conflicts are also realized for the solution of climate and environmental problems. In this context, Turkey closely follows international legislation and implements the regulations it deems necessary in its national legal system within the framework of laws, regulations, directives, procedures, and principles. With the practices realized in Turkey in the last decade, the decisions taken within the scope of combating climate change and environmental problems have accelerated. Some of the practices realized in this context are as follows.

Turkey signed the Paris Agreement in April 2016 and ratified it in October 2021. Turkey has several documents in place to realize the obligations of the Paris Agreement. These documents include articles of various laws, including the Law on Agricultural Insurance and the Law on Catastrophe Insurance. It is also directly linked to the Law on the Protection of Nature and Biodiversity, the Law on Building Energy Performance, the Energy Efficiency Law, Regulation and Regulations on the Preparation of Spatial Plans. In particular, the Turkish Natural Disaster Insurance Institution (DASK) and the Insurance Regulation and Supervision Agency should be revamped to help improve protection against climate-related events.[74] At the same time, the Green Deal Action Plan_announced in July 2021 is an important document for the transition to a sustainable and resource-efficient economy.[75]

[72] Pazarcı, *ibid*., p.76
[73] Pazarcı, op.cit, p. 173-175.
[74] DASK, the Turkish natural disaster insurance institution (https://dask.gov.tr/tcip/) established in 2000 after the 1999 earthquake, is responsible for providing, implementing, and managing compulsory earthquake insurance. See also https://seddk.gov.tr/
[75] For its website, see; https://ticaret.gov.tr/data/60f1200013b876eb28421b23/ MUTABAKAT %20YE%C5%9E%C4%B0L.pdf

The goal of sustainable development is not to jeopardize the needs of future generations. But in doing so, it is also to ensure that the present generation meets its own needs.76 Development is mostly considered in economic terms. But it also has social, cultural, and environmental factors. Therefore, the concept is multidimensional. Within this multidimensionality, environmental development refers to the establishment of a comprehensive and environmentally sustainable system.[77] To expand the scope in Turkey, a new structure was introduced with Presidential Decree No. 85 published in the Official Gazette dated October 29, 2021, and numbered 31643. With this restructuring, the name of the Ministry was changed to the Ministry of Environment, Urbanization, and Climate Change. With this change, the scope and authority of the Ministry of Environment, Urbanization, and Climate Change has expanded. These powers include preparing legislation on settlement, environment, and construction, ensuring the development of professional services, carrying out urban transformation works, supervising practices, preventing environmental pollution and ensuring the protection of the environment and nature, and combating the effects of climate change.[78]

In addition, several measures have been taken to control the emission of fluorinated greenhouse gases[79] under the Montreal Protocol on Substances that Deplete the Ozone Layer in 2022 and for the purposes of measures and rules[80] for waste and waste collectors. At the same time, incentives are provided for production with domestic and national resources. In this context, the decision numbered 10888 was published in the Official Gazette on 30.03.2022. Within the scope of the decision, the maximum settlement price for Geothermal Power Plants was determined as 1,200 TL/MWh according to the resource type.[81]

In addition to these activities carried out by competent bodies, social organizations also carry out struggles for the protection of the environment.

[76] Murat Aydın, "The Role of Energy Efficiency in Sustainable Development: Turkey Assessment", Journal of Management Sciences, Vol.14, No. 28, 2016, pp.409-441.
[77] Jonathan M. Harris, "Basic Principles of Sustainable Development", Çev.Emine Özmete, Tufts University USA, Global Development and Environment Institute Working Paper, Vol.0, No.4, 2000, pp.6, Date of Accession: 01.01.2023 from http:// www.sdergi.hacettepe.edu.tr/ makaleler/ EmineOzmet2eviri.pdf
[78] Republic of Turkey Ministry of Environment Urbanization and Climate, History of Republic of Turkey Ministry of Environment Urbanization and Climate, 2022, Date of Accession: 04.05.2022 from https://www.csb.gov.tr/tarihcemiz-i-7012
[79] T.R. Official Newspaper, (31881, 29.06.2022), "Amendment to the Montreal Protocol (Kigali Amendment-2016) Agreed upon at the Twenty-Eighth Meeting of the Parties", Date of Accession: 01.01.2023 from https://www.resmigazete.gov.tr/eskiler/2022/06/20220629-1.htm
[80] Ministry of Environment, Urbanization and Climate Change of Turkey, "Waste Collectors Circular", Date of Accession: 22.06.2022 from , https://csb.gov.tr/atik-toplayicilari-genelgesi-bakanlik-faaliyetleri-34149
[81] T.R. Official Newspaper, (31794, 30.03.2022), "Decisions of the Energy Market Regulatory Board dated 29/03/2022 and numbered 10887, 10888, 10889, 10890", Date of Accession: 01.01.2023 from https://www.resmigazete.gov.tr/eskiler/2022/03/20220330-7.pdf

In this context, Turkey's first climate lawsuit was filed on behalf of the fishermen of Marmara Lake within the scope of combating environmental problems in Turkey.[82] Looking at the actual practices, it is seen that these lawsuits will continue to increase. Therefore, strategic climate litigation and the effective use of judicial tools should be prioritized by the government.

Furthermore, some cities and municipalities are taking measures to strengthen resilience to climate change by developing local climate change action plans and sectoral policies. In Turkey, there are 10 cities and 27 municipalities in total that have ratified the Global Compact of Mayors for Climate and Energy.[83] These municipalities have a Green Cities Action Plan to mitigate climate change and emission inventories.[84] Within the framework of this action plan, Turkey's long-term goal is to achieve net zero by 2053. In line with this target, open dumping is expected to be reduced by 50% by 2035 based on environmental and health outcomes.[85] In this process, Turkey has significant potential for circular economy practices that reduce emissions.[86] In this respect, Turkey provides incentives for green investments within the framework of investment incentive program projects.[87] Still, Turkey lags behind its peer emerging markets in terms of green exports.[88] Therefore, expanding the use of the Credit Guarantee Fund for green transition can contribute to the development of the process.

In conclusion, Turkey is a party to the Kyoto Protocol and the Paris Agreement. It struggles with climate change at national and international levels. In this way, it constantly updates its policies, strategies, plans, and programs. Some of these include:

a. *Short, medium, and long-term adaptation and mitigation targets set within the framework of the National Climate Change Strategy (2010-23),89*

b. *National Climate Change Adaptation Strategy and Action Plan (2011-23),90*

[82] Cem Altıparmak, (2022), "Turkey's First Climate Lawsuit Filed", Altıparmak Law Office, Date of Accession: 23.03.2022 from, https://altiparmakhukuk.org/duyuru-turkiye-nin-ilk-iklim-davasi-acildi
[83] Cities For Climate Climate Action Plan in Local Governments, 350Turkiye, 2019, For its website, see; https://iklimicinkentler.org/
[84] Global Covenant of Mayors For Climate & Energy, For its website, see; https://www.global covenant ofmayors.org/our-cities/ (Access 26.01.2023).
[85] For its website, see; https://www.c40knowledgehub.org/s/article/C40-cities-greenhouse-gas-emissions-interactive-dashboard?language=en_US (Access 26.01.2023).
[86] For its website, see; https://donguselekonomiplatformu.com/en/ (Access 26.01.2023).
[87] For its website, see; https://www.invest.gov.tr/en/investmentguide/pages/incentives-guide.aspx (Access 26.01.2023).
[88] For its website, see; https://www.climatebonds.net/market/data/ (Access 26.01.2023).
[89] For its website, see: https://webdosya.csb.gov.tr/db/iklim/ editordosya/iklim_ degisikligi_ stratejisi_ EN(2).pdf(Access 26.01.2023).
[90] https://webdosya.csb.gov.tr/db/iklim/editordosya/file/eylem%20planlari/uyum_stratejisi_eylem_plani_EN_Final.pdf (Access 26.01.2023).

c. *Turkey's Climate Change Adaptation Strategy and Action Plan (2011-2023),*

d. *National Communications on Climate Change,*

e. *NCCAP Monitoring System (2011-23),91*

f. *Greenhouse Gas Emission Annual Inventories,*

g. *11th National Development Plan (UKP) 92*

h. *NCCAP12 Energy, Buildings, Industry, Transport, Waste, Agriculture, Land Use and Forestry and Adaptation Program (2011-23),93*

i. *Biannual Reports on Climate Change,*

j. *National Contribution Intentions.*

Turkey's New Offensive Strategy in the EU Green Deal and Climate Change

Diplomacy is a subject with a long history in international relations.[94] Growing nationalism keeps diplomacy and diplomatic work alive.[95] The classical understanding of diplomacy is negotiation. It involves persuasion and dialog between equal and sovereign states. Today, the classical image of diplomacy has been replaced by a hybrid diplomacy with multiple actors due to multiple problems and multiple applications.

There are instances where diplomacy has fallen short in establishing global environmental governance. These include the seeming inadequacy of the United Nations (UN) system or the refusal of powerful states such as the United States to accept and implement decisions. This is why green growth governance and hybrid diplomacy are so important.

It is not correct to express the concept of climate change in a single, short sentence. Because when the concept is put into a narrow mold, it becomes difficult to see the big picture. Accordingly, from a general framework, the scientifically based concept of climate change is one of the most important environmental problems that entered the agenda of international politics in the last quarter of the 20th century.

The concepts of global warming and climate change represent different processes. The concept of global warming is related to the total energy

[91] For its website, see; https://iklim.csb.gov.tr/e-iklim-sistemi-i-100 (Access 28.01.2023).
[92] For its website, see; https://www.sbb.gov.tr/wp-content/uploads/2021/12/ Eleventh_ Development_Plan_2019-2023.pdf (Access 26.01.2023).
[93] https://webdosya.csb.gov.tr/db/iklim/editordosya/file/eylem%20planlari/iklim_degisikligi_eylem_plani_EN_2014.pdf (Access 28.01.2023).
[94] Gustavo Sosa Nunez And Ed Atkins, Environment, Climate Change And International Relations, E-Book, 2016, England, p.143.
[95] Şaban Kardaş and Ali Balcı, Introduction to International Relations History, Theory, Concepts and Issues, Istanbul, Küre Publications, 2014, pp.367-377.

balance of the earth.[96] However, the concept of climate change should also cover developments other than the temperature increase in the atmosphere. Therefore, by considering global warming as the cause and climate change as the result, we can say that the concept of climate change includes global warming. [97]

In the 21st century, when global warming and climate problems are on the rise, risks and threats are increasing for all actors. Increasing risks and threats necessitate active diplomacy. For this reason, Turkey is also trying to solve many problems it has by conducting an active diplomacy. Why should Turkey pay attention to hybrid environmental diplomacy in international relations? How should Turkey try to understand and explain the environment in multilateral relations? The answers to such questions should be prioritized. Because the threats of global governments facing climate change and other environmental problems will continue to increase. In these cases, the active use of hybrid diplomacy will be one of the most important tools for solving environmental problems.

The United Nations is the responsible organization for organizing the main international talks and negotiations on climate change. Therefore, all member states of the UN emerge as the main actors in the diplomatic process. Moreover, the solution to climate change problems requires governance. For governance to be successful, cooperation between states in the diplomatic process is a necessity. For this reason, climate change and environmental problems are among the top agenda items in terms of global governance.

Two selected phenomena of the United Nations Framework are the negotiations on the United Nations Framework Convention on Climate Change (UNFCCC) and green growth governance. In these negotiation processes where diplomacy works effectively, it has been seen that cooperation and solution-oriented approach is a necessity in environmental diplomacy. For this reason, it has been seen that the neoliberal world order offers alternatives for solving problems in the institutional sense. [98]

Within the framework of these alternative solutions, climate change should be prevented from having a negative impact on Turkey in many areas

[96] Thomas Farmer and John Cook, Climate Change Science: A Modern Synthesis: Volume 1-The Physical Climate, Springer Science and Business Media, 2013, pp.8.
[97] Frank P. Incropera, Climate Change: A Wicked Problem: Complexity And Uncertainty At The Intersection Of Science, Economics, Politics, And Human Behavior, Cambridge University Press, 2016, pp.19
[98] David Held, Eva Maria Nag and Charles Roger, The Governance Of Climate Change İn Developing Countries, France: Agence Française Développement, 2012, pp.1-63 Date of Accession: 06.01.2023 from https://www.files.ethz.ch/isn/129031/Held%20Nag%20%20Roger%20-%20The%20 Governance%20of%20Climate%20Change%20in%20China%20_3_.pdf

such as health, forests, food, water, energy, and finance. [99] In this scope, there are some regulations to be introduced or revised by the European Green Deal.

These include the 55 harmonization package, carbon regulation at the border, new circular economy action plan, corporate sustainability reporting directive, green consensus investment plan, fisheries control system, energy taxation directive, forest strategy, methane strategy, renewable battery strategy, and integrated water management.

In light of all these, Turkey needs to adapt to the Green Deal to lay a solid foundation for future generations. In this framework, the question of how and in what way the relations between Turkey and the EU will be affected needs to be answered. In general, it is seen that the relations between Turkey and the EU in the process of harmonization of international agreements into domestic law will be positively affected, but the development of the process has been limited and not at the expected level. [100]

Turkey took the first step in the process by signing the Paris Climate Agreement and ratifying it in the Grand National Assembly of Turkey (TBMM). [101] Afterward, there are decisions on adaptation and transformation to the green economy within the scope of the EU's Green Deal. Thus, Turkey's Medium Term Program includes the concepts of climate and environment in the green transformation process.

In fact, the EU Green Deal is a blueprint in the form of a roadmap for the EU to tackle climate change.[102] Thus, the agreement sets out the EU's new growth strategy, which includes key targets such as a 55% reduction in greenhouse gas emissions by 2030 and zero emissions by 2050, and an end to the dependence of economic growth on resource use.[103] Turkey, for its part, referred to the Green Deal in its Medium Term Program (MTP)

[99] Abdulkadir Bektaş, "Global Climate Change and its Socio-Economic Impacts, Turkish Academy Political Social Strategic Research Foundation (TASAV)", Ankara, 2022, Date of Accession: 05.01.2023 from Https://Www.Tasav.Org/İndex.Php/Kuresel-İ-Klim-Degisikligi-Ve-Sosyo-Ekonomik-Etkileri.Html
[100] Ali Oğuz Diriöz, "Transformation Process to Green Economy within the Scope of EU Green Deal, Evaluation of the Possible Effects on Turkey-EU Relations", International Crimes, Vol.22, 2021, pp.107-130. Date of Accession: 01.01.2023 from https://avim.org.tr/public/images/uploads/files/ali%20oguz%20dirioz.pdf
[101] Yasemin Kalyoncuoğlu, "Turkey will continue its fight against climate change by ratifying the Paris Climate Agreement", Anatolian Agency, Date of Accession: 01.01.2023 from https://www.aa.com.tr/tr/cevre/turkiye-paris-iklim-anlasmasini-onaylayarak-iklim-degisikligiile-mucadelesine-devam-edecek/2373731
[102] Delivering the European Green Deal, European Commission, 2022, Date of Accession: 02.01.2023 from https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/deliveringeuropean-green-deal_en
[103] EU Green Deal, Uludag Exporters' Association, Bursa, 2020, For its website, see; https://uib.org.tr/tr/kbfile/ab-yesil-anlasmasi

published in 2021.[104]

The European Green Deal represents a multidimensional and comprehensive process involving many areas.[105] For this reason, policies are being developed to improve the harmonization between the European Green Deal and the Turkish economy. [106] These policies include the establishment of a "Green Consensus Working Group".[107]

This working group, chaired by the relevant deputy minister of the Ministry of Trade with the participation of officials from ministries such as Agriculture and Forestry, Energy and Natural Resources, Environment and Urbanization, Transportation and Infrastructure, Treasury and Finance, National Education, Industry and Technology, has various objectives. The most important of these is to follow the realization of the Green Deal Action Plan and to organize new studies by following global policy developments.

Finally, the prevention of climate change should be approached in the light of scientific foundations. [108] In this direction, R&D and innovation issues should be developed to increase compliance with the agreement. [109] Steps to be taken in this area will increase Turkey's share of international investments and integrate Turkey into global value chains.[110] Since Turkey's full candidacy was accepted on October 3, 2005, it is in the EU full membership process. Therefore, the decisions of the EU affect the changes in Turkey's Environmental Policy.[111] In this framework, there are short-term priorities for Turkey on the environment. First of all, the acquis needs to be transposed into domestic law and then implemented. This requires building the necessary institutional capacity and financial resources. Medium-term priorities for the environment are to continue the transposition and implementation of relevant international legislation and conventions. [112]

[104] Ayşe Böcüoğlu Bodur and Enes Duran, "Yeşil Dönüşüm OVP'ye Girdi." Anadolu Ajansı, Date of Accession: 03.01.2023 from https://www.aa.com.tr/tr/cevre/yesil-donusum-ovpye-girdi/2356412
[105] https://www.ikv.org.tr/images/files/AB_Yesil_Mutabakati_Temel_Unsurlari_ve_Yol_Haritasi.pdf
[106] Kübra Ecer, Oğuz Güner and Murat Çetin, "The European Green Deal and the Harmonization Policies of the Turkish Economy", Journal of Business and Economics Studies, Vol.9, No.2, 2021, pp.125-144. , For its website, see; https://dergipark.org.tr/en/download/article-file/1923045
[107] T.R. Official Newspaper, (31543, 16.07.2021), "Green Deal Action Plan", Date of Accession: 01.01.2023 from https://www.resmigazete.gov.tr/eskiler/2021/07/20210716-8.pdf.
[108] Mutlu Tüzer and Seyhan Doğan, "Scientific Basis of Climate Change", Social Sciences Research Journal, Vol.10, No.3,2021, pp.639-656.
[109] For its website, see; https://www.tubitak.gov.tr/sites/default/files/21566/yesilmutabakat.pdf
[110] Ministry of Commerce of the Republic of Turkey, Green Memorandum Action Plan 2021, Date of Accession: 01.01.2023, https://ticaret.gov.tr/data/60f1200013b876eb28421b23/MUTABAKAT%20YE%C5%9E%C4%B0L.pdf.
[111] Jale Çokgezen, "European Union Environmental Policy and Turkey", Marmara University İİBF Journal, Vol.23, No.2, 2007, pp.112
[112] Uğur Yıldırım and Sevim Budak, Changes in Turkish Environmental Policies in The Process of Turkey's Full Accession To European Union, Mustafa Kemal University Journal of Institute of Social Sciences,

Environment and Climate Statistics in Turkey in Recent Years

Turkey has been paying attention to global warming and climate change since the first day the concept emerged. There are three main reasons for this situation. The first one is that the concepts threaten all of humanity. Therefore, it is imperative to take part in a common struggle against a common threat. Secondly, Turkey is on its way to full membership in the European Union. For this reason, it aims to harmonize with EU legislation. Finally, the fact that Turkey will be directly and closely affected by the disaster scenario due to the risk and threat factors created by the conditions Turkey is in. For this reason, analyses are carried out on the need to take precautions.

For this analysis, a Köppen-Geiger climate types map has been created indicating that Turkey has 10 sub-climate types within 3 main climate types in which summer or winter season is dry.[113] This classification increases the risks posed by climate change. In fact, the data in the United Nations water report shows that Turkey will experience water scarcity within 30 years, except for the Black Sea Region.[114] In addition, there are recent fires, especially in the Aegean Region, floods in the Western Black Sea region, and increasing drought risks in the Southeastern Anatolia Region. Especially the geographies where Keban and Atatürk Dams are located are among the regions that are expected to be most affected by climate change in terms of temperature change. The decrease in the water level in the dams will also reduce the performance of the people of the region to meet their water and electricity needs. This situation may lead to serious social problems. In this framework, climate change should not be seen only as an environmental problem. Because climate change is a serious global security threat.

A United Nations report, the Intergovernmental Panel on Climate Change (IPCC), adopted by 195 countries, has been published to examine these developments, which show climate change as a serious global security threat. The report stated that harmful carbon emissions between 2010-2019 reached the highest level in human history.[115] The report also states that the global temperature will increase between 1 and 3.5 degrees by 2100. If we explain this result in another way, a global temperature increase of approximately 0.1 degrees every ten years is predicted.[116] Therefore, all people

Vol.7, No.13, 2014, pp. 173-191. Date of Accession: 09.01.2023 from https://dergipark.org.tr/tr/pub/mkusbed/issue/19571/208611
[113] Muhammed Zeynel Öztürk, Gülden Çetinkaya and Selman Aydın, "Climate Types of Turkey According to Köppen-Geiger Climate Classification", Journal of Geography, Vol.35, 2017, pp.17-27
[114] The World Water Development Report, United Nations, 2016, pp.6-19 Date of Accession: 30.06.2022 from http://www.unwater.org/publications/world-water-development-report/en/
[115] UN climate report: It's 'now or never' to limit global warming to 1.5 degrees, 04.04.2022, Date of Accession: 20.06.2022 from https://news.un.org/en/story/2022/04/1115452.
[116] Kemal Öztürk, "Global Climatic Changes and Their Probable Effect upon Turkey", G.U. Gazi Education Faculty Journal, Vol.22, No.1, 2002, pp.47-65.

need to have a sense of responsibility for future generations.[117] Within the framework of this awareness, there are many alternative methods to solve the climate crisis caused by global warming. For example, the use of alternative sources such as solar, wind, and geothermal energy is increasing all over the world. In addition to these resources, the utilization rates of renewable energy resources such as biomass and biogas energy are also increasing day by day. In Turkey, geothermal energy resources are used for electricity generation, thermal tourism, and residential heating. In addition to these areas, geothermal energy is also used in other areas such as greenhouse cultivation, fresh fruit and vegetable drying, and freshwater fishing. Geothermal resources, which have such a variety of uses, should be used efficiently in Turkey. This will facilitate meeting energy needs and accelerating economic growth. Currently, Turkey ranks first in Europe in terms of utilization of geothermal energy resources. It ranks fourth in the world.[118] This rate can be increased with support.

On the other hand, Turkey is the fourth country with the fastest-growing electricity demand as of 2021. In response to the increasing demand for electricity, Turkey's effort to transition to more renewable energy continues. The best example of this is seen in the global decline of coal power plants. Since the 2015 Paris Agreement, there has been a 77% decline in coal plant capacity. Turkey's coal production fell by 8% between 2018 and 2021.[119] Between 2015 and 2021, Turkey tripled the share of wind and solar in electricity generation with new applications. Turkey also ranked fifth in wind and solar production among G20 countries. In other words, Turkey has 13% of the world's production share by 2021.[120] Turkey's solar energy installed capacity has increased from 40 MW to 8835 MW.[121] In this context, according to the "Renewable Capacity 2022 Statistics" report prepared by the International Renewable Energy Agency (IRENA), 53.7% of Turkey's renewable energy resources by the end of 2021.[122] This situation also

[117] Ruşen Keleş, Environment in 100 Questions; Environmental Problems and Environmental Policy, Yakın Bookstore Publications, İstanbul, 2013, pp.5.
[118] Ali Karaduman, "Geothermal Energy Increases Agricultural Yields", YENADER, 27.05.2022, Date of Accession: 20.09.2022 from https://www.yenienerji.com/haberler/yenader-jeotermal-enerjinin-tarimda-verimi-artirdigina-dikkat-cekiyor
[119] Climate Action Network Europe Report, "Boom and Bust Coal 2022: Tracking The Global Coal Plant Pipeline", 25.04.2022, Date of Accession: 03.05.2022 from https://caneurope.org/report-boom-and-bust-coal-2022/
[120] BBC Turkish, "Research: Turkey is the 4th Country with the Fastest Growth in Electricity Demand in 2021 compared to Before the Pandemic", Date of Accession: 30.03.2022 from, https://www.bbc.com/turkce/haberler-dunya-60925525
[121] Ministry of Energy and Natural Resources, "In the last 8 years, our installed solar energy capacity has increased from 40 MW to 8835 MW", Twitter, Date of Accession: 21.06.2022 from https://twitter.com/TCEnerji/status/1539247667351625734?ref_src=twsrc%5Etfw.
[122] Gülşen Çağatay, "Efficiency and Clean Energy Technologies to be the "Driving Force" in Green Energy Transformation", 21.06.2022, Date of Accession: 24.06.2022 from, https://www.aa.com.tr/

contributes significantly to Turkey's economy. For example, with the increase in Turkey's utilization of solar and wind energies, it has provided a benefit of 7 billion dollars in the last 12 months in 2022. [123]

Satellite imagery published by NASA (National Aeronautics and Space Administration) dramatically reveals the environmental damage caused by climate change, especially in the last 30 years.[124] According to the report published by the World Bank, adaptation and mitigation actions should be undertaken for a resilient and net zero emission development pathway (RNZP). This strategy emphasizes some key sectors for countries' efforts to reduce carbon emissions. Some of these sectors are Building, Electricity and Transportation, Industry, Forestry and Land Use.[125] Turkey, which is present in all of these sectors, is among the most vulnerable countries to the impacts of climate change among OECD countries. According to the Turkey Climate and Development Report prepared by the World Bank in June 2022, Turkey is shown as having high vulnerability in 9 out of 10 areas, while the average of climate change-related vulnerability among OECD countries is 2 areas. [126]

In another report prepared in the USA, Turkey is shown as one of the countries that will be most affected by the harmful effects of climate change by 2040. Turkey, which is among the countries that will be most affected by the process, will also be directly exposed to the security problems that will be experienced in other geographies if current trends continue. [127]

According to the 2022 assessment of CCPI - Climate Change Performance Index, Turkey's climate performance is shown as low. The main reasons for Turkey's low ranking in the index are as follows: [128]

- *Failure to disclose the Declaration of National Contribution to the Paris*

tr/cevre/yesil-enerji-donusumunde-verimlilik-ve-temiz-enerji-teknolojileri-itici-guc-olacak/2618718#:~:text=IRENA'n%C4%B1n%20%22Yenilenebilir%20Kapasitesi%202022,3%20bin%2064%20gigavata%20y%C3%BCkseldi.
[123] Nuran Erkul Kaya, "Wind and Solar Saved 7 Billion Dollars in Turkey's Energy Imports in the Last 12 Months", Anatolian Agency, Date of Accession: 24.05.2022 from, https://www.aa.com.tr/tr/ekonomi/ruzgar-ve-gunes-son-12-ayda-turkiyenin-enerji-ithalatinda-7-milyar-dolarlik-tasarruf-sagladi/2595960
[124] NASA, Understanding our planet to benefit humankind, For its website, see; Home – Climate Change: Vital Signs of the Planet (nasa.gov)
[125] The World Bank, "Climate Action Could Provide Nearly $150 billion in Savings for Türkiye by 2040", Says Pioneering World Bank Study, Date of Accession: 13.06.2022 from https://www.worldbank.org/tr/news/press-release/2022/06/13/climate-action-could-provide-nearly-150-billion-in-savings-for-turkiye-by-2040-says-pioneering-world-bank-study
[126] 2022 Türkiye - Country Climate and Development Report, World Bank, Washington, DC, Date of Accession: 13.01.2023 from https://openknowledge.worldbank.org/handle/10986/3752
[127] Climate Change and International Responses Increasing Challenges to US National Security Through 2040, National İntelligence Estimate, 2021, pp.1-27. Date of Accession: 13.01.2023 from https://www.dni.gov/files/ODNI/documents/assessments/NIE_Climate_Change_and_National_Security.pdf
[128] Climate Change Performance Index: Turkiye, CCPI, 2022, Date of Accession: 24.08.2022 from https://ccpi.org/country/tur/

Agreement on Climate Change,

- *The fact that Turkey's 21% emission reduction target announced as an intention for 2030 is insufficient,*
- *High rate of coal use in electricity generation compared to other countries,*
- *Insufficient data on the development of renewable energy capacity in the last decade compared to the 2053 net-zero target.*

As a result; The national energy plan that Turkey aims to achieve by 2035 includes comprehensive plans such as reducing energy intensity by 35%, increasing the use of solar energy to 52.9 GW, primary energy consumption to 205.3 Mtoe, electricity consumption to 510.4 TWh, the share of electricity in final consumption to 3-24.9%, wind energy use to 29.6 GW, electrolyzer capacity to 5 GW, nuclear energy use to 7.2 GW, battery capacity to 7.5

GW.[129]

Within the framework of these goals, the Kyoto Protocol and the Paris Agreement on Climate Change are very important. Because these protocols and agreements underline the obligations of developed and developing countries on global warming and the climate crisis. However, most countries do not fulfill these obligations. In the report prepared by the World Resources Institute on the emission rates of countries as of 2020, Turkey's share in global emissions is shown as only 1.1%. Emissions from China, the United States, the European Union, and India account for more than half of global emissions.[130] The report prepared by Carbon Brief also shows that the US, China, and Russia are in the lead.[131] This situation shows that Turkey is actually victimized. However, despite this victimization, Turkey is taking important steps towards climate change policies. These steps include joining international alliances, operating democratic processes, and transforming rules and institutions. However, there is still much work to be done and many steps to be taken. For this reason, Turkey should conduct an effective climate diplomacy in order to prevent the risks that await it in the future. In addition, Turkey should push the international community to take conclusive steps to combat climate change. Because it is not enough to realize only national measures to combat climate change, which is a global problem. Therefore,

[129] National Energy Plan of Turkey, T.R. Ministry of Energy and Natural Resources, Ankara, 2022, pp.1-42. Date of Accession: 24.01.2023 from https://enerji.gov.tr//Media/ Dizin/EIGM/ tr/ Raporlar/ TUEP/Türkiye_Ulusal_Enerji_Planı.pdf

[130] Johannes Friedrich, Mengpin Ge and Andrew Pickens, "This Interactive Chart Shows Changes in the World's Top 10 Emitters", World Resources Institute, 10.12.2020, Date of Accession: 16.09.2022 from https://www.wri.org/insights/interactive-chart-shows-changes-worlds-top-10-emitters

[131] Simon Evans, "Analysis: Which Countries Are Historically Responsible For Climate Change?", Carbon Brief Clear On Climate, 05.10.2021, Date of Accession: 16.09.2022 from https://www.carbonbrief.org/analysis-which-countries-are-historically-responsible-for-climate-change/

the crises related to climate change in the world and in Turkey continue to be among the biggest threats to future generations.

Conclusion and Suggestions

As a global problem, climate change and environmental problems affect Turkey as well as the whole world. In this context, the success of Turkey's climate and environmental policy is very important for its future. The historical background examined based on the activities, practices, and exemplary developments in Turkey shows that the issue of climate change has a long history for scientists.

The theoretical approach to this issue, which has historical foundations and involves complex and very important risks and threats, shows that the process is a very serious issue. In particular, it is understood that activities are being carried out all over the world for a solution and that Turkey should increase the measures it takes. Therefore, Turkey's solution to environmental problems, reduction of global warming and climate change, legal, political, economic, cultural, social, etc. The work of scientists who will contribute to the practices to be realized at every point should be given importance. For this reason, the presence of well-equipped people who will contribute to the process in Turkey will affect its success.

The uncertainties and risks of the global warming and climate change process reinforce the difficulty of the process of solving environmental problems. Moreover, due to these characteristics, it is necessary to constantly monitor the concepts mentioned in this study titled "The Politics of Nature in Turkey: Climate Change, Environmental Law and Democracy".

At the same time, it is observed that there are difficulties in the transposition and harmonization of multilateral environmental agreements signed by Turkey into domestic law. The main reason for this situation is the incompatibilities between the specific conditions of the signatories.

As stated in the study, the fact that Turkey is in the process of full membership to the EU increases Turkey's sensitivity to environmental issues. Because Turkey has experienced significant development, change, and transformation in terms of developing legal legislation and establishing institutional infrastructure with the harmonization process. In this framework, the "European Green Deal" and the "Carbon Border Adjustment Mechanism (CBAM)" have created an important dynamism in Turkey.

Furthermore, there is no full harmonization at the United Nations to solve the problems related to climate change. This is due to the fact that the impacts will generally be encountered in the future and that the values are not certain. These are the factors that cause Turkey, like all countries, to take the

fight against global warming slowly. In this context, Turkey's objection was appropriate since it was a member of the OECD and was included in the Annex-1 and Annex-2 lists at the same time. In 2001, as a result of Turkey's objections, it was a diplomatic victory that its special status was recognized and the list was kept in Annex-1. After the decision to be deleted from Annex-2, Turkey became a party to the Convention in 2004. In this context, Turkey's becoming the 189th country to ratify the Framework Convention on Climate Change is an indication of how much importance Turkey attaches to diplomacy.

Conceptually and intellectually, environmental problems, global warming, and climate change are closely related to Turkey in all areas. Aware of this situation, Turkey has taken a pioneering stance from the very beginning in order to combat these problems democratically and legally and to reduce the risks.

Climate change, global warming, and environmental problems are among the biggest global problems. This is because these problems and issues not only affect the physical and natural environment but also have a comprehensive impact on urban life, development, and economic life. They are also directly linked to technology and have an impact on vital issues such as human rights, agriculture and food, clean water, and health. This multidimensionality and increasing impact necessitates increased efforts to find solutions. Therefore, there is a need to develop new strategies and policies to solve the problems at all levels of government in Turkey. In addition, the policies of the institutions created as a result of the strategies and policies determined and the activities carried out need to be harmonized with the environment. In this context, policies and strategies harmonized to reduce the effects of climate change, protect the environment, and combat pollution should be linked to many economic, legal, social, and cultural processes. In order to realize sustainable development and economic growth, the way of struggle should be of a nature that encourages investments and increases employment.

As a result, it is imperative for Turkey to realize a green energy transformation. Therefore, issues such as ensuring green transformation, reducing climate and environmental problems, and controlling global warming should be designed globally with a holistic perspective. However, integrating adaptation to climate change into national, regional, and local policies is a sine qua non for sustainable development. Achieving these goals is inevitable for Turkey to ensure its own security. In this context, recommendations for environmental measures to be taken within the framework of the impact of possible climate change on Turkey are as follows:

1. *Ensuring that pollution-causing industries switch to low-emission technologies,*
2. *Ensuring that the carbon fees due to the EU remain in Turkey's treasury,*
3. *Investments to modernize Turkey's energy infrastructure,*
4. *Building thermal insulation and widespread use of electric vehicles,*
5. *Shifting bank loans to sustainable investment,*
6. *Preparation for changing product standards to reduce waste,*
7. *Establishing a comprehensive, detailed, and binding climate and environment management system with new legal regulations to be developed,*
8. *Increasing the absorption of greenhouse gases by increasing the capacity of forests and natural carbon sinks,*
9. *Energy storage systems of renewable energy systems should be developed and made widespread,*
10. *Taking comprehensive measures to protect the marine ecosystem (prevention of mucilage in Marmara, etc.)*
11. *Changing consumer habits by raising awareness and consciousness about the damage caused by climate change in society during green transformation through mass education programs,*
12. *Prevention of misuse or improper use of agricultural land,*
13. *Ensuring that developed countries fulfill their financial obligations regarding historical emissions by conducting effective climate diplomacy and that Turkey receives a larger share of international climate funds,*
14. *A legal framework should be provided for the actions to be taken by determining the strategies of our country on climate change,*
15. *Ensuring effective and efficient use of water resources against drought problems,*
16. *Increased public control over the most basic environmental infrastructure services, such as water, wastewater, and solid waste, to build ecosystems,*
17. *Ensuring the protection of areas that have ecological value but no protection status.*

GLOBAL WARMING AND CLIMATE CHANGE IN DISASTER AND RISK MANAGEMENT IN TURKEY

Levent Uzunçıbuk*

Introduction

A new understanding of disaster and risk management has become widespread after 1990. The new approach adopted gives priority to disaster hazards pre-disaster activities, that is, 'risk management' and 'avoidance' activities, rather than post-disaster activities. International organizations have defined the issue of avoiding natural disasters as a prerequisite for sustainable development. Many countries in the world have renewed their legal and institutional structures in line with this common discourse[1].

In Turkey, disaster and risk management covers an organization and activity model that is thought to be used after a disaster. After the 1999 earthquakes, it was understood that it needed to be taken against disaster hazards; Important steps have been taken in this regard. However, the main issue in the urgent and priority studies carried out in order to reduce the loss of life and property in possible disasters and to achieve "safe urban environments" should be "disaster risk management" and "avoidance planning" studies[2]. In addition to earthquakes, global warming and climate change issues should also be addressed first in these studies.

However, it is important to determine the priority status of natural and human-induced disasters by taking into account the geographical locations of the settlements and to start working within the scope of risk management without wasting time accordingly.

Global Warming and Climate Change in Disaster and Risk Management

Global warming and climate change are important issues in terms of disaster and risk management. Especially when it comes to disaster events, earthquakes are at the top of society's priorities. Climate change refers to long-term changes in weather conditions and climate patterns around the world. These changes may increase the frequency, severity and impacts of

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[1] Murat Balamir, "Afet Politikası, Risk ve Planlama", TMMOB AFET SEMPOZYUMU, 2007, p.33 https://www.tmmob.org.tr/sites/default/files/dea61eed4bceec5_ek.pdf (Access 20.04.2024)

[2] Murat Balamir, "Kentlerde Kapsamlı Deprem Sakınımı için Karşılaştırmalı Yöntem Geliştirme İstanbul ve Atina Örnekleri", Proje No: İÇTAG - I582/GSRT (102I005) 2008, p.31 https://search.trdizin.gov.tr/tr/yayin/detay/609687/ (Access 24.04.2024)

extreme weather events[3]. The fact that forest fires, which have become a current issue around the world in recent years and cover large areas, is attributed to climate change rather than profit.

Disaster and risk management includes a set of preventive, preparedness, response and recovery measures aimed at dealing with hazards arising from natural disasters or other events. Climate change can affect disaster risks by increasing the frequency and severity of natural disasters. For example, increasing temperature and humidity levels, heavy rainfalls can increase the risk of flooding and erosion. Likewise, climate change can be associated with other disasters such as droughts, wildfires, hurricanes and sea level rise.

The impacts of global warming and climate change on disaster and risk management may include:

Increasing extreme weather events: Climate change can increase the frequency and severity of extreme weather events such as extreme heat, heavy rainfall, storms, hurricanes and floods. This increases the likelihood and impact of disasters.

Effects on water resources: Climate change can have an impact on the amount and distribution of water resources. Drought and decreasing water resources may increase water shortage and food security problems.

Sea level rise: Global warming causes glaciers to melt and sea levels to rise. This increases risks such as erosion, salinization, floods and floods in coastal areas.

Health effects: Climate change can affect air quality and in turn cause respiratory diseases and other health problems. Additionally, heat waves and high humidity levels can also cause health problems.

Infrastructure and economic impacts: Disasters can cause serious damage to infrastructure and economy. Disasters related to climate change cause damage to buildings, roads, energy facilities, agricultural areas and other infrastructure elements. This causes economic losses[4].

Therefore, climate change and global warming factors should be taken into account in disaster and risk management processes. Preventive measures should be planned in line with climate change scenarios to reduce the effects of disasters. At the same time, rapid and effective response and recovery measures are also required. International cooperation and applicable

[3] Murat Türkeş, "Küresel iklim değişikliği nedir? Temel kavramlar, nedenleri, gözlenen ve öngörülen değişiklikler", İklim Değişikliği ve Çevre, Su Vakfı, 2008, p.27 https://dergipark.org.tr/en/download/article-file/518059 (Access: 27.05.2024)

[4] Aslı Akay, "İklim Değişikliğinin Neden Olduğu Afetlerin Etkileri", İklim Değişikliği Eğitim Modülleri Serisi 15, Ankara, 2019, p.28-35 https://www.iklimin.org/moduller/afetmodulu.pdf (Access: 27.05.2024)

common policies can help disaster and risk management in the fight against global warming and climate change.

In order to better understand global warming and climate change, it would be useful to explain some concepts and definitions on the subject.

Concepts and Definitions

Global warming

Global warming refers to long-term increases and averages in the atmosphere and oceans around the world, resulting from the amplification by human activities of a natural phenomenon known as the greenhouse effect. So-called greenhouse gases. Carbon dioxide (CO2), methane (CH4), nitrogen nitrite oxides (NOx), ozone (O3) and other fluorinated gases accumulate in the atmosphere and capture some of the light coming from the sun. This leads to warming of the planet and climate changes.

The main human activities that can cause climate change include the use of fossil fuels such as coal, oil and natural gas, industrial activities, energy production, agricultural practices and deforestation. These activities increase greenhouse gas emissions and increase the amount of greenhouse gases in the atmosphere.

The effects of global warming manifest themselves in various areas. These:

- Climate changes: Global warming causes changes in weather and climate patterns by increasing the average temperature around the world. This situation manifests itself in results such as hotter summer months, longer heat waves and less cold winter months. However, it seems that the increase in temperature averages causes an increase in extreme weather events such as extreme heat events, drought, heavy rains, hurricanes and sea level rise.

- Ecosystem impacts: Global warming affects natural ecosystems and therefore the habitats of plant and animal species, thus having negative effects on biodiversity. However, some species may not be able to adapt to changing climate conditions and may face loss of habitat. In this case, it can disrupt the balance of ecosystems and lead to habitat loss. It is clear that factors such as melting glaciers in the polar regions, decreasing sea ice and disappearing forests will have negative effects on biodiversity.

- Extreme weather events: Global warming increases the frequency and severity of extreme weather events. It is considered that extreme weather events such as severe hurricanes, storms, heavy rains, floods, drought and forest fires seen in our world in recent years are related to global warming. These extreme weather events harm people, the economy and ecosystems.

- Water resources: Global warming has a significant impact on water resources by affecting the water cycle. While the amount of precipitation is increasing in some regions, the risk of drought is increasing in other regions. It is evaluated that this situation may cause a decrease in water resources, drinking water shortage and some problems in agricultural production.

- Sea level rise: Warming causes glaciers to melt and sea levels to rise. Rising sea levels will also increase risks such as erosion, salinization and floods in coastal areas.

- Agriculture and food security: Global warming may affect agriculture and cause food security problems. However, factors such as drought, floods, weather events and the increase in harmful organisms will also negatively affect agricultural production, which will cause food prices to increase.

- Human health: Global warming, air pollution, heat waves and climate changes may cause health problems such as respiratory diseases, cardiovascular diseases and dehydration[5].

Due to the effects mentioned above, global warming and climate change have become an important environmental problem that needs to be fought together at the international level throughout the world today. It is deemed necessary to take important steps to reduce greenhouse gas emissions, transition to renewable clean energy sources and adapt to climate change by ensuring cooperation between international and national public institutions and organizations, governments, non-governmental organizations, universities and all individuals. In this context, it would be useful to explain climate change.

Climate Change

With the beginning of the Industrial Revolution in the 1700s, high amounts of greenhouse gases were released into the atmosphere as a result of the excessive use of fossil fuels in heating, cooling, lighting and energy in industry and settlements. The reason why these gases are called "Greenhouse Gases" is that they retain heat in the lower layer of the atmosphere like a greenhouse. Greenhouse gases have remained in the atmosphere for a long period of time, from past to present, and as these gases are increasingly added to the atmosphere around the world over time, more heat is retained and higher air temperatures occur in the atmospheric layers close to the earth's surface. This situation causes a change in the weather pattern and also increasingly changes the temperature of the oceans. At the same time, this climatic change negatively affects the living spaces of people, plants, animals

[5] Galip Akın, "Küresel Isınma, Nedenleri ve Sonuçları", Ankara Üniversitesi Dil ve Tarih-Coğrafya Fakültesi Dergisi, 46, 2 (2006) p.29-43 https://dergipark.org.tr/tr/download/article-file/2153271 (Access: 27.05.2024)

and even microorganisms, thus negatively affecting their quality of life[6].

Climate change is expressed as long-term changes in climatic conditions around the world. Climate is the sum of weather conditions in an area over long periods of time and is generally defined by average temperature, precipitation, winds, humidity, and other factors. Climate change is an observed and determined change in the long-term trends and variability of the climate. It has been determined that these changes are caused by human interactions as well as natural processes. Especially with the beginning of the industrial age, human activities have negatively increased greenhouse gas emissions and environmental pollution. It would not be wrong to associate this environmental cycle with the economic situation. In addition to ensuring that global capital rent is sustainable, it must also maintain its hegemony. For example, when we consider the automobile sector, it continues its production sustainably in line with the technological and economic developments from the industrial revolution to the present day, in parallel with the development of the population. Today, USA, China, Russia, Germany, France, England, India, South Korea etc. The situation can be better understood when the automotive sectors of the countries are examined in detail from the environmental perspective. However, since our topic is to take global warming and climate change into consideration in Disaster and Risk management, this subject has been excluded from the scope.

The symptoms of climate change are similar to the symptoms of global warming. These may include temperature increase, change in precipitation patterns, sea level rise, extreme weather events, ecosystem effects, health effects, decrease in water resources, decrease in agricultural areas and food security and similar issues. Many of these impacts interact with each other and can have a far-reaching impact on social, economic and environmental systems. Tackling and adapting to climate change is important to reduce these impacts and make people and ecosystems more resilient. However, it is useful to explain the carbon footprint as it is a concept that measures the amount of greenhouse gas emissions of an individual, an organization or an activity, especially emissions expressed as carbon dioxide (CO2).

Carbon footprint

Greenhouse gas emissions are at the top of the agenda of developed and developing countries in the world. With the industrial revolution, we entered a new era in which natural climate changes occurred and human activities also affected the climate. Today, efforts are continuing to transition to a low-

[6] Sümeyye Kahraman, Pervin Şenol, "İklim Değişikliği: Küresel, Bölgesel ve Kentsel Etkileri", Academia Journal of Social Sciences - Special Issue - 1, 2018, pp. 353-370 https://dergipark.org.tr/en/pub/asj (Access: 31.05.2024)

carbon economy against the threat of global warming and climate change[7]. In studies conducted to calculate CO2 gas, which has a direct impact on global warming, the concept of carbon footprint came to the fore and was used synonymously with "greenhouse gas inventory". Greenhouse gases are gases that absorb heat in the lower layers of the atmosphere and re-radiate it, keeping the atmosphere warmer than it should be. Until the Kyoto Protocol of 2013, the main greenhouse gases were water vapor in the atmosphere, carbon dioxide (CO2), methane (CH4), nitrogen monoxide (N2O), hydrofluoride carbon (HFCs), perfluorocarbon (PFCs), sulfur hexafluoride (SF6). Within the scope of the studies, nitrogen trifluoride (NF3) was also included after 2013. The retention period of each greenhouse gas in the atmosphere and its effects on global warming are also different. In order to determine the impact power of greenhouse gases, they are converted into CO2 units to give them CO2 equivalent effects. Because the final product resulting from the metabolism of carbon-containing nutrients is CO2[8]. However, carbon footprint is a concept that measures the amount of greenhouse gas emissions, especially emissions expressed as CO2, of an individual, an organization or an activity. It is usually expressed in metric tons or CO2 equivalents. Carbon footprint takes into account greenhouse gas emissions from many factors such as personal activities, consumption habits, energy use, transportation, residences, businesses, production processes and other activities.

Carbon footprint calculations use the life cycle approach when evaluating the sources of emissions. This involves calculating the greenhouse gas emissions released from production to consumption of the product or service. For example, a product's carbon footprint can include processes from raw material extraction to production, packaging, transportation, distribution, use and waste management.

Carbon footprint calculations typically include these factors:

Direct emissions: Emissions resulting from the direct sources of an activity or organization. CO2 emissions released from vehicle exhaust can be given as an example.

Indirect emissions: Emissions resulting from the energy consumption of an activity or organization. For example, they are CO2 emissions resulting

[7] Kazım Kumaş, Ali Akyüz, Muhammad Zaman, Afşin Güngör, "Sürdürülebilir Bir Çevre İçin Karbon Ayak izi Tespiti: MAKÜ Bucak Sağlık Yüksekokulu Örneği", El-Cezerî Fen ve Mühendislik Dergisi Cilt: 6, No: 1, 2019 pp.108-117, https://dergipark.org.tr/tr/download/article-file/639027 (Access: 31.05.2024)

[8] Merve Ersoy Mirici, Süha Berberoğlu, "Türkiye Perspektifinde Yeşil Mutabakat ve Karbon Ayak İzi: Tehdit Mi? Fırsat Mı? ", Doğal Afetler ve Çevre Dergisi, 2022; 8(1): pp.156-164, https://dacd.artvin.edu.tr/tr/download/article-file/1923261 (Access: 31.05.2024)

from the combustion of fuel used for electricity generation or heating.

Sectoral emissions: Emissions from sources specific to the sector of an activity or organization. An example of this is the emissions resulting from the production process of a factory.

Carbon footprint calculations are used to quantify greenhouse gas emissions and identify potential reduction strategies. Individuals and organizations can reduce their carbon footprint through measures such as energy efficiency, use of renewable energy, sustainable transportation options, waste management and changing consumption habits.

Relevance of Carbon Footprint to Global Warming and Climate Change

There is a direct relationship between global warming and climate change and carbon footprint. Climate change occurs as a result of the accumulation of greenhouse gases in the atmosphere and the warming of the planet. One of the most important components of greenhouse gases is CO2. Carbon footprint calculations can measure the contribution of individuals, organizations or activities to climate change by determining the amount of CO2 emissions.

Carbon footprint is used as a tool for measuring and reducing greenhouse gas emissions. Greenhouse gases accumulate in the lower layer of the atmosphere, creating a "**greenhouse effect**" by preventing the sun's rays from reflecting back from the earth's surface. This causes an increase in the average temperature around the world and changes in the climate.

Carbon footprint calculations enable us to understand the contribution to climate change by identifying the sources and magnitude of greenhouse gas emissions. On a large scale, human activities, especially sectors such as fossil fuel use, energy production, transportation, industrial processes and agriculture, cause the release of carbon dioxide and other greenhouse gases into the atmosphere. These emissions contribute to global warming and climate change.

Reducing the carbon footprint means combating climate change by reducing greenhouse gas emissions. Measures such as switching to energy sources that emit less carbon, increasing energy efficiency, choosing sustainable transportation options, using renewable energy, improving waste management and developing more sustainable consumption habits help reduce the carbon footprint.

Therefore, reducing the carbon footprint is an effective strategy to combat climate change. In our global world, reducing carbon footprint and controlling emissions for a more sustainable future is of great importance. In this context, the issues that should be taken into consideration in a Disaster

and Risk Management system in order to prevent the negative effects of global warming and climate change come to the fore. For this reason, it is useful to explain the concepts of Disaster and Risk management.

Disaster and Risk Management

If we consider the effects of global warming and climate change as a disaster, it is a comprehensive and interdisciplinary management model that seeks solutions to the problems of prevention, preparation, harm reduction, emergency response and recovery in order to develop measures taken to reduce the negative effects through planning, research and observation studies regarding a disaster situation. It is defined as "Disaster Management". Another definition of "Disaster Management" is to use all institutions, organizations and resources of the society towards this goal in order to carry out the work that needs to be done before, during and after the disaster and to ensure coordination in order to prevent disasters and reduce their damage[9]. Another definition of "Disaster Management" is the activities in which experts in emergency management and risk management are organized in conjunction with different institutional units, and where local and central authorizations and responsibilities are determined by legal regulations[10].

When we look at these definitions, it will be seen that risk management is included in the concept of disaster management. In this context, the process of determining the problems that arise as a result of the risk identification and evaluation process and, in short, what the problems are and how they will be solved is called "Risk Management".

Considering a disaster situation and in pre-disaster studies, it is considered important to decide whether the risk levels related to this disaster are acceptable or negligible, to reduce risk options by paying attention to this situation, to reveal the risks that may be necessary and to find solutions to them.

However, on an important issue, especially in the risk management decision process, social, economic, legal and political factors, as well as factors such as cost, technical competence, population density in the region, affect the risks and, as a result, the priorities of the measures to be taken to reduce or minimize the risks are determined. It varies at the central and local government levels. On the other hand, when we evaluate it from its managerial aspect, it will be seen that there are two important differences that distinguish risk management from emergency management. One of these

[9] Levent Uzunçıbuk, Yerleşim Yerlerinde Afet ve Risk Yönetimi, (Doktora tezi), Ankara, Ankara Üniversitesi, 2005, p. 21.
[10] Murat Balamir, Kentlerde Kapsamlı Deprem Sakınımı için Karşılaştırmalı Yöntem Geliştirme İstanbul ve Atina Örnekleri, Proje No: İÇTAG-I582/GSRT (102I005), 2018, p. 56. https://search.trdizin.gov.tr/tr/yayin/detay/609687/ (Access: 24.04.2024)

differences is that while risk management creates a continuous and sustainable public management, emergency management becomes effective only if dangers occur[11]. The second difference is that a pluralistic behavior and community participation is deemed necessary in risk management, while a singular decision and executive power is deemed necessary in emergency management[12]. In other words, we can say that risk management has broad participation and emergency management has narrower participation.

The magnitude of the loss of life and property in the Marmara and Düzce earthquakes of 17 August and 12 November 1999, in which we suffered greatly, shows the importance of pre-disaster preparations and studies in order to reduce or minimize all damages caused by earthquakes in settlements, in other words, how important risk management is. demonstrated once again.

In the event of a disaster that occurs in our country, a "Disaster Management" system that takes into account the work before, during and after disasters in the face of painful events has been developed and put into practice. However, what should not be forgotten is that the two systems in question, called "Disaster Damage Mitigation System (Risk Management)" and "Disaster Response System (Disaster Management)" and which complement each other, have some differences due to their structure. Both systems differ from each other in terms of their goals, scope and institutionalization.

One of these is "Disaster Management" and "Crisis Planning" studies are carried out with the Disaster Response System, and "Risk Management" and "Avoidance Planning" studies are carried out to give priority and validity to the measures aimed at "avoiding injury" with the Disaster Damage Reduction System. In Risk Management studies, it is mandatory to reveal the earthquake hazard in spatial planning and construction activities. Another difference is that it should not be forgotten that ensuring integrity in the Disaster and Risk Management System depends on the detailed determination of short, medium and long-term activities for all stages of the disaster and their timely implementation. In this context, "Disaster and Risk Management System" includes the timely use of existing resources before, during and after a disaster event, analysis and planning, decision-making and evaluation processes to be prepared for all kinds of dangers at any time, damage reduction, intervention, improvement and We can define it as a system that includes reconstruction works in a continuous and sustainable way. Another difference is that the

[11] Uzunçıbuk, op.cit, p.27
[12] Murat Balamir, "Afet Politikası, Risk ve Planlama", TMMOB AFET SEMPOZYUMU Bildiriler Kitabı, 2007, p. 35. https://www.tmmob.org.tr/sites/default/files/dea61eed4bceec5_ek.pdf (Access: 24.04.2024)

biggest danger in ensuring the safety of life and property of residents in settlements in a disaster arises from the fact that the time, place, how and what size and type of disaster cannot be known exactly and precisely. The Disaster Management system generally comes into play immediately after a disaster occurs, despite all the precautions taken. However, a strong continuity and sustainability is essential in Disaster and Risk Management. Disasters can cause loss of life, property, social, physical, cultural and economic losses that are difficult to compensate for and whose effects last for many years and cannot be compensated. On the other hand, unethical behavior such as talking about a disaster or a disaster due to the "number of casualties and injured people" and the "magnitude of the destruction or damage that occurred" in a disaster is exhibited. In this context, administrators, who are decision makers and implementers, are morally responsible for the protection and health of the inhabitants of the settlements against all kinds of disasters. If managers and decision makers prioritize this moral responsibility over their other responsibilities, it will positively affect organizational efficiency.

In this context, the main purpose of the Disaster and Risk Management System is to prevent disasters, to be prepared at all times, to reduce the damage by taking precautions and precautions in advance, and to carry out rapid and effective search and rescue, first aid, temporary shelter and reconstruction activities during and after the disaster. The technical, administrative and legal activities of all central and local public institutions and organizations and non-governmental organizations as a whole should be carried out in a continuous and sustainable living system by ensuring their participation[13].

Points to Consider Regarding Global Warming and Climate Change in Disaster and Risk Management

Within the scope of Disaster and Risk management, it would be useful to consider the following issues regarding global warming and climate change:

Evaluation of Climate Change Scenarios: Climate change has a significant impact on the frequency, intensity and impacts of natural disasters. Therefore, it is important to consider climate change scenarios and forecasts. Future climate change scenarios should be analyzed based on climate models and scientific data, and risk assessments should be made in line with these scenarios and included in risk management plans.

Determining Affected Areas: Climate change can have different effects in different regions. Central and local governments, public and private sector organizations, non-governmental organizations and universities should

[13] Uzunçıbuk, *ibid.*, p. 34-35

identify the areas that may be most affected by climate change and develop disaster and risk management strategies together in these areas.

Effective Climate Monitoring and Early Warning Systems: Effective climate monitoring and early warning systems should be established to cope with natural disasters that increase with climate change. Early warnings for disasters should be provided using weather forecasts, climate change scenarios and climate change-related data.

Developing Adaptation Strategies: Adaptation strategies are important to adapt to the effects of climate change. Adaptation measures should be developed in infrastructure projects, urban planning, agricultural practices, water management and other sectors. This could help reduce risks associated with climate change and increase resilience to disasters.

Regional and International Cooperation: Combating climate change and disaster management is a global issue that requires regional and international cooperation. Collaboration mechanisms should be developed to share information, share best practices and provide technical support. Additionally, global action should be supported through climate agreements and international commitments.

Community Participation and Awareness: Community participation and awareness are important in disaster and risk management processes. Awareness programs against climate change and disasters should be organized, communities should be trained on disaster preparedness, and mechanisms that encourage participation should be created.

These measures will help develop more effective and sustainable strategies by taking into account the effects of climate change and global warming in disaster and risk management processes[14].

In addition, it is considered that taking the following measures will be beneficial in combating global warming and climate change[15]:

Moving away from fossil fuels: The burning of fossil fuels (coal, oil, natural gas) is one of the main sources of greenhouse gas emissions[16]. Investments should be made in renewable energy sources, such as clean energy sources such as solar energy, wind energy and hydroelectricity. At the same time, energy consumption should be reduced by adopting energy

[14] Nuray Tetik, Ayşen Acun, "Turizm Öğrencilerinin Küresel Isınma ve İklim Değişikliği Algısı ve Görüşleri", Uluslararası Sosyal Araştırmalar Dergisi, Cilt: 8 Sayı: 41, 2015, pp.1459-1476

[15] Bahar Şanlı, Halil Özekicioğlu, "Küresel Isınmayı Önlemeye Yönelik Çabalar ve Türkiye", https://dergipark.org.tr/tr/download/article-file/107457https://dergipark.org.tr/tr/download/article-file/107457 (Access: 09.06.2024)

[16] Tümay Dalbudak, Biyoloji ve Fizik Öğretmenliği Birinci Sınıf Öğrencilerinin Çevreye Karşı Bilgi, Tutum ve Çevresel Davranışları, Yüksek Lisans Tezi, Konya, Necmettin Erbakan Üniversitesi, 2013, p.24

efficiency measures.

Transformation of transportation: The transportation sector causes significant amounts of greenhouse gas emissions. The transition to low-emission or no-emission transport options such as electric vehicles, hybrid vehicles and public transport should be encouraged. Additionally, environmentally friendly transportation models such as cycling and walking should be encouraged.

Sustainability efforts of industry and businesses: The industrial sector accounts for a large portion of greenhouse gas emissions. Businesses should intensify their sustainability efforts by increasing energy efficiency, using renewable energy, improving production processes and adopting technologies that reduce greenhouse gas emissions.

Forestry and afforestation: Forests are natural carbon sinks that absorb and store carbon dioxide from the atmosphere. Forests should be protected, forestry practices should be sustainable and afforestation projects should be supported. This helps reduce the amount of carbon in the atmosphere.

Sustainable agriculture and food systems: While the agricultural sector accounts for a portion of greenhouse gas emissions, it also plays an important role in combating climate change. Sustainable agricultural practices should include reduced chemical use, soil conservation, water management and the use of renewable energy. Food waste should be reduced and sustainable eating habits encouraged.

Education and awareness: Raising public awareness about climate change and education and awareness activities are important. People should be provided with accurate information and access to resources to reduce their carbon footprint at the individual level.

These measures can be effective in combating global warming and climate change. However, cooperation and coordination between governments, businesses, society and individuals are required. The creation and implementation of climate policies on a global scale should also be supported through international agreements and agreements.

International Studies on Global Warming and Climate Change

Many studies, agreements and collaborations are being carried out at the international level on global warming and climate change. Notable studies include:

United Nations Framework Convention on Climate Change (UNFCCC): Adopted in 1992, this agreement provides a global framework to combat climate change and reduce greenhouse gas emissions. Every year, the UNFCCC organizes meetings called the Conference of the Parties (COP)

and makes agreements on climate policies.

Kyoto Protocol: This protocol, adopted in Kyoto, Japan in 1997, involves industrialized countries committing to reduce greenhouse gas emissions by a certain amount. The protocol set binding targets for reducing greenhouse gas emissions and expired in 2012.

Paris Agreement: This agreement, adopted in Paris, the capital of France, in 2015, set the goal of limiting global warming to 2°C and, if possible, reducing it to 1.5°C. The agreement enables countries to set their own national climate targets and report regularly.

International Panel on Climate Change (IPCC): IPCC is a scientific committee operating under the umbrella of the United Nations. It evaluates the latest scientific findings on climate change and offers valuable guidance for policymakers. IPCC's reports form the basis of climate policies and decisions.

G7 Climate Declaration: An agreement is reached on climate change and sustainability at the summits held between G7 countries (Germany, France, Italy, Japan, Canada, England, USA). The G7 Climate Declaration includes the climate policies and commitments of these countries.

Conference of the Parties (COP) meetings: These meetings, held within the scope of the UNFCCC, are important platforms where global climate policies and commitments are discussed[17]. These meetings promote international cooperation and the fight against climate change.

These international studies and agreements promote international cooperation on climate change and global warming and provide guidance for policy makers. However, continuous and sustainable studies are deemed necessary for the effective implementation of these studies and the achievement of the goals.

In recent years, the issue of adaptation has gained momentum within the scope of international climate negotiations. The issue of adaptation to climate change, whose importance increased with the establishment of the Nairobi Working Group in 2005, gained a strong structure that encourages international cooperation with the Cancun Adaptation Framework and Adaptation Committee adopted in 2010. Article 7 of the Paris Agreement addresses the issue of adaptation in detail and directs the party countries to a

[17] Mehmet Öztürk, Arzu Öztürk. "BMİDÇS'den Paris Anlaşması'na: Birleşmiş Milletler'in İklim Değişikliğiyle Mücadele Çabaları", Ömer Halisdemir Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, Yıl: 2019 Cilt-Sayı: 12(4) pp. 527-541, https://dergipark.org.tr/tr/download/article-file/832675 (Access: 10.06.2024)

global harmonization target.

The 2030 United Nations Sustainable Development Agenda and the United Nations Sendai Framework for Disaster Risk Reduction also include important steps in combating climate change. These frameworks have been associated with sustainable development and poverty eradication efforts and aim to strengthen the capacity to respond to the climate threat[18].

Studies on Global Warming and Climate Change in Turkey

Türkiye has carried out and continues to carry out various studies on global warming and climate change. If we summarize the important studies carried out in Turkey; Türkiye adopted the National Climate Change Strategy and Action Plan in 2010 after the Kyoto Protocol. This plan includes policies and measures on reducing greenhouse gas emissions, increasing energy efficiency, transition to renewable energy sources and adaptation to climate change.

Turkey Climate Change Panel: This panel is an institution that coordinates scientific research on climate change and provides guidance for policy makers. It evaluates climate change scenarios, impacts and adaptation strategies.

Turkey's Climate Change Adaptation Strategy and Action Plan (2011-2023): Turkey published Turkey's Climate Change Adaptation Strategy and Action Plan in 2011. Within the framework of this plan, Turkey's adaptation strategies and measures to the effects of climate change have been determined and implemented from 2011 to 2023[19].

Green Building Certification System: Turkey uses international green building certification systems such as LEED (Leadership in Energy and Environmental Design) and BREEAM (Building Research Establishment Environmental Assessment Method) by the Turkish Ministry of Environment, Urbanization and Climate Change in order to promote green building practices.

Renewable Energy Incentives: Turkey implements various regulations and incentives to encourage the transition to renewable energy sources. There are support mechanisms and licensing processes for renewable energy resources such as wind energy, solar energy, hydroelectric energy and

[18] İklim Değişikliğine Uyum Stratejisi ve Eylem Planı (2024-2030), T.C. Çevre, Şehircilik ve İklim Değişikliği Bakanlığı, İklim Değişikliği Başkanlığı, p. 2 https://iklim.gov.tr/db/english/dokumanlar/2024-2030--8230-3125-20240328165545.pdf (Access: 10.06.2024)

[19] Türkiye'nin İklim Değişikliği Uyum Stratejisi ve Eylem Planı 2011–2023, Çevre ve Şehircilik Bakanlığı, Ankara, 2012, pp.1-85 https://webdosya.csb.gov.tr/db/iklim/editordosya/uyum_stratejisi_eylem_plani_TR.pdf (Access:10.06.2024)

biomass.

Climate Change Action Groups: Various institutions, universities and non-governmental organizations in Turkey have formed action groups on climate change. These groups operate to raise awareness about climate change, offer policy recommendations and carry out projects.

Intended National Contribution Declaration (INDC): With this declaration submitted to the UNFCCC Secretariat in 2015, Turkey set a 21% greenhouse gas reduction target by 2030. In 2023, this target was updated and a 41% reduction commitment was made.

Paris Agreement: Turkey signed the Paris Agreement on April 22, 2016 and approved it by the Parliament on October 7, 2021. In this context, more ambitious reduction targets are presented every five years.

However, Turkey's climate change-related legislation and policy documents include:

- *Environmental law,*
- *11th Development Plan (2019-2023),*
- *Strategic Environmental Assessment Regulation,*
- *National Climate Change Strategy (2010-2023) and Action Plan (2011-2023),*
- *National Climate Change Adaptation Strategy and Action Plan (2011-2023),*
- *Energy Efficiency Strategy and National Energy Efficiency Action Plan (2017-2023),*
- *2053 National Transportation and Logistics Master Plan,*
- *Turkey's Green Deal Action Plan,*
- *Climate Council Final Recommendations,*
- *Türkiye National Energy Plan,*
- *Medium Term Program (2024-2026),*
- *12th Development Plan (2024-2028).*

The legislation and policy documents that Turkey is working on to improve climate action are as follows:

- *Climate Law,*
- *Local Climate Change Action Plan Regulation,*
- *Türkiye Spatial Strategy Plan 2053,*
- *Water Law,*
- *Flood Law,*
- *2053 Long Term Climate Change Strategy,*

- Circular Economy Strategy and Action Plan,

- Sustainable Consumption and Production Strategy,

- Sustainable Smart Transportation Strategy and Action Plan,

- Green Growth Technology Roadmap,

- Climate Finance Strategy[20].

Institutions and Organizations Responsible for Studies on Global Warming and Climate Change in Turkey

A few important institutions responsible for studies on global warming and climate change in Turkey are:

Ministry of Environment, Urbanization and Climate Change: Determining and implementing climate change policies in Turkey is the responsibility of the Ministry of Environment and Urbanization. The Ministry carries out the creation of national climate policies, ensuring compliance with international agreements and supporting projects related to climate change.

Turkey Climate Change Panel (TÜİDAP): Turkey Climate Change Panel is an institution that directs scientific research on climate change and provides consultancy to policy makers. The panel evaluates climate change scenarios and provides guidance on adaptation strategies.

Ministry of Energy and Natural Resources: Shaping energy policies in Turkey and encouraging the transition to renewable energy sources is the responsibility of the Ministry of Energy and Natural Resources. The Ministry develops policies to support the use of renewable energy resources, increase energy efficiency and reduce greenhouse gas emissions.

Ministry of Agriculture and Forestry: The agricultural sector is a sector that directly interacts with climate change. The Ministry of Agriculture and Forestry implements policies to harmonize agricultural activities with climate change and ensure sustainability in the agricultural sector.

Turkish Statistical Institute (TUIK): TURKSTAT is responsible for data collection, analysis and reporting processes regarding climate change and greenhouse gas emissions. TURKSTAT informs policy makers by providing statistics on climate change.

These institutions carry out studies and shape policies on combating global warming and climate change in Turkey. In addition, other institutions and non-governmental organizations also contribute to studies on climate change.

[20] İklim Değişikliğine Uyum Stratejisi ve Eylem Planı (2024-2030), op.cit, p.3

There are many non-governmental organizations in Turkey that carry out studies on global warming and climate change. Here are some examples:

TEMA Foundation (Turkish Foundation for Combating Erosion, Afforestation and Protection of Natural Assets): TEMA Foundation works on issues such as protecting natural resources, combating erosion, and protecting forests and biodiversity. It has activities such as raising awareness, carrying out projects and presenting policy recommendations in the fields of climate change and sustainability.

WWF Turkey (World Wildlife Fund): WWF Turkey is a non-governmental organization working on the protection of natural life, sustainable development and climate change. It carries out projects and raises awareness on issues such as forest protection, water resources management, and climate-friendly energy projects.

Youth for Climate: Youth for Climate is a youth movement that raises the voices of young people for climate justice and sustainability. It carries out studies on climate change through education, awareness activities, campaigns and policy recommendations.

Doğa Association: Doğa Association is a non-governmental organization that works on issues such as conservation of natural life, biodiversity, sustainability of ecosystems and climate change. It conducts research, education, conservation projects and policy studies.

Genç Hayat Foundation: Genç Hayat Foundation operates to raise young people's awareness of climate change, develop projects and support young people to take a leadership role on climate issues.

These are just some examples and there are many other non-governmental organizations working on climate change in Turkey. These organizations work to raise public awareness, carry out projects, provide policy recommendations and work towards a more sustainable future in the fight against climate change.

Turkey carries out studies on global warming and climate change within the framework of the United Nations' Sustainable Development Goals (SDGs). The Sustainable Development Goals are a UN initiative adopted in 2015 that aims to achieve sustainable development by 2030. In this context, some of Turkey's studies on climate change include:

Climate Action Plan: Turkey has created a National Climate Change Action Plan to combat climate change and achieve the goals of the Paris Agreement. This plan sets targets and offers policy recommendations on issues such as reducing greenhouse gas emissions, increasing energy efficiency and renewable energy use, and preventing deforestation.

Renewable Energy: Turkey aims to reduce carbon emissions in energy production by working on renewable energy sources. Studies are carried out such as encouraging the use of renewable energy resources such as wind energy, solar energy and hydroelectricity and developing sustainable energy policies.

Forestry and Afforestation: Turkey works to manage forest resources sustainably and prevent deforestation. Activities such as forest restoration, afforestation projects, and combating erosion play an important role in combating climate change.

International Cooperation: Türkiye attaches importance to international cooperation in the fight against climate change. It carries out studies to comply with international agreements such as the UN Framework Convention on Climate Change and the Paris Agreement and to contribute to international partnerships on issues such as climate finance.

These studies help Turkey fulfill its commitments to combat global warming and climate change in line with the Sustainable Development Goals. Turkey strives for a sustainable future by developing national policies, legal regulations and projects in the fight against climate change.

AFAD's Duties and Authority Regarding Global Warming and Climate Change in Turkey

AFAD (Disaster and Emergency Management Authority) is an institution operating in the field of disaster and emergency management in Turkey. AFAD's primary duty is to prevent disasters in advance, manage preparation, intervention and recovery processes.

AFAD does not have any duties or authority directly related to global warming and climate change. However, AFAD carries out studies on the management of natural disasters related to climate change and preparedness for disasters. In particular, it contributes to planning, intervention and improvement efforts regarding disasters that can be associated with climate change, such as increasing weather events, floods, droughts and forest fires.

By working in cooperation with other institutions related to climate change, AFAD supports reducing disaster risks, developing early warning systems, increasing society's preparedness for disasters and carrying out recovery works in affected areas.

Changing the name of the Ministry of Environment and Urbanization to "Ministry of Environment, Urbanization and Climate Change" reflects the recognition of the importance and impacts of climate change in Turkey and greater focus and effort on this issue. This amendment aims to address the fight against climate change and adaptation efforts in more detail, by emphasizing the impact of climate change on environmental and urban

policies.

Climate change is a global problem and has effects on many areas such as environment, economy, social structures and urban planning. Turkey made this change in order to take a more active role in the fight against climate change and to fulfill its international commitments.

The Ministry of Environment, Urbanization and Climate Change is responsible for developing, regulating and implementing policies on environmental protection, implementation of urban policies and combating climate change. In this way, it is aimed to better understand the connections between environment, urbanism and climate change and to take steps for a sustainable and climate-friendly future by adopting integrated approaches.

Activities that AFAD Can Do in Turkey to Combat Global Warming and Climate Change within the Scope of Risk Management

AFAD (Disaster and Emergency Management Presidency), as an institution operating in the field of risk management, can carry out the following activities in the fight against global warming and climate change:

Disaster risk analysis: AFAD can conduct disaster risk analyzes considering the effects of climate change. These analyzes can be used to determine the potential impacts of climate change-related disasters and identify risk areas. In this way, it is possible to determine priorities in disaster preparation, response and recovery processes.

Early warning and alarm systems: AFAD can develop early warning and alarm systems for disasters such as weather events associated with climate change, floods, drought and forest fires. These systems can strengthen preparedness and response processes by quickly sharing information about the impending dangers of disasters with the public.

Education and awareness studies: AFAD can conduct education and information activities to raise awareness about climate change and raise public awareness about disasters. It can organize campaigns to educate the public about the risks associated with climate change and to improve disaster preparedness and response skills.

Disaster adaptation projects: AFAD can carry out projects to combat disasters related to climate change and increase society's adaptation to disasters. For example, it may carry out infrastructure improvements in areas at risk of floods associated with climate change or support water management projects to combat drought.

National and international cooperation: AFAD can cooperate at national and international levels on climate change and disaster management. By collaborating with other institutions, local governments, non-

governmental organizations and international organizations, we can share best practices and develop joint projects.

These studies enable AFAD to help deal with issues related to global warming and climate change from a risk management perspective and strengthen its disaster preparedness and response capacity.

Conclusion and Evaluation

a) In possible disaster studies carried out for the purpose of disaster and risk management in our country, to expand cooperation between central government and local governments, public institutions and organizations, private sector organizations, universities and non-governmental organizations in order to create social unity and to develop encouraging strategies and policies. is gaining importance. However, it is considered that it would be beneficial to provide continuous, effective and widespread awareness training programs under the coordination of AFAD in order to create a resilient society. On the other hand, in order to popularize disaster volunteering due to global warming and climate change, it would be useful to include general information and awareness-raising courses on this subject in the primary and secondary education curricula[21].

b) The possibilities and capabilities of the Turkish Armed Forces, which won the appreciation of the society for their work in the Marmara and Düzce earthquakes of 17 August and 12 November 1999, should not be ignored. It is considered that it would be beneficial for the General Staff and the Ministry of National Defense, which have a structure that can react instantly throughout the country, to take part in afforestation activities in the fight against global warming and climate change in Disaster and Risk management studies, with their knowledge and experience[22].

c) The earthquakes we have experienced in recent years, especially on February 6, 2023, give the impression that our settlements are still unsafe against possible disasters and show that the Disaster and Risk Management System is not effective in terms of disaster preparedness. In addition, the increase in the population of the region caused by the intensity of migration to big cities, the acceleration of uncontrolled and profit-oriented construction, the fact that these situations pave the way for unplanned urbanization and industrialization, and the loss of life and property in the face of disasters, including possible global warming and climate change, will be

[21] Afet Yönetiminde Etkinlik Özel İhtisas Komisyonu Raporu, T. C. Kalkınma Bakanlığı, Ankara, 2014, p.50 https://www.sbb.gov.tr/wp-content/uploads/2022/08/Onuncu-Kalkinma-Plani-Afet-Yonetiminde-Etkinlik-Ozel-Ihtisas-Komisyonu-Raporu.pdf (Access 10.06.2024)
[22] *ibid*., p.341

very large. is the indicator[23]. In this context, it is considered that it would be beneficial to reorganize the AFAD Presidency, which has responsibility and authority against disasters, to create the General Directorate of Risk Management, which includes similar powers and responsibilities, as well as the General Directorate of Disaster Management. It should not be forgotten that in this new formation, it may be important to work in coordination with the Ministry of Environment, Urbanization and Climate Change by giving an active role towards global warming and climate change.

d) Projects should be implemented to popularize the use of environmental products and recyclable materials. In order to reduce the carbon footprint, savings measures should be taken in areas such as water, natural gas, waste management, electricity consumption, heating and transportation. The use of alternative energy sources should be encouraged and studies in this field should be accelerated. In addition, public institutions should be ensured to reach the capacity to meet their own electricity needs[24].

The final word should be noted that minimizing the damages caused by disasters depends on the success of risk management, and that global warming and climate change studies should be included in the Disaster and Risk Management System carried out by AFAD without wasting time, in cooperation with central and local governments.

[23] Bülent Tercan, "Türkiye'de afet politikaları ve kentsel dönüşüm", Abant Kültürel Araştırmalar Dergisi, 2018, 3 (5), pp.102-120. https://dergipark.org.tr/en/download/article-file/469664 (Access 26.01.2022)
[24] Kazım Kumaş, Ali Akyüz, Muhammad Zaman, Afşin Güngör, op.cit, p.116

PART IV.

SOCIAL LIFE, TECHNOLOGY AND CLIMATE CHANGE

THE ROLE OF CLIMATIC DISRUPTION IN THE GENERAL DESTRUCTION OF 1200 BC

Haldun Aydıngün[1] and Şengül Aydıngün[2]

Introduction

The world was struggling with serious climatic irregularities in 1200 BC, For this reason, agricultural production, which was the main source of livelihood of the Palace Economies, declined, and even famines broke out, and the people who had to leave their homelands in a wide area from Central Asia to Central Europe began to destabilize and shake the existing social structures. Especially at the beginning of the 12th century BC, Egypt was deprived of the rainfall and fertility brought by the monsoon rains due to the suddenly cooling climate and entered a period of decline that would never return to its former splendor. During this period, all state systems in the Aegean and Eastern Mediterranean, except Egypt, collapsed. States such as Hittites, Mycenaeans, and the administrative systems of cities such as Ugarit disintegrated. This period will be followed by a completely different period that will last for a few centuries and is also called the "Dark Ages" by historians.

The definitions of "climate change" and "global warming", which are used almost as synonyms, present us with extremely horrible scenarios; we are told that a catastrophic future is very close to us, in which coastal cities will be flooded, the forest will turn to deserts, food chains will be disrupted, the civilization humanity has built within itself will be completely destroyed, and perhaps the whole of humanity will never recover again. The fact that climate change, which has started due to global warming and the effects of which we have already begun to feel, is described with such harsh words creates suspicion in some social circles. For this reason, the same circles do not find climate change credible and claim that some scientists are exaggerating[3] the issue in order to gain power for themselves. However, in the history of mankind, sudden climate changes have occurred in periods that are not very distant, and the consequences have been catastrophic in general. The most important thing that these changes have shown us is that even when climate change was not extreme, societies could face major collapses. One of these periods is the destruction experienced around the year 1200 BC,

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[3] Mark Gongloff, No, Climate Scientists Aren't Being Forced to Exaggerate, Access: 26.11.2023, https://www.bloomberg.com/opinion/articles/2023-09-08/no-climate-scientists-aren-t-being-forced-to-exaggerate, 2023

which started about 3230 years ago and whose effects were felt fully within 50 years. Although it was not the biggest climatic change of the Holocene period, which covers roughly the last 10,000 years, in terms of the damage it caused to the social structure, it can perhaps be characterized as the biggest destruction triggered by the climate.

During the destruction of 1200 BC, the Hittite Empire, the most powerful empire of the time, disappeared and Hittite cuneiform was never used again. The Mycenaeans, who existed in modern-day Greece and parts of the Aegean coast of Anatolia, also disappeared. Their script, the Linear B script, was completely forgotten. Egypt, on the other hand, although it did not burn down, never regained its former glory.[4]

The pre-crisis 13th century BC was certainly an era of international splendor and prosperity. It was a time of diplomatic relations between kings, the exchange of precious gifts, reciprocal visits by royalty, the establishment of marriage ties between these families, and the exchange of experts. In many ways, the 13th century BC is reminiscent of Europe before the First World War. Similarly, the great multi-ethnic empires of the pre-war period were divided into many small "nation" states after the war.[5]

Beneath the apparent prosperity and splendor of the period were powerful destructive forces. These were either ignored by overconfident emperors and their advisors or failed to take adequate and correct measures. Despite these destructive threats, emperors lavishly spent huge resources on the construction of new temples and the creation of gigantic capitals, such as at Kar-Tukulti-Ninurta, Primases, and Tarhuntasa, while existing capitals underwent luxurious renovations. In particular, the efforts of Hittite kings to glorify themselves and elevate themselves to the status of gods increased in inverse proportion to the weakening of the central authority. Perhaps all these efforts can be explained by the efforts of the rulers, who were aware of their failure, to hide this fact.[6]

In the history of mankind, migrations, invasions, war, famine, earthquakes, volcanoes, cosmic events, epidemics, political and/or economic problems, wars of succession, and climatic changes have been encountered before and after, but never to such an extent. In 1200 BC, perhaps all of the above-mentioned causes of destruction occurred simultaneously and almost brought the civilized world in the eastern Mediterranean basin to an end.

An examination of these causes of catastrophe and destruction reveals that they were not independent of each other. The occurrence of one can

[4] Haldun Aydıngün, Uygar Dünyanın İlk Yıkılışı MÖ 1200, Arkeoloji ve Sanat Yayınları, İstanbul, 2014, p.15
[5] Itamar Singer, Calm Before the Storm. Atlanta: Society of Biblical Literature, 2011, p.x
[6] *Ibid*, Singer, p.xi

trigger the other. For example, climate change brings about drought, which can lead to famine, which in turn can lead to massive migratory movements, while at the same time facilitating the outbreak of epidemics among malnourished people. Large-scale earthquakes, on the other hand, destroy the defensive walls of cities, leaving them vulnerable to people who have to migrate desperately. Thus, once a multidimensional domino sequence is set in motion, it can become almost impossible to stop.

A detailed description of the destruction: Greece and the Aegean Islands

No palace in Greece survived beyond the beginning of the 12th century BC. The northernmost destruction in Greece was identified at Iolkos,[7] where the palace of Thebes, one of the first to be looted, was destroyed, rebuilt, and finally looted once more. Lefkandi was abandoned around 1100 BC. After the burning of the palace of Pylos in Messenia, in the south-western part of the Greek mainland, many large and small settlements in the region were abandoned and there was a great loss of population.[8] As a result of the researches conducted, it was thought that this situation would be valid for all Mycenaean lands, and the great loss of population after the destruction is accepted as a result of these studies.[9]

Nearly a hundred Bronze Age settlements have been identified in the east of the Peloponnesian peninsula. All of these settlements were either destroyed or abandoned after 1200 BC. The inland settlements of Prosymna, Berbati, and probably Lerna were abandoned without being destroyed.[10] The small settlement of Zygouries, which was not protected by walls, was destroyed around 1200 BC and never used again.[11] Tiryns, one of the most important cities in the region, was destroyed by a major earthquake.[12] Likewise, Mycenae also contains important traces of earthquake destruction for the same period.[13]

In Achaea, the northern part of the Peloponnesian Peninsula, there is evidence of settlements destroyed by fire during the 1200 BC events. These

[7] Jorrit Martin, Kelder, "Greece During the Late Bronze Age", Journal of the Ancient Near Eastern Society - Ex Oriente Lux. No.39, 131-179, 2006, p.157
[8] William A. McDonald, George R. Jr. Rapp, The Minnesota Messenia Expedition: Reconstructing a Bronze Age Regional Environment. St. Paul: North Central Publishing Company, 1972, p.143
[9] Guy Daniel Middleton, The collapse of palatial society in LBA Greece and the postpalatial period. Unpublished PhD Thesis, Durham University, 2008, p.226
[10] Vincent Robin d'Arba Desborough, The Last Mycenaeans and Their Successors, Oxford, Clarendon Press, 1964, p.77
[11] *Ibid*, Desborough, p.84
[12] E. B. French, P. W. Stockhammer, Ursula Damm-Meinhardt, "Mycenae and Tiryns: the Pottery of the Second Half of the Thirteenth Century BC - Contexts and Definitions", The Annual of the British School at Athens, Vol.104. 175-232, 2009, p.183
[13] *Ibid*, French et al., p.182

settlements include Aghia Kyriaki and Pagona.[14] The coastal settlements of Cape Araxos and Teichos Dymaion at the westernmost tip of Achaea were completely burned down but were re-settled and this time protected by fortifications.

The Aegean islands were not as devastated as the Greek mainland and Anatolia, although some traces of destruction are evident. Unlike all others mentioned above, in the city of Ialysos, north of Rhodes, the population increased fivefold and prospered during this period. The settlement of Seraglio on the island of Kos shows a similar continuity without destruction. The Lukka / Lycia region was famous for its pirates. Already in the 14th century BC, the Egyptian Amarna tablets mention the Lukkans as pirates who plundered Alasia (Cyprus).[15] The proximity between this region where piracy was widespread and the island of Rhodes inevitably brings to mind a number of possibilities as to how the island prospered during the destruction of 1200 BC.

Crete

By the early 12th century BC, many centers in central and eastern Crete were abandoned.[16] Amnisos, the port city of Knossos, was emptied, traces of conflagration were found in Malia and the settlement was completely abandoned. Palaikastro on the eastern tip of the island was also abandoned in the same period and moved to a settlement on Mount Kastri. The settlement at Khania on the western side of Crete was also destroyed. Around 1180 BC, the settlement pattern in Crete changed completely. Farms and small villages were abandoned in favor of large, well-protected villages in inaccessible mountainous areas.

Anatolia

The city of Miletus (Milawata or Milawanda in Hittite texts) on the west coast of Anatolia was surrounded by a large fortification wall in the 13th century BC, but the city did not survive the destruction at the beginning of the 12th century BC.[17] At Hisarlık Tepe, two major destructions were found both in Troy VI and Troy VIIa.[18] Troy VIIa was probably burned down

[14] Ioannis Mochos, "Evidence of Social Re-organization and Reconstruction in Late Helladic III C Achaea and Modes of Contacts and Exchange via the Ionian and Adriatic Seamore". From the Aegean to the Adriatic: Social Organisations, Modes of Exchange and Interaction in Postpalatial Times (12th–11th B.C.), International Workshop (Udine, December 1st–2nd 2006). Rome, 345-414, 2009, p.346
[15] Frederik Christiaan Woudhuizen, The Ethnicity of the Sea Peoples. PhD Thesis, Erasmus Universiteit, Rotterdam, 2006, p.31
[16] Robert Drews, The end of the Bronze Age-Changes in the Warfare and the Catastrophe ca. 1200 B.C., New Jersey: Princeton University Press, 1993, p.28
[17] Vincent Robin d'Arba Desborough, The Last Mycenaeans and Their Successors, Oxford, Clarendon Press, 1964, pp.162-163
[18] Carl William Blegen, John Langdon Caskey, Marion Rawson. (1958). Troy Excavations Conducted by the University of Cincinati 1932 –1938, cilt.IV. Setlements VII a,VIIb and V, 1958, pp.6-10

around 1180 BC.[19]

The capital city of the Hittites, Boğazköy (Hattusas), located in the core region of the Hittites, who established a powerful empire in Central Anatolia, within the Kızılırmak bend, was abandoned during this period. Alaca Höyük, located about 20 km northeast of Boğazköy, shows a conflagration layer. Alisar, south-east of Boğazköy, and Maşat Höyük, 100 km east of Boğazköy, which was built to protect the border with Kashka, are among the Hittite settlements destroyed in the early 12th century BC.

Mersin and Tarsus were destroyed in the same period, but Tarsus was re-settled and expanded in the 12th century BC. The Late Bronze Age settlements of Norşuntepe, Lidar Höyük[20] and Tille Höyük[21] on the banks of the Euphrates were also destroyed by fire.[22]

Cyprus

During the 1200 BC period, Cyprus also experienced great changes and destruction. Among these cities that were burned, destroyed, or simply abandoned, settlements such as Pyla, Sinda, Alassa, and Apliki were completely destroyed. Settlements such as Myrtou Pigadhes, Hala Sultan Tekke, Vounari, Kyrenia, Tamassos were destroyed during this period and did not see settlement or repair for a long time, but reappeared in the 800s BC.[23]

Levant

The easternmost tip of the Mediterranean Sea, starting from Hatay and including the coasts of Syria, Lebanon, and Israel, is called the Levant, especially in archaeological discourse.

In the northern Levant, the date of the crisis is identified as the first quarter of the 12th century BC. In this region, too, there was great destruction, and pottery from the last phase of the Mycenaean civilization was found in most of the cities, showing trade and cultural relations between the Mycenaean world and the Levant.

The important and rich city of Ugarit was destroyed by a major earthquake

[19] Ralf Becks, "Yüksek Troia Kültürü: Troia VI ve Troia VIIa", Troya, Efsane ile Gerçek Arası Bir Kente Yolculuk, 2nd e. İstanbul: Yapı Kredi Yayınları, pp.84-93, 2002,
Manfred Korfmann, "Was There a Troian War?" Archaeology, Vol.57, No.3, 2004
[20] Harald Hauptmann, "Lidar Höyuk in der Südost-Turkei". Archaoloqischer Anzeiger 1991. pp.349-358, 1991, p.391
[21] G. D. Summers, Tille Höyük 4 - The Late Bronze Age and the Iron Age Transition. British Institute of Archaeology at Ankara, 1993, p.3
[22] Robert Drews, The end of the Bronze Age-Changes in the Warfare and the Catastrophe ca. 1200 B.C., New Jersey: Princeton University Press, 1993, p.11
[23] Valerie Cook, Cyprus During the Transition From the Bronze to Iron Age – Evidence of Foreign Contacts in Proto White Painted - White Painted I Pottery Context, PhD Thesis, Ecole Pratique des Hautes Etudes en Sciences Sociales, Paris, 2010, p.10

in the early 12th century BC and was never inhabited again. In Ras Ibn Hani, located near Ugarit, the South and North palaces were evacuated and the "B" Building was left undamaged.[24] A similar fate was observed at Tell Kazel (Simyra) and Tell Afis (Hazrek), two other cities in the region within the borders of present-day Syria; after the cities' Late Bronze Age majestic and monumental buildings were destroyed in the first quarter of the 12th century BC, makeshift shelters were built on the ruins of the same structures in the second and third quarters, and in the last quarter the cities began to recover in a much more modest fashion.[25] Barbara Chiti argues that, based on the way the city was used during this transitional period, it was possible to propose that the original inhabitants of the city did not abandon it, but continued to live in it, trying to adapt to the crisis. Fabrizio Venturi, on the other hand, argues that a similar Late Bronze Age, and Early Iron Age transition was experienced at Kilise Tepe, Tarsus, and Kinet Höyük.[26]

Large cities in present-day Syria, away from the coastal area, were also burned and destroyed, such as Tell Açana (Alalakh), Hama (Hamath), Qatna, and Kadesh. All four of these cities were apparently looted.[27]

In the southern Levant, all the cities in the part of Egypt from Gaza to Jaffa were destroyed.[28] The major ports of the southern Levant, Ashdod, Ashkelon, and Akko, were probably completely destroyed no later than 1190 BC.[29] Small settlements (Tell Jemmeh, Tell Sippor, and Tell Jerishe) connected to these major cities also disappeared during this period. Tell el-Qedah (Hazor)[30], Beitin (Bethel), Beth Shemesh, Tell el-Hesi (Eglon), Tell Beit Mirsim, and Khirbet Rabud in the interior were also destroyed during this period, and makeshift huts, grain storage places, and crude ovens were

[24] Steffano Mazzoni, "Syria and the Chronology of the Iron Age", Revista sobre Oriente Próximo y Egipto en la Antigüedad, No.3, 121-138, 2000, p.122
[25] Barbara Chiti, "Dynamiques de Réoccupation: Le Passage du Bronze Récent au Fer I à Tell Afis", Societies in Transition – Evolutionary Process in the Northern Levant between Late Bronze Age II and the Early Iron Age, Papers Presented on the Occasion of the 20th Anniversary of the New Excavations in Tell Afis, Casa Editrice Clueb scarl, Bolonya, 29-38, 2007, p.33
[26] Fabrizio Venturi, "Cultural Breakdown or Evolution? The Impact of Changes in 12th Century BC Tell Afis", Societies in Transition – Evolutionary Process in the Northern Levant between Late Bronze Age II and the Early Iron Age. Papers Presented on the Occasion of the 20th Anniversary of the New Excavations in Tell Afis. Bolonya: Casa Editrice Clueb scarl., 1-28, 2007, p.8
[27] D. Kaniewski, E. Paulissen, E. Van Campo, K. Van Lerberghe, "Middle East Coastal Ecosystem Response to Middle-to-late Holocene Abrupt Climate Changes". PNAS-Proceedings of the National Academy of the USA. Vol.105, No.37, 13941-13946, 2008
[28] Robert Drews, The end of the Bronze Age-Changes in the Warfare and the Catastrophe ca. 1200 B.C., New Jersey: Princeton University Press, 1993, p.15
[29] Ayelet Gilboa, Ilan Sharon, "An Archaeological Contribution to the Early Iron Age Chronological Debate: Alternative Chronologies for Phoenicia and Their Effects on the Levant, Cyprus, and Greece". American School of Oriental Research, No.332. 7-80, 2003, p.7
[30] Kristina Josephson Hesse, Contacts and Trade at Late Bronze Age Hazor – Aspects of Intercultural Relationships and Identity in the Eastern Mediterranean. PhD Thesis, University Umea, 2008, p.17

built immediately after the destruction[31].

Although the Near East was the region most affected by the events of 1200 BC, there were also signs of significant change in regions far away. Parts of Central Asia were subjected to similar devastation to that experienced in the Near East around 1200 BC. Soviet scientists excavating in Turkestan came across the first works of massive irrigation projects (probably to fight increasing drought) which were not completed. Further north and east, almost all settlements were abandoned in favor of a nomadic lifestyle.[32] Other regions, that did not experience climatic devastation, were nevertheless affected by the catastrophe. For example, while the Caucasus, Eastern Anatolia, and Western Iran were in very favorable climatic conditions, the fact that defensive walls were added to all settlements in these regions, suggests that there was an increasing security problem and that the severe destruction and large-scale tribal movements in the nearby lands could have caused these protective measures.[33]

In Ireland, at the westernmost tip of Europe, similarly, many castle structures dating to the same period have been uncovered. In addition, many materials originating from Central Europe suddenly appear in the archaeological record. This information has been interpreted as indicating that while Ireland was not directly affected by climate change itself, it received a large migration from Central Europe and a security problem emerged in the country.[34]

The economy of Bronze Age states was based on agricultural production. States collected the surplus agricultural production of the people as taxes and paid these as salaries to priests, officers, and anyone else they would employ.[35] The disruption of agricultural production shook the state to its foundations. From the various dams and ponds Hittites built from 1500 BC onwards it is understood that they were trying to prevent the decrease in agricultural production. Within the framework of these measures, there are five pools

[31] *Ibid*, Drews, p.17
[32] Arie S. Issar, Mattanyah Zohar, Climate Change - Environment and the History of the Near East. Berlin, Springer, 2nd e, 2007, p.167
[33] Sabine Reinhold, Andrej B. Belinskij, Dmitrij S. Korobov, "Landschaftsarcha¨ologie im Nordkaukasus-Erste Ergebnisse der Untersuchung der Vorgebirgslandschaft bei Kislovodsk wahrend der Spatbronze- und frühen Eisenzeit". Eurasia Antiqua. No.13. 139-180, 2007, p.179
Azarnosh Masoud, Hamid Khatibshahidi, Reza Rezaloo, "Reviewing the Chronology of Northwestern Iran in the Bronze Age, Case Study: Qalla Khosrow", Humanities. Vol.13, No.3, 1-15, 2006, p.1
[34] O'Neil John (2007). "Connectivity, Climate and Chronology: Ireland in 1200 BC", Symposium in University College Dublin, March 7-9, 2007, 1200 BC: War, Climate Change and Cultural Catastrophe
Ó'Súilleabháin Muiris (2007). "A Long Sleep at Tara?" Symposium in University College Dublin, March 7-9, 2007, 1200 BC: War, Climate Change and Cultural Catastrophe
[35] L. De Blois, R.J. Van der Spek, An Introduction to the Ancient World, (Trans.) Susan Mellor. 2nd e. New York: Routledge, 2008, p.53

called the Southern Pools in the Upper City of Hattusa.[36] They also built two pools on the low area southeast of the South Fortress. The Pool-1 of these water collection basins, called the Eastern Pools, measures 60 x 90 meters. The exact dimensions of Pool 2 are not yet known.[37] Alacahöyük Gölpınar, Sivas Sarissa, Kayseri Karakuyu, Konya Köylütolu, Konya Yalburt, Konya Eflatunpınar dams[38] were also built.

The special climatic conditions of Egypt

From a climatic point of view, Egypt has a completely different characteristic compared to the other lands of the Near East. In order to understand why, something needs to be said about the climatic conditions that affect the whole world in a broad sense, and the Near East in particular. Two interrelated but different-sized systems create our weather patterns. The larger of these, the "Southern Oscillation", is a phenomenon unique to the tropics, centered on the Pacific, Indian, and South Atlantic oceans, where the world's largest bodies of water are located. Monsoon systems and El-Nino fall within this system. It is called ENSO as an abbreviation. The other system is the "North Atlantic Oscillation" (NAO). Although smaller, this system is very influential and more complex than ENSO and is directly responsible for the weather in the Mediterranean region. The constantly changing relationship between these two systems causes the desert belt to shrink or grow, starting from North Africa and extending to the Near East, Central Asia, and Mongolia.

As a result, the Near East generally receives its precipitation from the North Atlantic Oscillation, while Egypt receives its precipitation from the monsoon system in the Indian Ocean, which brings precipitation to Central Africa and is carried by the Nile River. And these two systems are in competition. The Monsoons, which seem to have strengthened at that time, pushed the NAO further north, causing the Near East to receive less rainfall.

Conclusion: How the region-wide destruction proceeded

In the 13th century BC and the following 12th century, the world was plagued by serious climatic irregularities. For this reason, agricultural production, the main source of income for the Palace Economies, declined and even famines emerged, and the people who were forced to leave their homelands in a wide area from Central Asia to Central Europe began to destabilize and shake the existing social structures. Near the end of the 13th century B.C., Egypt had to fight the Libyan settlers who wanted to settle in

[36] Jürgen Seeher, Hattuşa Rehberi – Hitit Başkentinde Bir Gün – Gözden Geçirilmiş 4. Baskı. İstanbul: Ege Yayınları, 2011, p.60
[37] *Ibid*, Seeher, p.96
[38] Emre Kutlu, "The Hittite Dam of Karakuyu". H.M. Prince T. Masaka (Ed.) Essays on Anatolian Archeology. Wiesbaden, 1993, p.1

the Nile Delta.

The people of the Mycenaean world were tired of the demands of the palace. Around 1200 BC, Tiryns was destroyed by a sudden earthquake and the Mycenaean people revolted against the defenseless palace. The uprising led to the looting and destruction of all the palaces in the Mycenaean world in a very short time. The Mycenaean people embarked on a great migration, guided by the provincial organizations of the damos and temples, by the large stock of ships that the Mycenaean world possessed, and by the guidance of merchants and sailors who knew the Levant well.

During this period, the Hittite Empire was importing large amounts of grain from Egypt in order to survive. An exceptionally dry period[39] between 1198-96 BC was devastating and the Hittites became completely dependent on grain imported from Egypt. In order to ensure the security of this shipment, it is understood from the tablets that there was a navy in the port of Ugarit, belonging to the Kargamish vassal kingdom, under the command of the Hittites.[40] On the other hand, in order to keep its vassals and neighboring countries in its hands, it had to wage wars in every direction, even going as far as Cyprus with its naval forces. When the Mycenaean state order collapsed, the pirates of the Lukka region were freed and started to plunder every city they could reach. The Hittites saw the danger and even sent their navy to the coast of Lukka. It is possible that the eastern half of the Mediterranean basin was in the midst of one of the earthquake storms that periodically recurred during this period; we think that a great earthquake around 1190 BC had depleted the Hittites of all naval power in the Mediterranean, and therefore their existence. [41] Therefore, after the loss of the port of Ura, from which they shipped grain, the Hittites were no longer able to feed the armies that sustained them. The capital city Hattusa must have been evacuated and abandoned in an orderly manner.

The Mycenaeans came from the sea to the Levant and Anatolian coasts, settled in cities that had probably been previously sacked by pirates, and began to establish a regular coexistence with the local population, at least in many places. This was because the local population was no longer able to resist as a result of the looting, and the Mycenaeans who came with their families came not to fight but to live in better conditions. As a continuation of the migration and settlement movement, the Mycenaeans moved towards the Nile delta of Egypt, where they had to clash with the Pharaoh's armies both at sea and on land. Despite the Pharaonic propaganda described on the

[39] Sturt W. Manning, Cindy Kocik, Brita Lorentzen, Jed P. Sparks, "Severe Multi-year Drought Coincident with Hittite Collapse around 1198-1196 BC", Nature, Vol. 614, No.23, 719-739, 2023,
[40] Trevor Bryce, The Kingdom of the Hittites. Oxford, Oxford University Press, 2005, p.322
[41] Haldun Aydıngün, Uygar Dünyanın İlk Yıkılışı MÖ 1200, Arkeoloji ve Sanat Yayınları, İstanbul, 2004, p.58

walls of the Medinet Habu Temple, they were partially successful and managed to settle to a certain extent. Egypt, on the other hand, was shaken by these attacks, even if it saved its important central cities intact. Especially at the beginning of the 12th century B.C., due to the suddenly cooler climate, it was deprived of the rainfall and fertility brought by the monsoons and entered a period of decline, never to return to its former glory. This period, also called the "Dark Ages" by historians, would be followed by a completely different civilization[42].

[42] *Ibid*, Aydıngün, p.169

CLIMATE CHANGE AND URBAN PLANNING: RETROSPECTIVE FRAMEWORK

Ersan Koç[1]

Urban Context: Forged Amidst Built and Natural Environments

Cities – as ultimate human artifacts of history - have always been forged in areas where natural resources and the social structures that will process these resources overlap in the early periods of their historical formation. The first settlements were formed close to water resources, the first source of natural resources. The building was formed in the nearby walls of forests, which are the basic elements for production, soil, masonry, stone artifacts and wood/timber stocks that can be used as buiding materials of security fortifications/buildings and heating infrastructure. As the habitats of mankind, cities have established structures around these source-production-labor cycles starting from the first ages.

In this context, civilization of humanity has reached different levels of urban revolutions. It was realized in the Ottoman / Mesopotamian / Middle Eastern geography where we enjoy agglomarations of agricultural production and seed-cultivating/breeding culture, which can be called the "first urban revolution". The second urban revolution sprang up in western front, which is a part of our cultural field, revealing itself in different forms all over the world through the forms and phase of "industrial revolutions". Furthermore, the "distance" and "time cost" becomes lesser important caused by information technology advancements. So, societies and individuals have been passing through a third wave of transformation that leads to a new era of urban revolution. Long-term revolutionary transformations outlined above are directly related to what kinds of components are produced by industry and employment today as general category. And how these components are distributed in the region, city or other forms of city activities forge urban space.

Turkish Cities encountered rapid and uncontrolled urbanization and city building processes that caught the institutions responsible for urban development and structuring unprepared, especially in the Early Republican Period and the mid-20th century. In this rapid unprecetended process, when the quality and unresilience to disasters are added to the built environment stock. Furthermore; industrial production processes that are not adequately controlled alongside migration and derivative forms of under-urbanization,

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low-standard and poor-quality living environments spaces with serious safety and vulnerability problems in terms of environmental risks and other disasters have agglomeratively emerged. This situation resulted in unsafe and fragile urban contexts, which ingited in the last period of the 19th century and lasted for decades, and urban environments that developed planned or unplanned.

Henceforth, urbanization refers to the process in which population and settlements are increasingly concentrated in cities and there is a transition from rural areas to urban areas. This process generally occurs under the influence of economic, social, cultural and technological factors. Urbanization is associated with a process evolving from agricultural societies to industrial and post-industrial societies. Industrialization leads to an increase in job opportunities in cities, which encourages migration from rural areas to cities. Cities generally offer more employment, education, healthcare, infrastructure, and other social amenities, which may lead people to prefer cities. During the urbanization process, large-scale migrations occur from rural areas to cities. These migrations contribute to the growth and expansion of cities by increasing their population. This process may also cause rural areas to become empty and depopulated. Urbanization often brings with it a number of challenges such as infrastructure, transportation, housing and environmental problems in cities. Therefore, effective urban planning and sustainable urban development issues are important for managing urbanization and reducing its negative effects.

The term "planning institution" generally refers to public or private organizations dealing with urban and regional planning. These institutions may operate at the local, regional or national level and usually specialize in urban planning, environmental planning and transportation planning. In the 20th century, increasingly more energy needs emerged, the consumption of nature without boundaries to produce energy quickly sparked a period in which negative consequences was observed. This fundamental problem has created the result that in the near future traditional energy sources will inevitably be exhausted. And it made it inevitable to turn to wind, wave, sun and other renewable energy sources.

Modes of Urban Planning: General Framework

Planning and design professions and pertinent institutions guiding the approach/theory and practice/praxis of urbanization operate for the following basic purposes:

1.Urban Planning: City and regional planning aims to regulate the growth and development of cities. This includes elements such as residential areas, commercial zones, green areas, transportation infrastructure.

2. Environmental Planning: It includes planning activities aimed at ensuring sustainable use of natural resources and minimizing environmental impacts.

3. Transportation Planning: It aims to organize and develop transportation infrastructure such as public transportation, road network and bicycle paths.

4. Sustainable Development: It aims to balance economic, social and environmental factors in accordance with sustainable development principles.

5. Community Participation: Encourages the participation of the public, local governments and other stakeholders in planning processes.

These institutions usually have a team of expert planners and work in collaboration with local governments to create policies and strategies on urban and regional planning issues. At the same time, they can manage the evaluation and approval processes of projects in accordance with the legislation. Throughout history, urbanization has become a means of developing and reducing poverty. States and governments can turn human habitats into a development opportunity with the goals of "equality, prosperity and shared wealth". For the economic and human development of the cities in all the spheres of thought, the spheres of thought in the global context need to be mobilized. Such and approach can create a very precious atmosphere when cities are systematically linked to the planning objectives of countries with the aim of being the most important locomotive and motivational source for economic and social development in the national context. It is necessary to call for more urban quality for all settlement scales, to overcome physical space conditions, to establish more connections and bridges between urban, sub-urban and rural settlements, and to encourage governments and administrations to be effective for national and local development politics.

Urban Design and Disaster Resilience

The main features of resilient cities are; containing the capacities to be prepared, resistant and able to recover against multiple types of dangers caused by natural/geographic physical movement cycles or human actions encountered in space and time [2]. This situation is mostly remembered together with earthquakes in our country's social memory. The most important problem facing the goal of being resilient to disasters stems from the use of the concepts of danger-earthquake-disaster-risk in a complex, entangled and intertwined manner. Risk, on the other hand, is a multi-layered concept that includes concepts such as "types of danger, exposure to danger, vulnerability of values that may vary depending on the type of danger, and capacities to take precautions in techno-social innovation and behavioral-cultural contexts" [3].

[2] Vale, L.J., & Campanella, T.J. (2005). The resilient city : how modern cities recover from disasters.
[3] Beck, Ulrich., (2014) "Risk society." Essential concepts of global environmental governance 178 (2014).

Environmental Quality Standards: Each urban design experience should begin to develop environmental standards specific to its locality. By starting to emerge unique contextual experiences in terms of goals and objectives, next-generation shared and autonomous mobility/movement technologies can create multi-sector partnerships in terms of transportation and public transport standards. If the Civil Society sector supports bicycle and pedestrian movement; The private sector will begin to create designs and products in these areas[4]. In terms of usage program formation, "Mixed" models require the development of environmental standards in line with these goals. As the cost and time of transportation to work and study spaces decrease, total living costs will also decrease relatively. In order to increase the environmental education level and awareness of the local community, space programs can be instrumental in the development of original educational programs.

Compact Urban Environments:

Urban design projects with space programs sensitive to environmental cycles define goals to improve not only energy production and consumption, but also the structures, buildings and the citizens living in them, which are of great importance in urban life, by creating sustainable urban environments with livability[5]. The Charte for New Urbanism, known as redefining urbanism for the approach of reducing environmental impacts by changing the built environment, has supported sustainable transportation. People living in dense urban neighborhoods create living spaces with significantly lower environmental impacts due to fewer road trips[6]. In the field of sustainable architecture, the design movement called the New Architecture movement emerges as a stance against the monomorphic movements of modernist architecture by trying to combine balanced and smart growth strategies, walkable spaces, traditional architecture and classical styles.

Climate Change: Outlining Context and Basis for Planning Thinking

Climate change refers to significant changes in the atmosphere, oceans, and other natural systems that are usually observed over a long period of time. These changes often include various climate characteristics such as average temperature, precipitation patterns, wind patterns, sea levels, etc. Climate change is often linked to global warming caused by human activities. Key factors include greenhouse gases, especially carbon dioxide (CO2),

[4] Fook, L.L. (2010) Towards a Livable and Sustainable Urban Environment: Eco-cities in Asia Singapore: World Scientific
[5] Folke, Carl., (2002), "Resilience and Sustainable Development: Building Adaptive Capacity in a World of Transformations." Ambio (2002).
[6] Çalışkan, Olgu., (2004). Sürdürülebilir kent formu: derişik kent. Register, Richard., (2006) Ecocities: building cities in balance with nature, New Society Publishers.

methane (CH4) and some other gases. These gases are released into the atmosphere as a result of fossil fuel use, industrial activities, deforestation and other human activities, creating a greenhouse effect. The greenhouse effect causes warming by preventing these gases in the atmosphere from trapping the sun's rays and reflecting them back to the earth's surface. Potential impacts of climate change include increasing average temperatures, frequency and severity of extreme weather events, rise in sea levels, changes in water resources, degradation of ecosystems and fluctuations in agricultural production. These impacts can lead to significant economic, environmental and social consequences across a variety of sectors and societies. Therefore, efforts to combat and adapt to climate change have gained importance on a global scale.

In the Industrial Revolution, which we might consider as the "second urban revolution", triggered by technological transformation and energy mode shifts created an explosion in the number and diversity of "white-collar" specialists. Experts who make tools, design these tools with fabrication methods, analyze working principles, calculate production processes, control fabrication processes, design goods produced by technology and technology, and plan and / or improve the efficiency of all these complex relationships network have entered our lives[7]. Today, tremendous advances in information and mass media have become increasingly vague in terms of the relationship between space and time, and knowledge as a component of technology has itself become the main element of technology. In this context, the difference between societies that have succeeded in adapting the transformation of science and technology to their own habitat and the societies that are ahead in these matters is expanding day by day [8]. As a result, science and technology are integrated and complement each other and new international developments are taking place[9].

Table 1. Conferences and reports carried out in the global context in terms of environment, urbanization and industry agenda and contributing to the transformation in development, urban and environmental interfaces.

MEETING NAME / DATE / ACTIVITY QUALIFICATIONS FOR CITIES AND ENVIRONMENT
United Nations Conference on Human Environment / Stockholm, Sweden, June 1972 / Ensured the birth of International Environmental Law. Also known as the Stockholm Declaration. It deals with different types of environmental issues with the

[7] Yıldız, B., Ilgaz, H., (2010) Türkiye'de Bilim ve Teknoloji Politikaları:1963'den 2013'e Kalkınma Planlarına Genel Bir Bakış, Muğla University
[8] Koç, Ersan., (2009). Disaster Policy A Commitment Based Mitigation Model. 48th Annual Meeting of the Southern Regional Science Association, 1(1), 60-70.
[9] Yatkın, A., Eşidir, K.A. (2015) Türkiye'nin Bilim ve Teknoloji Politikası (2005-2010), 3. Uluslararası Bölgesel Kalkınma Konferansı

dimensions of human rights, natural resource management, pollution prevention and the relationship between environment and development.

Habitat 1 / Vancouver, Canada, 31 May – 11 June,1976 / The Habitat Summit consists of 64 proposals for national action plans. These suggestions are organized in 6 main headings, a. Settlement policies and strategies, b. Layout planning, c. Housing, infrastructure and services, d. Land policy, e. Community participation, f. Institutions and management 10

Brundtland Report / 1987 / A. Critical issues such as the environment and development need to be reexamined and innovative, positive and realistic action recommendations for mutual understanding should be developed. / B. International coordination on environment and development should be developed and recommendations should be developed for new forms of co-ordination that will break existing patterns of behavior to achieve the necessary change. / C. Work on the perception of individuals, voluntary organizations, business world, institutes and governments to understand the concept and develop the understanding of the problem and take responsibility.

Rio Summiti / 1992 / Seek international agreements in the direction of conservation and to preserve the integrity of environmental development systems in a global context. Recognition and respect of the world's interdependence midst nature.

Habitat 2 (İstanbul) / 1996 / As a result of the conference, the vital roles of Civil Society organizations, local governments and scientists were emphasized in the implementation of the announced decisions.

Millennium Development Goals (MDG) / 2000 / Poverty eradication, environmental sustainability, improvement of the lives of low-skilled residents

İstanbul +5 / 2001 / All local governments, private sector components and local communities that share the habitat agenda should regularly check and make necessary updates on comparable samples using human settlements and housing inventories 11.

World Summit on Sustainable Development /2002 / With Local Agenda 21, associating the basic priorities related to cities, environment and development with the construction of the basic vital infrastructure

Rio + 20 / 2012 / Cities can be economically / socially / environmentally sustainable habitats if they are well planned and developed through integrated / integrated planning and management approaches 12.

Post 2015 Development Agenda / 09.2015 / Building Sustainable Development Goals / Cities should be inclusive, safe and secure, resilient and sustainable.

COP21 / 12.2015 / Cities produce 70% of greenhouse gases / Most cities are being affected by global warming

Habitat 3 Preparatory Meetings / 2014-2015-2016 / 1st Preparation Meeting (09.2014), 2nd Preparation Meeting (05.2015), 3rd Preparation Meeting (07.2016)

Habitat 3 Conference / Quito, Ecuador, 17-20 October 2016 / The cities that constantly produce problems, the forms of settlement that need to be minimized, and the deep problem of breaking down the perception of being open 13.

[10] The Vancouver Action Plan, 64 Recommendations for National Action Approved at Habitat: United Nations Conference , on Human Settlements, Vancouver, Canada, http://habitat.igc.org/vancouver/vp-intr.htm (accessed 10.12.2023)
[11] http://www.un.org/ga/Istanbul+5 , (accessed 10.12.2023)
[12] https://www.habitat3.org/the-new-urban-agenda (accessed 10.12.2023)

What Went Wrong: Techno-Industrial vs Sensitive-Natural

In the twentieth century, when the industrial revolution accelerated, many groups of people emigrated from rural settlement areas of various social and political contexts of countries to cities where industrial investments were concentrated. This complex phenomenon has allowed us to observe intense population growth in cities. Many articles produced on the "Case of Migration" are shaped around a backbone that emphasizes the negative aspects of the phenomenon. Human damage to nature generally occurs as a result of the negative effects of various human activities on natural ecosystems. These damages generally arise from factors that are contrary to the principle of environmental sustainability, based on resource consumption and disrupting the natural balance[14].

Table 2. Extreme human actions causing environmental damage and biosphere erosion

Industrial Activities	Industrialization and industrialization processes can cause air and water pollution, soil erosion, forest destruction and loss of natural habitats. Factories, energy production and other industrial activities can often lead to environmental impacts.
Deforestation	Excessive logging of forest areas can cause biodiversity loss, soil erosion, climate change and habitat loss. Additionally, wood and paper production, agriculture and residential expansion can threaten forests.
Farming Practices	Modern farming methods can often lead to water pollution, soil erosion, chemical use and biodiversity loss. The expansion of agricultural land can lead to the destruction of natural habitats.
Pollution	Air, water and soil pollution can be caused by various sources such as industrial wastes, domestic wastes, chemical fertilizers and pesticides. Pollution can damage water resources and ecosystems, leading to loss of biodiversity.
Climate Change	Fossil fuel consumption, deforestation, and industrial activities can contribute to climate change by causing greenhouse gases to be released into the atmosphere. Climate change can cause extreme weather events, rise in sea levels and other environmental problems.

[13] Habitat III Konferansı General Secretary Dr. Joan Clos, Montreal Thematic Meeting short briefing video https://youtu.be/CbeDzUxqBuk (accessed 25.12.2023)
[14] Joss, S. (2015). Sustainable Cities: Governing for Urban Innovation. London: Palgrave Macmillan.

These damages usually occur for reasons such as people not paying attention to their environmental responsibilities, not acting in accordance with sustainability principles, or prioritizing short-term gains. However, conscious environmental policies and sustainable practices can lead to taking steps to reduce or prevent these negative impacts.

Principles of Eco-City Design

Ecological planning refers to sustainable planning processes that take into account the interactions of environment, nature and humans. This type of planning is based on the protection of ecosystems, the maintenance of biodiversity and the management of human interaction in an environmentally balanced manner[15] [16]. Here are some of the ecological planning principles, which as a whole form the basis of ecological planning and aim to manage natural resources sustainably, protect biodiversity and ensure environmental balance.

Table 3. General principles of environmental planning: Putting nature first

Biodiversity	Planning processes should prioritize biodiversity in order to protect the diversity of natural life and the sustainability of species. Identifying, protecting and restoration strategies for natural habitats and areas that need to be protected are part of this principle.
Green Areas and Natural Corridors	Protecting and developing green areas and ecological corridors in urban and rural areas supports biodiversity. This can facilitate species movement and gene flow by maintaining the connectivity of habitats.
Sustainable Urban Planning	Economic, social and environmental factors should be balanced in planning processes to ensure sustainable use of natural resources. It is important to promote sustainable practices in matters such as land use, water management and energy use [17].
Reconciling Ecosystem Balances	Planning processes should understand the various services that ecosystems provide (e.g. water supply, soil fertility, climate regulation) and focus on managing these services sustainably [18].
Minimizing Environmental Impacts	Before planning decisions, the environmental impacts of projects should be evaluated and appropriate strategies should be determined to minimize these impacts.
Social Capital and Ecology Education	Encouraging public participation in planning processes and raising awareness on environmental issues is important for the implementation of ecological planning [19].

[15] Kenworthy, J. (2006) The eco-city: ten key transport and planning dimensions for sustainable city development. Environment and Urbanization, Vol 18-1, s67–85, SAGE PUB
[16] Roseland, M. (1997) Dimensions of the Eco-city. Cities, 14-4, s197–202
[17] James, Paul; with Magee, Liam; Scerri, Andy; Steger, Manfred B. (2015). Urban Sustainability in Theory and Practice: Circles of Sustainability. London: Routledge
[18] Register, R. (1987) Ecocity:Building Cities for a Healthy Future. Berkeley North Atlantic Books
[19] Koç, Ersan., (2015). Kentsel Dönüşüm Deneyimlerini Afet Güvenliği Hedefleri ve Sosyal Parçalanma

Natural Adaptability	Ecological planning processes should include flexible and adaptable strategies that can adapt to changing environmental conditions [20].
	AREAS OF INTERFERENCE FOR ECOLOGICAL PROTECTION AND NATURAL CULTURE
	1. Preventing separation from nature and alienation from natural systems. 2. Impact of fossil fuels, greenhouse gases and industrial production due to the destruction of nature. Increasing global warming and deterioration of climate balance. 3. Develop sustainable urban models that strive to bring together environmental, social and economic goals between energy and consumption. 4. Preventing the spread of approaches that perceive the whole world as an unlimited energy source in an open and inconsistent manner. 5. Developing intensive urban (compact city) projects based on more intense, less sprawled, mixed use and walking urban life. 6. To further expand the sources of renewable energy, which place it at the center of the search for consumption, efficient production systems, and not excessive consumption. 7. Prevention of alienation from agricultural environments. 8. Open-area programs aimed at social and cultural contact more often for communities that break apart due to the dynamics of individual vehicles and extreme urbanization and are alienated from their local context,

Sponge-City Model: A Retrospective Framework

The "sponge city" model refers to an approach that emphasizes the principle of sustainability in urban planning and design. This model aims to enable cities to use natural resources more effectively, minimize environmental impacts, and better adapt to challenges such as climate change. The sponge city model aims to ensure sustainability, especially in the water management of cities.

Table 4. The sponge city model: main principles ad modes of planning

Rainwater Collection	By using rainwater collection systems in city design, rainwater is evaluated and reused. This aims to use water resources more efficiently and improve the water cycle in the city.
Green Infrastructure	Natural water filtration is provided in sponge cities by using green areas, parks, trees and other vegetation. This cleans water, reduces erosion and improves environmental quality [21].
Water Permeable Surfaces	Water permeable materials are used instead of surfaces such as concrete or asphalt, allowing water to seep underground. This helps reduce water accumulation and flood risk in the city.
Natural	Wetlands and ponds are created to revitalize natural water

Süreçleri Arasında Okumak:Kocaeli Örneği, 5th International Earthquake Symposium Kocaeli 2015, 1(1), 135-140.
[20] McHarg, Ian. L., (1969) Design with Nature, American Museum of Natural History, 1969
[21] Sen. J., (2013). "Sustainable urban planning", The Energy and Resources Institute

Regeneration	systems and clean up pollution. This maintains ecosystem health by increasing biodiversity [22].
Green Roofs and Walls	They create vegetation on the roofs and walls of buildings, absorb water and increase energy efficiency by balancing heat.
Sustainable Transportation	The environmental impacts of urban transportation are reduced by using sustainable transportation systems such as public transportation, bicycle paths and pedestrian-friendly areas [23].

The sponge city model aims to improve cities' water resource management, protect biodiversity by increasing green areas, and improve environmental sustainability in general[24]. This model aims to strengthen cities' abilities to cope with climate change and environmental sustainability[25]. Environmentally friendly urban planning objectives are only possible by establishing more intensive and healthy communication environments between residents. The concept of urban proximity is an indispensable element of current and future sustainable transport systems. In such cities, for example, a single visit between neighborhoods and urban parts will result in a relative decrease in transit traffic with strong axes and corridors, or transit / trips using a long path. Walkable cities reduces the social cost of residents who prefer to live in these cities, instead of going out and allowing them more time with their parents and friends. Architectural design, building elements, natural and artificial / hard and soft landscape and material selection should be chosen according to these principles. Local landscaping should include local trees, herbs and flowers in the environment of the buildings and landscapes, and also to maintain the local climate and settlement climate balances[26]. An eco-industrial park building material should be selected considering the life cycle analysis of any environment that constitutes the built environment. In parallel to these debates, growth in our country is at the center of the aggression towards the environment and natural habitats and the destructive actions at the advanced stage depending on the development dynamics. In the economic, social and cultural contexts, the increasing tendency to position itself in the world is becoming increasingly competitive, and the ability to cope with the environmental crises triggered by the development and expansion of the city is the main determining factor[27]. Cities should encourage all production and labor components in this century by taking sound steps with environmental awareness programs and

[22] Richard Register (2006) Ecocities: building cities in balance with nature, New Society Publishers.
[23] Fook, L.L. (2010) Towards a Livable and Sustainable Urban Environment: Eco-cities in Asia Singapore: World Scientific
[24] Holling, Crawford S., (1973), "Resilience and Stability of Ecological Systems." Annual Review of Ecology, Evolution, and Systematics 4 (1973): 1-23.
[25] Joss, S. (2015). Sustainable Cities: Governing for Urban Innovation. London: Palgrave Macmillan.
[26] Lowe, E.A. (2011) Eco-industrial Park Handbook for Asian Developing Countries Report for Asian Development Bank, Indigo Development, Oakland, CA , 2011
[27] Koç, Ersan (2017)., "Commitment Building for Earthquake Management, Reconciling Stagnant Local Capacities with Government Agencies for Effective Earthquake Mitigation", LAP Publishing, 2017

inclusive and effective strategic plans in the next century[28]. In the final analysis, the public mechanisms regulating and supervising urbanization do not have the right to decide on harmful activities to the environment and the natural balance. Furthermore, we are in need to nurture and foster multiple modes of environmental behavior, set of which refer to individuals acting in an environmentally friendly and sustainable manner[29]. These behaviors can occur in a variety of areas, such as personal habits, consumption habits and lifestyle choices.

Table 5. Modes of environmental Behavior

Waste Reduction and Recycling:	Environmentally friendly individuals participate in recycling programs to reduce the amount of waste and promote recyclable waste by separating materials correctly.
Energy Saving:	Behaviors such as using energy-saving devices to reduce electricity and water consumption, turning off the lights, and using water economically are part of an environmentally friendly lifestyle.
Green Transportation:	Choosing green transportation options such as public transportation, cycling, walking or choosing energy efficient vehicles [30].
Sustainable Shopping:	Sustainable shopping habits such as choosing fair trade products, supporting organic and local products, reducing disposable products and choosing durable materials.
Nature Conservation and Cleaning:	Participation in nature conservation activities such as nature walks, participation in cleaning campaigns, and support for the protection of local parks and natural areas.
Environmental Awareness:	Obtaining information about environmental problems, following current environmental news and participating in efforts to raise awareness on environmental issues.
Sustainable Diet:	Environmentally friendly individuals can choose sustainable and low-carbon diets to reduce environmental impacts. This may include behaviors such as consuming less meat and choosing local and seasonal food.
Environmental Activism:	Participation in environmental activism, such as attending events to raise awareness of environmental issues, collaborating with environmental organizations, and speaking out for policy changes. These forms of behavior can help individuals make a positive impact on the environment and contribute to an overall sustainable lifestyle.

[28] Chadwick, G.A., (1978)"Systems View of Planning", Pergamon Press, Sydney (1978)
[29] Koç, Ersan., (2016). Egokentten Ekokente Birey Merkezli Yasam Alanlarının Doğal Reçeteler İle Islahı. Tarih ve Uygarlık İstanbul Dergisi, 2016(9), 243-258.
[30] Devuyst, D. (2001) How green is the city? New York: Columbia University Press

Cities that want to be more durable, resilient and sustainable face the problem of coordinating the existing building stock with sustainable urban development and simultaneous development management [31] [32]. The costs and human capital infrastructure required to manage such visions of large-scale behavioral and systemic transformation do not exist within most bureaucratic administrations. In addition to this financing and management problem, many cities in the world are currently struggling to maintain their current positions in the growth and development rankings with the influence of inter-city competition.

These structural problems prevent the development and spread of proactive/pre-activist managements, which are a stronger alternative to reactive/reactive management styles that take action as they arise. However, many problems such as poverty, inefficiency in transportation, coping with rapid population growth rates, etc. are only possible with proactive management structures. In the final analysis, it is possible for our country to get rid of the earthquake-disaster-wound healing impasse only with broader approaches. In order to be successful in the goal that can be titled as safe cities, it will be an important start to keep in mind the fact that today's high transformation costs will be much less than the cost of damage to the environment, nature and people in the medium and long term.

[31] Waugh, William L., (2000) "Living with Hazards, Dealing with Disasters: An Introduction to Emergency Management: An Introduction to Emergency Management." (2000).
[32] Sartorio, F.S., (2005), "Strategic Spatial Planning". A Historical Review of Approaches, its Recent Revival, and an Overview of The State of the Art in Italy.

CLIMATE CHANGE AND AVIATION SUSTAINABILITY

Serap Gürsel[1] and Rafet Demir[2]

Introduction

Air transportation is a type of transportation that has irreplaceable advantages in the transportation industry. It has many benefits and conveniences, such as saving time in intercontinental travel, providing employment opportunities directly or indirectly, and significantly supporting tourism, which is a large sector. This situation can be explained not only by the conveniences it provides but also by the high demand data associated with these facilities. Considering the number of 4.5 billion passengers carried in 2019 alone and the annual demand growth rate (4.5%), aviation will continue to grow actively and be the most preferred mode of transportation in the coming years.[3] On the other hand, what makes aviation indispensable on a global scale is its economic contribution. The rate of aviation in global gross domestic product was announced as 4.1%.[4] These and similar prominent aviation benefits do not cause interest in the industry to be only a matter of demand or preference. Aviation also comes to the fore in sustainability and climate issues. In addition to its industry volume and global contributions, its effects are also examined and discussed. In line with the studies and agreements made on climate change, especially in the last decade, some steps have been taken for aviation activities to prevent global warming. Of course, aviation impacts were first examined with greenhouse gas emissions and scenarios were established to slow down, reduce, and neutralize the increase in emission impacts. However, before the dates were determined as turning points, due to technological developments in aviation, fewer emission data were announced, especially in the 2000s compared to the 1990s.[5] This may indicate that aviation shows promise in adapting to the set goals. However, especially in the 2020s, carbon emissions from aviation are one of the issues that are closely monitored, and regulations are being introduced to the industry accordingly.

Carbon emissions are considered an important issue within the scope of impact on climate change. As a matter of fact, this importance stems from

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[2] Ress. Asst., Kocaeli University, Aviation and Space Science Faculty, Aviation Management Department, ORCID: 0000-0002-7103-6698
[3] ICAO. (2019). Presentation of 2019 Air Transport Statistical Results. ARC.
[4] ATAG. (2020). Adding value to the economy: Aviation: Benefits Beyond Borders. https://aviationbenefits.org/economic-growth/adding-value-to-the-economy/
[5] ATAG. (2021). SDG 13: Climate Action: Aviation: Benefits Beyond Borders. Aviation: Benefits Beyond Borders. https://aviationbenefits.org/un-sustainable-development-goals/sdg-13-climate-action/

the fact that emissions are cumulative, and apart from this reason, it is not possible to eliminate hazardous gases. In order to respond to the increasing demand, studies on reducing emission rates in a constantly growing industry have been carried out by different organizations and partially mandatory scopes have been included in the future targets. With these targets and the policies developed, the aviation industry has started to operate under restrictions since 2020. Airlines and airports, among aviation's most important stakeholders, have increased their sustainability activities and started to organize their operations in this context. Of course, these regulations were introduced by the regulatory and supervisory institutions of aviation. In addition to these regulations, technological developments have also become a way out for efficient operations in aviation. So much so that in an industry with low profitability, efficient operations are often the focus. In this context, aviation strives to become operationally efficient and profitable while also trying to comply with sustainability targets. Although the effects of aviation differ on a country basis, the strategies and targets determined are carried out relatively jointly. Although the effects of aviation globally have not been alarming until 2020, the effects predicted in future scenarios are that aviation will take more than it gives to the world. The measures to be taken in this direction have differed. Each measure is handled separately, and if it goes as expected, the result of each measure is the same. The result, of course, is to reduce emission rates and build a green aviation industry. Another issue is to manage the increasing travel demand together with sustainability efforts. This will be achieved by intensifying efforts and producing creative solutions, together with the measures taken by aviation organizations. In this context, airline companies and airports are adopting innovative technologies and sustainability practices such as energy efficiency and the use of renewable energy to minimize the environmental impacts of their operations. In addition, international collaborations, and sectoral initiatives play an important role in reducing the environmental impacts of the aviation industry. Effective implementation and continuation of these efforts are critical to building a clean and sustainable aviation industry for future generations.

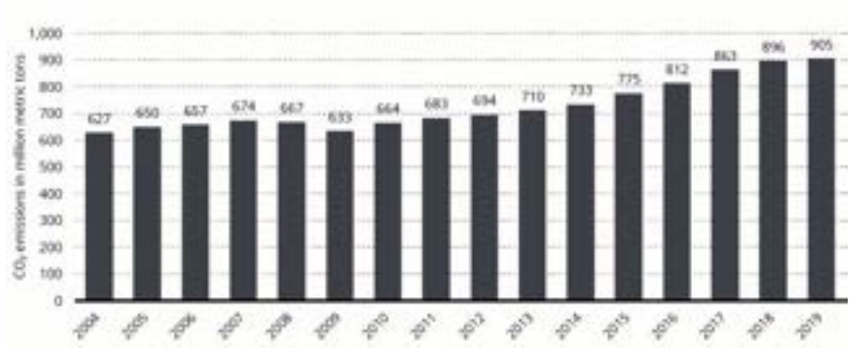
Air transportation is not among the top pollutants when evaluated in terms of carbon dioxide emissions among all industries and transportation modes. Despite this, precautionary methods to reduce CO2 and greenhouse gas emissions in air transportation were discussed in all climate panels. The main reason for this is the international structure of air transportation and air transportation directly creates pollution in the sky. When air transportation began to be valued in terms of climate change, efforts to reduce the environmental impacts created by air transportation gained importance. In this context, the relationship between climate change and air transportation is first examined within the scope of the study. International sustainability

studies related to aviation are explained and the measures taken regarding climate change in aviation are detailed.

The Impact of Aviation on Climate Change

In addition to its economic contributions, the environmental impacts of aviation are a subject that has been frequently emphasized in recent years and has been the subject of studies in the literature[6]. As in every industry, aviation is responsible for non-neutral impacts on the environment, and these can be listed as air pollution due to emissions, soil, and water pollution, noise from aircraft in and around airports, hazardous material waste, non-recyclable waste generation and land use.[7][8] Of course, the most examined and focused on effects in the international community are emissions. As mentioned, this effect is directly related to the cumulative effect, that is the release of gases accumulated in the air. The increase in the number of flights and ground operations due to demand over the years has caused emissions and other impacts to increase at the same rate. It is known that aviation is responsible for 2.5 percent of total emissions and 3.5 percent of global warming when non-emission effects are included.[9]

Figure 1. Commercial Aviation Worldwide CO_2 Emissions[10]



Looking at Figure 1, emission rates have a constantly increasing trend. In 2019, that is, in the year before the pandemic, the emission value reached by

[6] Etchebehere, V. (2023). Climate change and aviation. In Handbook of Business and Climate Change (pp. 187–207). Edward Elgar Publishing Ltd. https://doi.org/10.4337/9781839103001.00015

[7] Jakubiak, Mateusz. (2015). Environmental impact of air transport - case study of Krakow Airport. Logistyka. 2. 276-283.

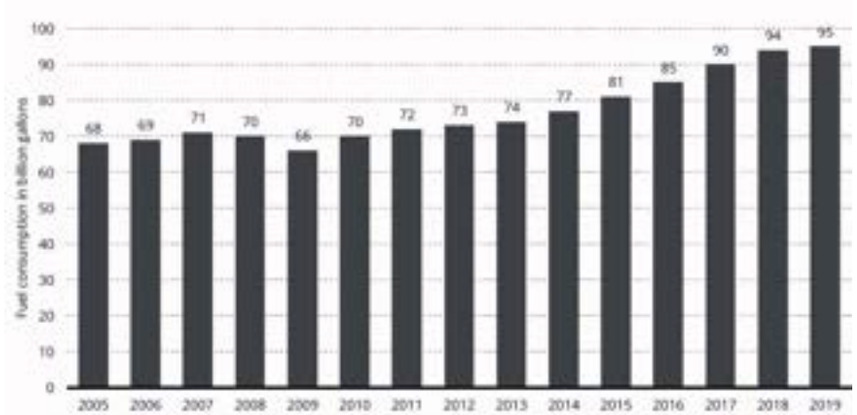
[8] Wincewicz-Bosy, Marta. (2020). Environmental Impact of Air Transport. EUROPEAN RESEARCH STUDIES JOURNAL. https://www.academia.edu/87509532/Environmental_Impact_of_Air_Transport

[9] Ritchie, Hannah (2020). "Climate change and flying: what share of global CO2 emissions come from aviation?" Published online at OurWorldInData.org. Retrieved from: 'https://ourworldindata.org/co2-emissions-from-aviation'

[10] ICAO, Our World in Data., ICAO. (2019). Presentation of 2019 Air Transport Statistical Results. ARC.

aviation approached almost a billion tons. Apart from this effect, as mentioned, high energy consumption leads to a decrease in resources. This is discussed in Figure 2. Waste is another issue within the environmental impacts of aviation. This impact has been highly attributed to airports. Waste management at airports is a complex and challenging multi-stakeholder process.[11] For the management of these complex processes, ICAO has presented a waste management report to the industry.

Figure 2. Total Fuel Consumption of Commercial Aviation[12]



Noise is a frequently encountered issue when examining the environmental impacts of air operations. So much so that the airport environment is the area where this effect has been studied the most. Aircraft noise is an obstacle to air transport development and therefore research on noise reduction technologies is encouraged.[13] Another impact group that comes with noise, which is also a regional impact of aviation, is water and air pollution. When there is no waste management process depending on water usage, it causes serious damage to the environment and natural life. Air pollution is considered to be related to the emission effects of aviation and is generally associated with affecting the air quality of airports and their surroundings. Emissions from aviation include pollutants that contribute to global greenhouse gas emissions and have various health effects.[14]

[11] Sebastian, R. M., & Louis, J. (2021). Understanding waste management at airports: A study on current practices and challenges based on literature review. Renewable and Sustainable Energy Reviews, 147, 111229. https://doi.org/10.1016/J.RSER.2021.111229

[12] IATA, ICAO. Annual reports.

[13] Sadeghian, M., & Mofid Gorji, B. (2020). Technologies for Aircraft Noise Reduction: A Review. Journal of Aeronautics and Aerospace Engineering. https://doi.org/10.35248/2168-9792.20.9.219

[14] Harrison, R. M., Masiol, M., & Vardoulakis, S. (2015). Civil aviation, air pollution and human health. Environmental Research Letters, 10(4), 041001. https://doi.org/10.1088/1748-9326/10/4/041001

Carbon Dioxide Emissions

Climate change is one of the popular topics of recent years. It is seen that the climate is changing as a result of humanity polluting the world. It is thought that if no measures are taken against climate change, we will reach a point where people will not be able to use the world's resources. For this reason, the concept of sustainability has developed and started to produce tools to prevent climate change. The aviation industry is an important source of carbon and greenhouse gases. Apart from the airborne part of the flight process, there are also many sources of carbon emissions and greenhouse gases at airports. There are sustainable aviation fuel projects for carbon emissions released during flight. The carbon emissions created at airports include vehicles used for services required for flights, in addition to aircraft. Electric use of these vehicles is seen as an option for carbon emission reduction efforts[15].

One of the sources of carbon dioxide emissions in the atmosphere is air transportation. If there is a 55% reduction in carbon emissions compared to 2000, the average global warming value in 2050 will be between 2 and 2,4 degrees. To reach these warming values, the carbon dioxide concentration in the global atmosphere must be reduced by 80%. Aviation is a relatively small industry, contributing 3-5% of global CO2 emissions. But aviation is a growing industry. In the world where CO2 emissions are intended to be reduced by 80%, the value of 3-5% becomes very important. Air transportation, which is thought to contribute little to global climate change, is still one of the important pollutants. The first important reason is the growth in aviation. Airplanes not only emit CO2 in the sky, but they also create other greenhouse gases. Moreover, it releases these harmful gases directly into the area of the atmosphere close to the troposa (a climate-sensitive region). For this reason, air transportation causes contrails to occur and cirrus cloudiness to increase. This situation creates an important source of uncertainty in global climate modeling. 73% of the CO2 emissions of air transportation are created by transportation for tourism purposes. For this reason, air transportation, as a type of transportation that is thought to be not a compulsory consumption, should be subject to mandatory regulations.[16]

Greenhouse Gas Emissions

In addition to creating carbon emissions, air transportation also contributes to greenhouse gas emissions. According to NASA, because of

[15] Baglin, Chris, (2012). National Academies of Sciences, Engineering, and Medicine 2012. Airport Climate Adaptation and Resilience. Washington, DC: The National Academies Press. https://doi.org/10.17226/22773.

[16] Jonanovic, M. M., Vracarevic, B. R., (2016). Challenges Ahead: Mitigating Air Transport Carbon Emissions, Polish Journal of Environmental Studies, 25 (5), pp.1975-1984, https://doi.org/10.15244/pjoes/62700.

the increase in greenhouse gases in the atmosphere; There is an increase in global warming, a negative impact on agriculture, an increase in evaporation, and negative greenhouse gas effects.[17]

Countries are trying to make GHG (Greenhouse Gas) protocols in order to prevent climate change and eliminate the negative effects of climate change. Airport Council International has developed the Airport Carbon Accreditation program in this direction. The aim of the program is to validate the improved performance of carbon and energy management and improve airport management in line with carbon neutral targets. Carbon emission sources at airports are[18];

- Controlled source emissions
  - 01 Vehicles/airport ground support equipment
  - 02 On-site waste management
  - 03 On-site wastewater management
  - 04 On-site energy production
  - 05 (Possible) fire extinguishing activity
  - 06 Boilers, furnaces
- Emissions from purchased electricity
  - 07 Off-site electricity generation
    - A Heating
    - B Cooling
    - C Lighting
- Emissions from other sources
  - 08 Aircraft landing runway
  - 09 Aircraft take-off runway
  - 10 Aircraft ground motion area
  - 11 Auxiliary power unit
  - 12 Vehicles/airport ground support equipment
  - 13 Transportation of passengers to the airport
  - 14 Personnel logins

[17] Jarosova, M., Pajdlhauser, M., (2022). Aviation and Climate Change, Transportation Research Procedia, Volume 65, pp.216-221.
[18] Giuffre, Orazio and Grana, Anna. (2011). Managing Greenhouse Gas Emissions for Airport Inventories: An Overview. Journal of Sustainable Development. 4. 10.5539/jsd.v4n5p67.

  - 15 On-site waste management
  - 16 On-site water management
  - 17 Personnel arriving at airport

There are three levels in the carbon accreditation project. Level 1 includes verification of carbon footprint emissions within the direct control boundaries of the airport. Level 2 includes the development of a carbon management plan with agreed emission reduction targets in addition to level 1 and the continuous improvement of emission levels from scope 1 and 2 emission sources. Level 3 includes the specification of the stakeholders' collaboration plan in addition to level 2 and the expansion of the airport carbon footprint to include some scope 3 emissions. Level 3+ includes level 3 plus carbon neutralization for activities within the airport's control limits[19].

Other Impacts

Emissions from aircraft in the high atmosphere have several specific effects. This proves that the impact of aviation on climate change is not only related to CO2 emissions or greenhouse gas emissions. These effects;[20]

- Nitrogen oxide (NOx) emissions leading to ozone (O3) formation and methane (CH4) degradation
- Stratospheric water
- Contrails
- Sulfate aerosols that reflect sunlight
- Soot aerosols that absorb sunlight

Ozone and water vapor degradation are being investigated due to climate changes. In particular, the causes of deterioration in water vapor, which will have dynamic effects and climatic effects, are being investigated. Ozone and water vapor degradation are closely related to sea surface temperatures. The biggest cause of these deteriorations is seen as aircraft emissions. Removing ozone in the lower stratosphere without allowing sea surface temperatures to change causes -10 degrees cooling in the lower stratosphere and radiative heating in the middle stratosphere.[21]

3. International Climate Change Strategies in Aviation

Climate change in the world is one of the important problems of recent

[19] Goktas, Pinar and Ozler, Cenk, (2017). Using Failure Modes and Effects Analysis to Improve Airport Carbon Accreditation Process Applications, Suleyman Demirel University The Journal of Faculty of Economics and Administrative Sciences, Vol.22, No.4, pp. 1013-1030.
[20] Jungbluth, N., (2018). Aviation and Climate Change: Best Practice for Calculation of the Global Warning Potential, Doi 10.13140/RG.2.2.26044.90245
[21] Rind, D., Lonergan, P., (1995). Modeled Impacts of Stratospheric Ozone and Water Vapor Perturbations with Implications for High-speed Civil Transport Aircraft, Journal of Geophyscial Research, Atmospheres, Volume 100, Issue D4.

years. It is frequently discussed internationally, and research is carried out to eliminate the effects of climate change. Since the solutions developed based on research results may not be suitable for every country, international climate strategies and national strategies differ. It is the initial Kyoto protocol for international discussions involving air transport. The Kyoto Protocol was signed in 1997 and is the first international regulation in which aviation-related measures were taken. Following the Kyoto Protocol, ICAO and the EU have developed important international strategies regarding carbon reduction in air transportation.

The Kyoto Protocol influenced the setting of generally accepted global climate change offset targets. Situation analysis of balancing targets can be made when compared with ICAO's aviation growth forecasts. With this analysis, it can be determined whether the goals have been achieved or not. Looking at ICAO forecasts, it is seen that CO2 emissions will increase in air transportation in 2040. In light of this information, if CO2 emissions in air transportation are to be reduced, many policies must be implemented together through international targets.[22]

Since the Kyoto Protocol, national targets have begun to be determined. CO2 reduction policies in air transportation are also included in these targets. The amount of CO2 created by aviation is considered beyond national targets due to the international nature of air transportation. By evaluating the impact of air cargo transportation on all other sectors in raw material transportation, the impact of air transportation on climate change is increased. The growth in aviation is also expected to be huge, as the increase in people's income and the appreciation of time increase people's interest in air transportation. Additionally, aviation does not only cause air pollution. In addition, it also causes solid waste creation and water pollution through airports.[23]

International Civil Aviation Organization

ICAO is the institution that leads efforts to reduce greenhouse gas emissions from air transportation within the scope of UNFCCC. ICAO develops techniques for countries to reduce carbon emissions within a non-binding framework. ICAO's insistence on using MBMs restricts the environmental policies of airlines. The global mandatory carbon offset system also causes an increase in sustainability efforts. When Kyoto was first discussed, options such as dividing emissions between origin and destination countries, collecting them according to the country that buys or sells jet fuel,

[22] Jonanovic, M. M., Vracarevic, B. R., (2016). Challenges Ahead: Mitigating Air Transport Carbon Emissions, Polish Journal of Environmental Studies, 25 (5), pp.1975-1984, https://doi.org/10.15244/pjoes/62700.
[23] Bows-Larkin, A., Mander, S. L., Traut, M. B., Anderson, K. L., Wood, F. R., (2014). Aviation and Climate Change- The Continuing Challenge, Encyclopedia of Aerospace Engineering, John Wiley and Sons.

or according to the nationality of the aircraft were discussed. After discussions, it was decided to determine the carbon emission policies of countries and airlines within the scope of ICAO. One of these goals is to limit or reduce the impact of greenhouse gases caused by aviation on the global climate. ICAO has encouraged member countries to prepare voluntary national CO2 reduction programs. It has collected annual action plans from countries that have a large share in air transportation. Member countries have set a 2 percent improvement in global annual average fuel efficiency between 2010 and 2020, and a 2 percent global fuel efficiency target between 2021 and 2050. This goal was considered only as an initial step. ICAO has not been able to develop internationally mandatory measures for various political reasons. In 2011, the EU requested a meeting to be held to get the ICAO's opinion on the missing points regarding the ETS. Strong opposition from ICAO members has been observed, especially in determining the situation for other countries that will carry out air transportation to the EU.[24]

CORSIA, which is affiliated with the Paris Climate Agreement, was introduced in 2016 and was formally developed by ICAO is a carbon offset and reduction plan.[25] This plan will begin implementation in 2021, and participation will be mandatory for signatory states by 2026. CORSIA, the climate change plan adapted by ICAO to the industry, has three basic features; a solution for the distribution of offsetting responsibility (first partial and then full compliance with climate regulations), periods for implementation, and provisions for the implementation of the plan.[26] In addition, what is expected from the plan in the first stage is the monitoring, reporting, and verification of CO2 emissions resulting from international aviation covering all states. In the following stages, carbon reduction will be tried to be achieved by obtaining reports from the enterprises. Also internationally, ICAO's CORSIA initiative recommends the use of alternative fuels as a way to make aviation greener.[27] The second phase of this plan will be completed in 2035, and although participation is mandatory, no sanctions are mentioned for companies. However, the exact implementation plan is still unclear. ICAO first presented the 2018 version to the industry for this initiative. The current version is the 2023 version. Considering the

[24] Gehring, M. W., Robb, C. A. R., (2013). Addressing the Aviation and Climate Change Challenge, A Review of Options, ICTSD Programme on Trade and Environment Trade and Sustainable Energy Series, Geneva, Switzerland.
[25] ICAO. (2021). Environmental Protection. ICAO Environment: www.icao.int/environmental-protection/Pages/default.aspx
[26] Anjaparidze, G. (2019). The Extraordinary Climate Agreement on International Aviation: An Airline Industry Perspective. Harvard Project on Climate Agreements, 1-12. www.belfercenter.org/sites/default/files/files/publication/191021-anjaparidze
[27] Ausilio, Bauen., Anisha, Harris., Christopher, Sim., N., J., Gudde., Matteo, Prussi., Nicolae, Scarlat. (2022). CORSIA Lower Carbon Aviation Fuels: An Assessment of the Greenhouse Gas Emission Reduction Potential. Applied Sciences, 12(22):11818-11818. doi: 10.3390/app122211818

widespread use of aviation in global European countries, based on emissions from previous years, there is concern that CORSIA's emission reduction expectations will not be realized quickly.[28] These and similar environmentally focused policies and plans are seen as an additional economic burden by airline carriers.[29]

European Union

The European Union, which advocated carbon taxes in the 1990s, decided that trading greenhouse gas emissions was a better option with the Kyoto Protocol. ETS has been a turning point in the EU's fight against climate change. Within the framework of ETS, the EU has achieved a 21% industrial greenhouse gas reduction by 2020. The European Union has decided to implement ETS (Emission Trading System) for greenhouse gas emissions created by air transportation. With the decision made in 2012, carbon emission amounts determined by businesses began to be traded on a stock exchange. ETS has been discussed a lot by EU member states and non-member countries flying to Europe. Despite the discussions, airline companies have agreed to operate within the scope of ETS. EU ETS studies have increased climate change-based studies in air transportation by putting pressure on ICAO.[30]

ETS has been defined primarily as a financial source for the European Union to be environmentally friendly. ETS is a system based on tax payments by companies that emit emissions. For aviation, it became mandatory for all flights in Europe in 2012 for the first time. Details for the operation of the system and aviation were reported in the report published in 2009.[31] ETS aims to achieve emission reduction most economically and effectively by setting an emission ceiling and allowing trade between sectors.[32] In other words, the Emission Trading System (ETS) is one of the existing economic mechanisms that aims to reduce greenhouse gas (GHG) emissions in the

[28] Kaya, Gizem, & Kayalıca, Özgür. (2022). Aviation-caused CO2 emissions reduction efficiency in EU-28 under CORSIA compliance. Akıllı Ulaşım Sistemleri Ve Uygulamaları Dergisi, 5(2), 33-52. https://doi.org/10.51513/jitsa.1164739

[29] Rathore, H., & Jakhar, S. K. (2021). Differential carbon tax policy in aviation: One stone that kills two Birds? Journal of Cleaner Production, 296(1), 1-16. doi:10.1016/j.jclepro.2021.126479

[30] Gehring, M. W., Robb, C. A. R., (2013). Addressing the Aviation and Climate Change Challenge, A Review of Options, ICTSD Programme on Trade and Environment Trade and Sustainable Energy Series, Geneva, Switzerland.

[31] European Union. (2009). Directive 2008/101/EC of the European Parliament and of the Council of 19 November 2008 amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community (Text with EEA relevance). Official Journal L 8, 13.1.2009, s. 3–21 http://data.europa.eu/eli/dir/2008/101/oj

[32] Heiaas, Anne, M. (2021). The EU ETS and Aviation: Evaluating the Effectiveness of the EU Emission Trading System in Reducing Emissions from Air Travel. Review of Business and Economics Studies. 9(1):84-120. doi: 10.26794/2308-944X-2021-9-1-84-120

aviation industry and, as a result, sustainability.[33] According to the directive published in the official gazette, relevant countries or regulatory bodies determine emission quotas for the industry, and these quotas show the emission emissions in a certain period. Quotas are distributed to companies and emissions are allowed during a certain period. Companies can also trade for quotas they own. Penal sanctions may be imposed on companies that exceed quotas at the end of the specified period. Ultimately, an economic incentive is provided to reduce emissions and reduce carbon dioxide intensity. It contributes to the reduction of total emissions by enabling companies to reduce their emissions in financial terms or to endure buying more quotas. The reason why ETS is separated from CORSIA is that CORSIA was designed to operate internationally. While both involve market-based carbon reduction, ETS emphasizes sustaining this process within an economic framework, while CORSIA functions as part of a broader policy and regulatory framework.

Measures Taken Regarding Climate Change in Aviation

Fuel consumption is one of the important subheadings in air transportation. Fuel efficiency and biofuel use are solution suggestions put into effect at this point. Although carbon reduction in air transportation is difficult, various techniques for CO2 and greenhouse gas reduction are being studied by both sector managers and politicians. Biofuel use is also an important climate change issue. Although its intensive use does not seem possible in the near future due to production problems, biofuel is considered the best option for sustainable aviation.[34]

The UK also considers demand reduction as an option to reduce emissions in air transport. In the UK, commercial flights account for 7% of national greenhouse gas emissions. 96% of these greenhouse gas emissions come from international long-haul flights. It is thought that these flights will increase by 49% by 2050. Most alternative fuels are at the beginning of their development stage. Biofuels, electro-chemical fuels, and hydrogen fuels are among the most important alternative fuels. Biofuels and electro-chemical fuels are also called SAF. Biofuels have a carbon emission reduction capacity of 5-32%. Electro-chemical fuels are even more promising. SAF is the most effective way to reduce emissions in the short term.[35]

[33] Crespo, Antonio, Marcio, Ferreir., Wang, Chun. (2019). Carbon Emission Trading Systems (ETS), Industry Business Dynamics, and the Aviation System: a survey on economic modeling and ETS implementation impacts assessment techniques. Innovations in Systems and Software Engineering, 1-8. doi: 10.1109/ISSE46696.2019.8984567

[34] Bows-Larkin, A., Mander, S. L., Traut, M. B., Anderson, K. L., Wood, F. R., (2014). Aviation and Climate Change- The Continuing Challenge, Encyclopedia of Aerospace Engineering, John Wiley and Sons.

[35] UK Parliament Post, 2020, Climate Change and Aviation, Postnote, London.

In air transportation, airline companies benefit from climate awareness for passengers in the international arena by showing their efforts regarding climate change in their marketing activities. Since these efforts, which are shown as green marketing activities, are similar to international climate efforts, they help countries create an image and gain prestige in the international arena.

Airline companies support climate efforts with efficient design of airspace, development of market-based measures (MBM), alternative biofuels, and other emission-reducing measures.[36]

Conclusion

Air transportation is one of the sectors that attracts attention with its continuous growth. It is closely associated with the issue of climate change, which has become one of the main issues of international relations in recent years. Air transportation contributes approximately 3-5% to global CO2 emissions. Due to increasing growth and the inability to give up air transportation, importance is given to international policies regarding aviation in reducing CO2 emissions. Aviation's climate change-related impacts are not limited to CO2 emissions. Air transportation, with its CO2 emissions, GHG emissions, and other negative effects, has been subject to regulations by international institutions.

The European Union has caused many international debates by establishing the carbon trading system. ICAO called its members to a meeting and discussed whether countries that would organize flights to the European Union would be included in the Emission Trading System. When the result was negative, countries within the EU and voluntary countries joined the ETS. After this date, ICAO has been accepted as an umbrella institution to determine the policies and strategies of international air transportation regarding climate change.

Emission reduction in air transportation is very difficult due to the long lifespan of aircraft and the lack of zero-carbon alternatives. Carbon emission reduction technologies include new aircraft and engines, electric aircraft, and alternative fuels. These new technologies will not bring carbon emissions to zero. Low-carbon fuels are promising in the sector. However, the production of such fuels is progressing very slowly. Reducing the demand for flying is not always socially and politically possible. Emission balancing policy is an important step in reducing emissions, but it is seen as insufficient. The unique nature of air transportation is international. Therefore, carbon emission reduction strategies in air transportation should be international. But this

[36] Gehring, M. W., Robb, C. A. R., (2013). Addressing the Aviation and Climate Change Challenge, A Review of Options, ICTSD Programme on Trade and Environment Trade and Sustainable Energy Series, Geneva, Switzerland.

does not mean that national policies do not work. National steps are essential to begin with.

PSYCHOLOGICAL IMPACT OF CLIMATE CHANGE

Musa Şimşek[1]

Individual Differences Regarding Opinion Change

When people reflect upon human decision-making processes, they often presume that logic and pragmatism govern the outcome, but this is rarely the case. To fully grasp this idea, one needs to look at the fundamental components of the information processing procedure. First, a stimulus enters the perceptual world of a human being. This hypothetical stimulus' perceptual properties must be processed by the appropriate brain region for it to be "perceived." During the initial stages of the operation, fundamental physical stimulus properties are processed. However, this represents only a minor component of the overall process. The most crucial step is to ascribe a meaning to the stimulus. It is at this very step that most individual variances emerge.

If human perception processes were fully objective and evidence-based, then all people would perceive the same stimulus in the same way. But every person's perception is slightly different than others. This uniqueness arises from the involvement of top-down information processing.

Bottom-up a.k.a. data-driven processing refers to the evidence-based perceptual processes without the involvement of the prior experiences and knowledge; in other words, there are no individual differences since only exogenous evidence is used in this process. In contrast, top-down a.k.a. conceptually driven processing refers to the perceptual processes in which prior knowledge and experience affect the interpretation of the stimulus.

Bottom-up and top-down processes both take a role in every perceptual process, but their dominance may vary across different tasks. For example, while inspecting a painting, perception of colours would be very similar among people, since almost all people with healthy colour vision can distinguish main colours and successfully detect each individual colour. But, when we ask for the meaning of the painting, each person's answer can vary dramatically. Because, when people try to infer meaning from stimuli, they must use top-down processing dominantly. Detecting individual colours and inferring meaning are both cognitive tasks but the information processing type (bottom-up vs. top-down) proportions of these tasks are quite different. Different examples can be given for different sensory modalities, but the main point would be the same: humans are not objective information

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processors, instead, they are subjective meaning-makers.

The uniqueness of each person's information processing causes individual differences regarding the evaluation of new information. Generally, people are prone to interpret new information in a way that confirms their already-held beliefs and attitudes. This confirmation bias decreases mental flexibility but fortunately, not all people are equally rigid about their ideas. Particularly, there are individual differences regarding mental flexibility; therefore, evidence with varying quality and/or quantity is needed for opinion change to occur for different persons. Mentally flexible persons can update their opinions and beliefs relatively easily, while mentally rigid persons are more prone to justify their already held positions and are less likely to change their opinions.

Recipient of communication is indeed a crucial factor, but it is not the only factor in play. The message itself is another instrumental factor for successful communication. The format of a message is at least as important as the content. Some people are more responsive to explicit messages while others are more effectively affected by implicit messages. Some people prefer messages that resemble liberal values, while others are more likely to be moved by conservative values. Specifically, different propaganda styles should be used to reach out to different persons. Yet another important factor is the source of information. Information sources have varying credibility for individuals. For instance, government-related institutions instil confidence in some people while arousing suspicion in others. Some people prefer scientific study results to guide them while others put their trust in their opinion leaders. All the said factors create variety regarding people's responses to incoming information. Like information about different topics, information about climate change is met with various responses.

Consequences of Belief in Conspiracy Theories about Climate Change

Biddlestone, Azevedo and van der Linden[2] conducted a meta-analysis regarding the consequences of belief in conspiracy theories about climate change. Study results suggest that climate conspiracy beliefs have a negative correlation with the acceptance of scientific evidence regarding climate change, trust, pro-environmental concern, behavioural intentions, and policy support. These findings could emerge from the inclination of conspiracy theory adherents to overlook public news sources and government declarations. Misinformation is a dangerous factor when it comes to public opinion change. When individuals are uncertain about the reliability of

[2] Biddlestone, M., Azevedo, F., & van der Linden, S. (2022). Climate of conspiracy: A meta-analysis of the consequences of belief in conspiracy theories about climate change. Current Opinion in Psychology, 46, 101390.

information sources, the influence of conspiracy theorists on attitudes towards climate change may carry more weight. This could potentially create an atmosphere where objective and valid scientific information is undervalued. If individuals do not accept the evidence concerning climate change and do not trust the relevant authorities, they will lack the motivation to modify their climate mitigation behaviours. This process of distrust would inevitably lead to a lack of support for policies.

Determinants and Outcomes of Belief in Climate Change

As explained previously in this chapter, there are differing opinions on the existence of climate change. Some who acknowledge its existence refute that humans are the cause. To examine the factors that cause people to have differing approaches regarding belief in climate change, Hornsey et al.[3] have conducted a meta-analysis regarding correlates of belief in climate change. The findings suggest that political affiliation (correlation: 0,301) is the most significant demographic factor associated with belief in climate change. Individuals who plan to vote for more progressive political parties are more inclined to acknowledge the reality of climate change compared to those who align with relatively conservative political groups. The correlation between perceptions of climate change and political orientation (correlation: 0,149) is noteworthy, albeit weaker. Thus, the recognition of climate change appears to be in line with political party affiliations, rather than basic political ideologies. Minimal effects were observed for the other demographic factors, namely age (correlation: -0,125), education (correlation: 0,117), income (correlation: 0,057), race (correlation: 0,032), and gender (correlation: 0,029). Individuals with stronger convictions regarding climate change tended to be younger, possess a higher level of education, earn a more substantial income, and were more likely to be non-white and female.

Findings also suggest that the antecedent with the largest effect size is belief in new ecological paradigm (correlation: 0,493); followed by trust in scientists (correlation: 0,365), perceived scientific consensus (correlation: 0,349), experience of local weather change (correlation: 0,336), objective knowledge (correlation: 0,253), biospheric values (correlation: 0,252), activist/green identity (correlation: 0,229), environmental cues (correlation: 0,219), subjective knowledge (correlation: 0,182), experience of extreme weather (correlation: 0,052), hierarchical cultural values (correlation: -0,258), individualistic cultural values (correlation: -0,275) and lastly, free-market ideology (correlation: -0,296).

When it comes to consequences of climate change beliefs, the factor with the largest effect size is willingness to prioritize the environment over the

[3] Hornsey, M. J., Harris, E. A., Bain, P. G., & Fielding, K. S. (2016). Meta-analyses of the determinants and outcomes of belief in climate change. Nature climate change, 6(6), 622-626.

economy (correlation: 0,384), followed by policy support (correlation: 0,324), private pro-environmental intentions (correlation: 0,316), public pro-environmental intentions (correlation: 0,251), support for carbon tax/cap and trade (correlation: 0,207), public pro-environmental behaviour (correlation: 0,188) and finally, private pro-environmental behaviour (correlation: 0,173).

Climate Anxiety

Initially, climate change was not perceived as a human issue. However, over time, its impacts on the quality of human lives began to be felt. Certain groups are affected more significantly than others, while some experience its effects indirectly. This is particularly evident for individuals inhabiting regions that were already climate-sensitive prior to climate change, who have been forced to relocate from their homelands. Additionally, nations with relatively weak economic power have been disproportionately affected by climate change. The effect of climate change on mental health tends to be disregarded. However, a compelling body of evidence indicates a correlation between natural disasters and elevated levels of PTSD, depression, anxiety, and substance misuse[4].

Individuals who have been compelled to relocate owing to the direct and indirect effects of climate change encounter numerous issues when adjusting to a new environment. The unfamiliar surroundings can cause confusion, resulting in cognitive discomfort and stress. Furthermore, financial hardship presents an added challenge for involuntary migrants. Research shows that this vulnerable group experiences a high incidence of mental illness[5]. Feeling unwelcome in the new residential space compounds the adverse factors. Due to the scarcity of habitable land in certain regions of the world, individuals may exhibit a tendency to safeguard and assert control over their respective plots of soil. Frequent conflicts arise between diverse groups of people, particularly between migrants and native residents. Being displaced from their homes and experiencing rejection exacerbates the level of stress experienced by immigrants[6], resulting in adverse mental health effects[7].

Elevated temperatures are correlated with aggressive behaviour, conflict[8],

[4] Morganstein, J. C., & Ursano, R. J. (2020). Ecological disasters and mental health: causes, consequences, and interventions. Frontiers in psychiatry, 11, 1.
[5] Mindlis, I., & Boffetta, P. (2017). Mood disorders in first-and second-generation immigrants: systematic review and meta-analysis. The British Journal of Psychiatry, 210(3), 182-189.
[6] Tapsell, S. M., & Tunstall, S. M. (2008). "I wish I'd never heard of Banbury": the relationship between 'place' and the health impacts from flooding. Health & place, 14(2), 133-154.
[7] Miller, K. E., & Rasmussen, A. (2017). The mental health of civilians displaced by armed conflict: an ecological model of refugee distress. Epidemiology and psychiatric sciences, 26(2), 129-138.
[8] Miles-Novelo, A., & Anderson, C. A. (2019). Climate change and psychology: Effects of rapid global warming on violence and aggression. Current Climate Change Reports, 5, 36-46.

suicide[9], and a rise in mental health hospital admissions[10]. It is essential to highlight that involuntary migrants feel sorrow due to the displacement from their native environment. In other words, they experience a grief process.

Climate change elicits a range of emotional responses beyond anxiety. Other associated emotional responses include hopelessness, anger, and sorrow. When determining whether a particular type of anxiety is pathological or adaptive, it is necessary to assess its origin and level of severity. When anxiety prepares an individual to be defensive against a factual and legitimate threat, it demonstrates adaptability. In contrast, maladaptive anxiety causes unnecessary stress when it incapacitates an individual.

Ecological anxiety has been documented in numerous studies. For instance, Ellis and Albrecht[11] found that Australian farmers experience an elevated sense of risk of depression and suicide. Further research indicates that environmental issues may lead to depressive symptoms[12], substance misuse and suicidal thoughts[13].

Climate change affects individuals differently and often unfairly. There are variances in the way individuals respond emotionally and behaviourally to climate change. Several studies have shown that climate anxiety is more common among people who care about environmental issues more and experience climate change's impact more directly[14].

Climate Change and Aggression

There is a significant history of linking high temperatures with aggressive behaviour. Perry and Simpson[15] have reported that the rate of violent assault is positively correlated with temperature. According to Miles-Novelo and Anderson[16], there are three potential means through which climate change could escalate aggression and violence. Namely, (1) direct heat effects, (2)

[9] Carleton, T. A. (2017). Crop-damaging temperatures increase suicide rates in India. Proceedings of the National Academy of Sciences, 114(33), 8746-8751.
[10] Obradovich, N., Migliorini, R., Paulus, M. P., & Rahwan, I. (2018). Empirical evidence of mental health risks posed by climate change. Proceedings of the National Academy of Sciences, 115(43), 10953-10958.
[11] Ellis, N. R., & Albrecht, G. A. (2017). Climate change threats to family farmers' sense of place and mental wellbeing: A case study from the Western Australian Wheatbelt. Social science & medicine, 175, 161-168.
[12] Helm, S. V., Pollitt, A., Barnett, M. A., Curran, M. A., & Craig, Z. R. (2018). Differentiating environmental concern in the context of psychological adaption to climate change. Global Environmental Change, 48, 158-167.
[13] Cunsolo Willox, A., Harper, S. L., Ford, J. D., Edge, V. L., Landman, K., Houle, K., ... & Wolfrey, C. (2013). Climate change and mental health: an exploratory case study from Rigolet, Nunatsiavut, Canada. Climatic Change, 121, 255-270.
[14] Clayton, S. (2020). Climate anxiety: Psychological responses to climate change. Journal of anxiety disorders, 74, 102263.
[15] Perry, J. D., & Simpson, M. E. (1987). Violent crimes in a city: Environmental determinants. Environment and Behavior, 19(1), 77-90.
[16] Miles-Novelo, A., & Anderson, C. A. (2019). Climate change and psychology: Effects of rapid global warming on violence and aggression. Current Climate Change Reports, 5, 36-46.

prenatal and postnatal developmental problems, (3) intergroup conflict.

Heat can lead to irritation, which in turn can cause aggression. This phenomenon may arise through the activation of aggressive thoughts or the misattribution of bodily responses to higher temperatures. Several studies indicate that the mere notion of heat can trigger aggressive thoughts and behaviours[17]. In a separate study, individuals who were positioned in an uncomfortable room demonstrated greater levels of aggression and violence[18]. In a geographical context, research reveals that areas of the United States experiencing higher temperatures tend to exhibit elevated crime rates[19]. Another study, encompassing data from 60 countries, reported that temperature correlates with levels of violence, particularly in regions where conflict and instability prevail[20]. Yet another study result has shown that every degree increase in Celsius corresponds to a %6 rise in homicide level and even a mild change in temperature (e.g., 1.1 Celsius) could result in more than 25000 deadly assault records[21].

Aggression can be examined on both an individual and group level, with individual acts of violence being impacted by and having an impact on group dynamics. The use of violence and aggression can be influenced by various factors, including social norms, cultural values, and political contexts. It is important to investigate these factors when seeking to understand and prevent violent behaviour. If one social group perceives another as a threat to their resources and values, group-level violence may ensue. Scarce resources inevitably lead to conflicts between parties, and climate immigrants are often unwelcome in their new communities. The occurrence of aggressive and hostile group behaviours is indirectly linked to climate change, resulting in a conflict of interest. This results in an unending cycle of animosity towards immigrants, provoking aggressive behaviour towards native individuals, ultimately leading to acts of violence.

Climate Change and Children

Children are particularly vulnerable to the adverse effects of climate change[22]. There are numerous studies on this subject. For example, research has shown that children who experience extreme weather events may also

[17] DeWall, C. N., Anderson, C. A., & Bushman, B. J. (2011). The general aggression model: Theoretical extensions to violence. Psychology of violence, 1(3), 245.
[18] Anderson, C. A., Anderson, K. B., Dorr, N., DeNeve, K. M., & Flanagan, M. (2000). Temperature and aggression. In Advances in experimental social psychology (Vol. 32, pp. 63-133). Academic Press.
[19] Anderson, C. A. (1989). Temperature and aggression: ubiquitous effects of heat on occurrence of human violence. Psychological bulletin, 106(1), 74.
[20] Mares, D. M., & Moffett, K. W. (2016). Climate change and interpersonal violence: A "global" estimate and regional inequities. Climatic change, 135, 297-310.
21 Anderson, C. A., & DeLisi, M. (2011). Implications of global climate change for violence in developed and developing countries (p. 249).
[22] Burke, S. E., Sanson, A. V., & Van Hoorn, J. (2018). The psychological effects of climate change on children. Current psychiatry reports, 20, 1-8.

experience stress within their families[23], disruption to social support networks[24], displacement[25], PTSD, depression, anxiety, phobias, sleep disorders, attachment disorders and substance abuse[26]. Further negative consequences for children who have experienced extreme weather events involve difficulties in regulating emotions, heightened cognitive impairments, learning problems, behavioural issues, impaired language development, and reduced academic success[27].

Climate Change Mitigation Behaviour Interventions

Bergquist, Goldberg & van der Linden[28] have conducted a second-order meta-analysis regarding field interventions for climate change mitigation behaviours. According to this study, climate change mitigation interventions are generally effective ($d = 0.31$).

Six types of interventions were identified: social comparison (highlighting other people's pro-environmental behaviours as a means to increase pro-environmental behaviours; $d = 0.37$), financial incentives (financial rewards to people for acting in a sustainable way; $d = 0.32$), appeals (targeting people's values or responsibilities; $d = 0.28$), commitment (motivating people to commit to sustainable behaviours; $d = 0.27$), feedback (providing information to people regarding their past behaviours; $d = 0.16$), and education (providing factual information; $d = 0.09$).

Social comparison is the most effective intervention type as people tend to adapt their behaviour to fit in and avoid alienation. Displaying pro-environmental actions as the norm among others can stimulate an uptick in pro-environmental actions. Additionally, rewarding individuals who exhibit pro-environmental behaviours can encourage others to model such actions. In essence, the effectiveness of social comparison interventions is mainly attributed to adherence to social norms and modelling.

The second most effective intervention type is through financial

[23] Simpson, D. M., Weissbecker, I., & Sephton, S. E. (2011). Extreme weather-related events: Implications for mental health and well-being. Climate change and human well-being: Global challenges and opportunities, 57-78.
[24] Banks, D. M., & Weems, C. F. (2014). Family and peer social support and their links to psychological distress among hurricane-exposed minority youth. American Journal of Orthopsychiatry, 84(4), 341.
[25] Pfefferbaum, B., Jacobs, A. K., Jones, R. T., Reyes, G., & Wyche, K. F. (2017). A skill set for supporting displaced children in psychological recovery after disasters. Current Psychiatry Reports, 19, 1-8.
[26] Norris, F. H., Friedman, M. J., Watson, P. J., Byrne, C. M., Diaz, E., & Kaniasty, K. (2002). 60,000 disaster victims speak: Part I. An empirical review of the empirical literature, 1981—2001. Psychiatry, 65(3), 207-239.
[27] Clayton, S., Manning, C., Krygsman, K., & Speiser, M. (2017). Mental health and our changing climate: Impacts, implications, and guidance. Washington, DC: American Psychological Association and ecoAmerica.
[28] Bergquist, M., Thiel, M., Goldberg, M. H., & van der Linden, S. (2023). Field interventions for climate change mitigation behaviours: A second-order meta-analysis. Proceedings of the National Academy of Sciences, 120(13), e2214851120.

incentives which is closely related to positive reinforcement. Whenever a person's response is followed by a positive outcome, instrumental learning by positive reinforcement occurs. This type of learning is common in most animal species. In modelling, people observe others' positive reinforcement processes and learn response-stimulus associations vicariously. Whereas, in applications like financial incentives, learning occurs first-hand.

The third most effective type of intervention is appeals which target people's attitudes. People tend to modify either their actions or attitudes in a way that makes them compatible. Otherwise, a resulting discrepancy creates cognitive discomfort. By introducing a novel perspective to pro-environmental behaviours that correspond with people's already held values and attitudes, behavioural change can be enabled. Therefore, to ensure successful persuasive communication, it is crucial to consider individual differences in values and attitudes.

Effective commitment interventions involve setting clear, specific goals and encouraging individuals to achieve them. With well-prepared aims, people can approach their objectives in a more systematic and focused manner. Feedback interventions remind individuals of their past resource consumption, encouraging greater attentiveness to current behaviour. Education interventions inform people about the negative consequences of climate change. Feedback and education appear to have lower efficacy compared to other intervention types. This finding could be attributed to a lack of social influence and reinforcement effect associated with these interventions.

The authors have identified five categories of pro-environmental actions, namely: littering (disposal of waste in the environment; $d = 0.52$), recycling (reuse of products; $d = 0.27$) conservation (saving water or electricity; $d = 0.25$), consumption (meat consumption or food waste; $d = 0.20$), and transportation (the use of a car, public transport, walking, and cycling; $d = 0.08$).

Overall, the study findings suggest that interventions can increase pro-environmental behaviour. Social comparison is identified as the most effective type of intervention, particularly those targeting littering behaviour.

Conclusion

Having examined the material throughout this chapter, several conclusions can be drawn. Firstly, it is important to acknowledge individual differences in information processing, particularly in relation to the interpretation of information about climate change, which can elicit a range of responses. In persuasive communication targeting pro-environmental behaviour, the message recipient, message content and the messenger's identity are all essential factors. Even if individuals admit to the reality of

climate change, they may nonetheless repudiate the involvement of humans. To encourage individuals to adopt more environment-friendly behaviours, certain prerequisites must be met. Firstly, it is imperative that individuals acknowledge the existence of climate change. Secondly, individuals must acknowledge the involvement of humans in this matter. Lastly, individuals ought to hold the belief that it is attainable for humans to mitigate the progression of climate change. Research indicates that individuals who subscribe to climate change conspiracy theories tend to ignore scientific evidence, display low levels of trust towards information sources, exhibit minimal environmental concern, lack pro-environmental behavioural intentions, and express limited policy support with regard to climate change. Belief in climate change appears to strongly correlate with one's political affiliation. In essence, those who identify as liberal are more inclined to accept the existence of climate change caused by humans. Individuals who have a stronger conviction about climate change tend to be younger, possess a higher level of education, earn a more substantial income, and are more likely to be non-white and female. When examining the factors that contribute to belief in climate change, trust in scientists and the perceived scientific consensus on the issue appears to be the most significant. The impact of accepting climate change as a fact tends to be the prioritisation of environmental concerns above economic ones. Among the detrimental direct and indirect psychological effects of climate change, climate anxiety is frequently emphasised. Exposure to severe weather conditions is linked with various adverse effects on mental health such as post-traumatic stress disorder (PTSD), depression, anxiety, substance abuse, confusion, discomfort, stress, and suicide, among others. Aggression has been identified as another contributing factor to climate change. Numerous studies indicate a correlation between rising temperatures and an escalation in aggressive behaviours. Children are particularly susceptible to the effects of climate change. Numerous developmental disorders are linked to climate change. Empirical evidence indicates that interventions presenting pro-environmental behaviours as the social norm, referred to as social comparison, are the most efficacious. Littering appears to be the most preventable form of environmentally harmful behaviour. Based on the available information, it can be concluded that promoting a shift in behaviour towards an environmentally friendly approach is feasible, essential and advantageous. But achieving this goal requires an approach that is tailored to individual circumstances, rather than adopting a one-size-fits-all strategy. Customized strategies for altering attitudes and behaviours are essential. Further research into methods for persuading individuals about the reality of climate change and the role of human activity in its occurrence would hold significant importance.

THE EFFECTS OF UNIVERSITY STUDENTS' CLIMATE CHANGE ANXIETY KNOWLEDGE ATTITUDE AND BEHAVIOURS ON THEIR RECYCLING BEHAVIOUR

Ali Eren Balıkel*

Introduction

Although the climate, which fundamentally affects the living and plant life in the region it dominates, has changed since the existence of the world, these changes have occurred over millions of years. The rapidly increasing production and consumption frenzy that started with the Industrial Revolution caused the ozone layer, which forms the outer layer of the atmosphere, to be depleted, and thus the world began to be exposed to harmful ultraviolet rays from the sun.[1] This situation caused the temperature increases/decreases, which could take place over millions of years, to occur in short periods such as a few years, and the climate, which affected all life forms, began to change rapidly.

Conclusive evidence reveals that climate is now beginning to have a negative impact on both living and non-living ecosystems as it leads to land degradation, freshwater scarcity, food scarcity/insecurity, global warming, floods and lack of shelter/comfortable housing, and health problems.[2]

Along with the rapid change in the environment, recycling concern started to gain importance and it attracted also the attention of scholars who were very keen on finding out the social reasons behind people's inclination to recycle. The researches were done by many scholars from many different disciplines, with a particular accent on the 'why' of such activities. To be more specific it is possible to notice, that a social psychologist would concentrate on the encouragement behind the activity, perhaps philanthropy or responsibility, while an economic scholar would dig into the financial aspects of recycling advantages.[3] In this study, the aim is to find out the effects of climate change anxiety knowledge attitude and behaviours on recycling behaviour.

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[1] Danladi Slim Matawal, Dafang John Maton, "Climate Change and Global Warming: Signs, Impact and Solutions", International Journal of Environmental Science and Development, Vol. 4, No. 1, 2013, p. 62, http://www.ijesd.org/index.php?m=content&c=index&a=show&catid=41&id=589 (Access, 20.10.2023).

[2] *ibid*., p.63

[3] Easwar S. Iyer, Rajiv K. Kashyap, "Consumer Recycling: Role of Incentives, Information, and Social Class", Journal of Consumer Behaviour, Vol. 6, No. 1, 2007, p. 35, https://onlinelibrary.wiley.com/doi/10.1002/cb.206 (Access, 20.10.2023).

Climate Change

The climate is defined by the Oxford Learner's Dictionary as the regular weather pattern of a particular place. These weather conditions can be classified as mild, hot and rainy depending on the season and/or location.[4]

It is stated that climate is a complex and interactive system. The system consists of the atmosphere, land surface, snow and ice, oceans and other bodies of water, and living things. The first of these, the atmosphere, characterizes the climate.

Various external factors affect the internal dynamics of climate systems, including natural events such as volcanic eruptions and solar radiation, as well as human-induced changes in atmospheric composition.[5] The escalating frenzy of production and consumption, triggered by the Industrial Revolution, has resulted in the depletion of the ozone layer, the outermost layer of the atmosphere. Consequently, the world has become susceptible to harmful ultraviolet rays from the sun.[6] This scenario has accelerated the occurrence of temperature fluctuations, typically taking millions of years, to transpire in brief periods, such as a few years. The climate, impacting all forms of life, has swiftly embarked on a transformative journey.

Definitive evidence highlights that the climate is increasingly exerting adverse effects on both living and non-living ecosystems, manifesting in land degradation, freshwater scarcity, food insecurity, global warming, floods, inadequate shelter, and health issues.[7] This is called climate change or climate crisis and become a very important issue for not only people and academicians but also for the governments. Therefore, factors such as anxiety, knowledge, attitude and behaviours related to climate change started to be researched by scholars.

Climate Change Anxiety, Knowledge, Attitude and Behaviours

Knowledge is the one's total facts and information about the issue. In this study, knowledge will be taken as one's total facts and information about climate change. Climate Change Anxiety (CCA), also referred to as ecological anxiety, climate distress, or climate anxiety, on the other hand, denotes the apprehension linked to the global climate crisis and the looming threat of environmental catastrophe. This anxiety has the potential to disrupt daily life and, in severe cases, may contribute to secondary mental health issues. The significance of CCA deserves heightened recognition, considering that the psychological ramifications of climate change extend beyond those directly

[4] *ibid*., p.63
[5] Olufemi Adedeji, Okocha Reuben, Olufemi Olatoye, "Global Climate Change", Journal of Geoscience and Environment Protection, Vol. 2, 2014, p. 115, doi:10.4236/gep.2014.22016 (Access 12.09.2023).
[6] Matawal, Maton, op.cit., p. 64.
[7] *ibid*., p.64.

impacted to encompass anyone with access to information through modern communication technology. While anxiety, in itself, does not necessarily indicate a mental health problem, it can serve an adaptive function by fostering a forward-looking mindset that signals the approach of a threat and motivates individuals to prepare adequately.[8]

Despite the prevalence of negative feelings about climate change, eco-anxiety is often defined as a healthy individual response to climate change rather than a pathological reaction, such as general anxiety disorder. Individuals who are cognizant of these issues and experience discomfort witnessing the consequences of climate change may be more inclined to take action to mitigate its impacts on their daily lives.[9]

Nevertheless, experts caution that such concerns can potentially precipitate mental health problems. Recent studies suggest that young people, in particular, experience heightened discomfort about climate change compared to older generations. In a study involving Generation Z Filipinos aged 18–26, a significant relationship between CCA and mental health was identified.[10]

Negative emotional responses to climate change were found to correlate negatively with mental health and quantitatively with symptoms of insomnia. As the risks associated with climate change escalate, anxiety about its impacts can result in elevated levels of distress, leading to cognitive, emotional, and functional impairments. It is crucial in this context to differentiate between "appropriate" emotional responses and "extreme" psychosocial reactions.[11]

Another issue that is related to climate change is attitude. Attitude, as described by Agiande, is an acquired predisposition.[12] Agiande further elucidated that individuals develop attitudes characterized by preferences or aversions, favourability or unfavorability.[13] Williams defined attitude as a willingness to act in a certain manner, as expressed through a person's words, gestures, or facial expressions.[14] This assertion is supported by the notion that one's actions are reinforced by facial expressions, behaviour, and the

[8] Sun Joo Jang, Sophia J. Chung, Haeyoung Lee, "Validation of the Climate Change Anxiety Scale for Korean Adults", Perspectives in Psychiatric Care, Vol. 2023, Article ID 9718834, 2022, p. 2, https://www.proquest.com/docview/2800595166 (Access, 19.10.2023).
[9] *ibid*., p.3.
[10] Marc Eric S. Reyes, Bianca Patricia B. Carmen, Moses Emmanuel P. Luminarias, Soleil Anne Nichole B. Mangulabnan, Charles A. Ogunbode, "An Investigation into the Relationship Between Climate Change Anxiety and Mental Health Among Gen Z Filipinos", Current Psychology, Vol. 42, No. 9, 2021, p. 7450, https://link.springer.com/article/10.1007/s12144-021-02099-3 (Access, 20.10.2023).
[11] Jang, Chung, Lee, op.cit., p. 4.
[12] Denis Agiande, "Environmental Education Awareness & Attitude of Secondary School Students in Ogoja Education Zone, Cross River State", M.ED. Project of the Department of Science Education, UNN, 2006.
[13] *ibid*., p. 15.
[14] Paul T. Williams, Waste Treatment and Disposal (2nd Ed.), Chichester, Wiley-Blackwell, 2005, p. 130.

articulation of ideas on a given subject. Ezeudu, Ezeudu and Sampson, alternatively, defined attitude as a mental and emotional state of preparedness to respond to previously conditioned or associated stimuli.[15] Ezeudu, Ezeudu and Sampson see attitude as a mental and innate state of preparedness shaped by experiences, exerting a guiding or dynamic influence on an individual's responses to all related objects and situations.[16] These definitions collectively portray attitude as the cognitive and behavioural disposition an individual adopts towards a particular subject or issue. In the context of climate change, attitude signifies an individual's thoughts and actions regarding the global climate change concern, encompassing their feelings and concerns.

Efforts have been made to enhance public awareness and shape attitudes toward climate change. This includes addressing climate and broader environmental topics such as the physical environment, sanitation, pollution, natural and man-made environmental hazards, deforestation, population dynamics, effects of industrial concentration, the composition of atmospheric gases, weather and climate, and the classification of global climate types.[17] Attitudes are designed not only to increase awareness and foster engagement but, ideally, to instigate behavioural changes. This may involve encouraging individuals to, for example, reduce their energy consumption.

Various scientific disciplines, including psychology, anthropology, sociology, and philosophy, have dedicated efforts to comprehend the factors that drive people's behaviour in relation to protecting the natural environment. This emotionally charged subject has been conceptualized as Behaviour Change Theory, a field of study that extends beyond environmental contexts and is also applied in health, education, and the introduction of new products or concepts.[18]

Behaviour Change Theory is primarily characterized by two interrelated approaches: models of behaviour and theories of change. Models of behaviour are instrumental in understanding specific behaviour and identifying influencing factors, particularly at the individual level. Conversely, theories of change elucidate the process of behavioural change through the lenses of social science, offering valuable insights for developing

[15] Samuel Agozie Ezeudu, F.O. Ezeudu, Monday Sampson, "Climate Change Awareness and Attitude of Senior Secondary Students in Umuahia Education Zone of Abia State", International Journal of Research in Humanities and Social Studies, Vol. 3, No. 3, 2016, p. 10, https://www.ijrhss.org/ pdf/v3-i3/2.pdf (Access 05.10.2023).
[16] *ibid.*, p. 12.
[17] Miriam Fernandez, Lara S.G. Piccolo, Diana Maynard, Meia Wippoo, Christoph Meili, Harith Alani, "Talking Climate Change via Social Media: Communication, Engagement and Behaviour", Conference Paper. May 2016, doi:http://dx.doi.org/10.1145/2908131.2908167. (Access 02.10.2023).
[18] *ibid.*, p. 13.

interventions that lead to the desired changes in behaviour.[19]

Recycling Behaviour

Recycling can happen only with active consumer involvement. According to the classic recycling behaviour theory, an individual will become a recycler only after obtaining adequate facts about the effect on the environment, what can be done to lessen the negative impact and how to go about implementing ways of doing so.[20]

The high involvement theory stipulates that consumers should be keenly committed to collating the facts and statistics of recycling; their involvement will generate optimism and create a conviction in their mind about the process thus leading to a dedicated recycler. There is an exception to this method though, and that is the recycling rewards method. Recycling is bound to fail if it is dependent only on the rewards system and not on the individual's strong desire to do so.[21]

There seems to be no comparable way to the rewards and promotion method of ensuring that recycling is done on a regular basis even without any rewards.[22] This is so because sustainable recycling behaviour can occur only when there is high interest and motivation in the process among the community and it is not based only on theory.[23]

It has been noticed that once the rewards are taken away from individuals who do not have a high sense of involvement in the process, the recycling is discontinued.[24] Therefore, as is evident, there are limitations to this theory being followed since without any rewards or promotion, there is a lack of continuity in the process with no innate long-term change in the consumer.[25] An enduring recycling scheme can flourish with the rewards and promotion system because of the consequences it has on the consumers' psyche.[26]

[19] *ibid.*, p. 13.
[20] Marion Martin, Ian D. Williams, Martyn P. Clark, "Social, Cultural and Structural Influences on Household Waste Recycling: A Case Study", Resources, Conservation and Recycling, Vol. 48, No 4, 2006, p. 370, https://www.sciencedirect.com/science/article/abs/pii/S0921344906000218 (Access, 21.10.2023).
[21] Jacqueline Vaughn, Waste Management: A Reference Handbook, California, ABC-CLIO, 2009, p. 170.
[22] *ibid.*, p.171.
[23] Christine Thomas, "Public understanding and its effect on recycling performance in Hampshire and Milton Keynes", Resources, Conservation and Recycling, Vol. 32, No. 3-4, 2001, pp. 259-274. https://www.sciencedirect.com/science/article/abs/pii/S0921344901000659 (Access, 06.10.2023).
[24] Williams, op.cit., p. 131.
[25] Shaufique F. Sidique, Satish V. Joshi, Frank Lupi, "Factors Influencing the Rate of Recycling: An Analysis of Minnesota Counties", Resources, Conservation and Recycling, Vol. 54, No. 4, 2010, p. 245, https://doi.org/10.1016/j.resconrec.2009.08.006 (Access, 14.10.2023).
[26] Gonzalo Diaz Meneses, Palacio A Beerli, "Different Kinds of Consumer Response to the Reward Recycling Technique: Similarities at the Desired Routine Level", Asia Pacific Journal of Marketing and Logistics, Vol. 18, No. 1, 2006, p. 45, https://www.emerald.com/insight/content/doi/ 10.1108/ 13555 850610641082/full/html (Access, 22.10.2023).

On the other hand, recycling is becoming a common concept now and with its exclusivity becoming a thing of the past, is nearing the last stages of the innovation diffusion curve. Towards the end of this curve, since there is ample information available and the process is well established in the community, consumers are more amenable to adopting it.[27]

Studies Related to Recycling Behaviour

The last two decades have seen a resurgence in the field of recycling, leading to sizable research on the preservation of the environment and consumer recycling attitudes.[28] These parameters have been explained by several scholars and include awareness of consumers, what drives them towards this process, their mindset and interest in preserving the environment and the demography of this endeavour.[29]

As part of the research undertaken on this subject, links between conservation activities and the approach and interest of individuals in recycling have been looked into.[30] The study showed some interesting results. Those following the newer environmental hypotheses revealed that a link between a consumer's beliefs and his behaviour towards recycling and the environment shows an optimistic trend.[31] Other studies, though, profess that there is not much of a connection between values, behaviour and outlook of the consumer.[32]

The demographic studies show varying indecisive results as well. While a few studies show a relationship between socio-demographic elements and the conservation behaviour of consumers, other studies demonstrate that there is more connectivity between recycling and increased knowledge of the consumer.[33] The connection between recycling behaviour and the economic status of the consumer also showed a strong connection.[34]

On the other hand, these results have been contradicted by other scholars

[27] Sidique, Joshi, Lupi, op.cit., p.246.
[28] *ibid*., p. 247.
[29] Daniel Guerin, Jean Crete, Jean Mercier, "A Multilevel Analysis of the Determinants of Recycling Behavior in the European Countries", Social Science Research, Vol. 30, No. 2, 2001, p. 197, https://doi.org/10.1006/ssre.2000.0694 (Access 23.09.2023).
[30] Thomas, op.cit., p. 260.
[31] Lucas Reijnders, "A Normative Strategy for Sustainable Resource Choice and Recycling", Resources, Conservation and Recycling, Vol. 28, No. 1-2, 2000, p. 124, https://www.sciencedirect.com/science/article/abs/pii/S0921344999000373 (Access, 15.10.2023).
[32] Linda Derksen, John Gartrell, "The Social Context of Recycling", American Sociological Review, Vol. 58, No. 3, 1993, p. 435, https://doi.org/10.2307/2095910 (Access 16.10.2023).
[33] Diane M. Samdahl, Robert A. Robertson, "Social determinants of environmental concern: A specification and test of the model", Environment and Behavior, Vol. 21, No. 1, 1989, pp. 57-81, https://doi.org/10.1177/0013916589211004 (Access, 14.10.2023).
[34] Joanne Vining, Angela Ebreo, "What's Makes a Recycler? A Comparison of Recyclers and Non Recyclers", Environmental and Behavior, Vol. 22, No. 1, 1990, pp. 55-73, https://journals.sagepub.com/doi/abs/10.1177/0013916590221003 (Access, 13.10.2023).

in their studies.[35] The socio-demographic research, however, forms only a tiny fraction of the discrepancies on the subject.[36] Over the past few years, there have been mixed reactions to these reports, some of which are in accordance with the reports while others are contradictory.[37] Earlier studies averred that women, on the whole, show a keener awareness of the environment than men do.[38]

A different perspective, though, stated that men display a stronger bond between their usage of non-polluting products and their personal environmental beliefs than women.[39] In terms of gender, Bezzina and Dimech also found differences between man and women's recycling behaviour, however, in terms of recycling scheme preferences.[40] In this sense, women prefer more convenient ways of recycling than men.

There are conflicting findings on the economic status and literacy levels influencing environmental beliefs as well. It was considered that individuals with a high or medium income were predisposed towards adopting environmental practices.[41] These individuals were considered to be well-educated and thus expected to be more receptive to new ideas that could assist in saving the environment.[42] But the data obtained was not consistent with the theory and all income groups were found to be environmentally friendly, regardless of their income. Contrary to these findings, it was discovered that an average ecologically aware person is less educated and belongs to a lower socioeconomic class, which proved neither of the two predictors, income and education, to be true depicters of environmentally responsible behavior.[43]

The demographic data about age has changed as well over the years. Early

[35] Stuart Oskamp, Maura J. Harrington, Todd C. Edwards, Deborah L. Sherwood, Shawn M. Okuda, Deborah C. Swanson, "Factors Influencing Household Recycling Behaviour", Environment and Behavior, Vol. 23, No. 4, 1991, p. 500, https://doi.org/10.1177/00139165912340 (Access, 11.10.2023).
[36] Guerin, Crete, Mercier, op.cit., p. 198.
[37] Leila H. Essoussi, Jonathan Linton, "New or Recycled Products: How Much are Consumers Willing to Pay?", Journal of Consumer Marketing, Vol. 27, No. 5, 2010, pp. 459-460, https://doi.org/10.1108/07363761011063358 (Access 05.10.2023).
[38] May Aung, Martha L. Arias, "Examining Waste Management in San Pablo del Lago, Ecuador: A Behavioural Framework", Management of Environmental Quality: An International Journal, Vol. 17, No. 6, 2006, pp. 744-745, https://doi.org/10.1108/14777830610702557 (Access 26.09.2023).
[39] Ingo Balderjahn, "Personality Variables and environmental Attitudes as Predictors of Ecologically Responsible Consumption Patterns", Journal of Business Research, Vol. 17, No. 1, 1988, p. 52.
[40] Frank H. Bezzina, Stephen Dimech, "Investigating the Determinants of Recycling Behaviour in Malta", Management of Environmental Quality: An International Journal, Vol. 22, No. 4, 2001, pp. 464-465, https://doi.org/10.1108/14777831111136072 (Access 26.09.2023).
[41] Daniel Palmer, "The green revolution: are consumers buying it?", https://www.ausfoodnews.com.au/2008/10/02/the-green-revolution-are-consumers-buying-it.html (Access, 22.10.2023).
[42] Richard Katzev, Gerald Blake, Barry Messer, "Determinants of Participation in Multi-Family Recycling Programs", Journal of Applied Social Psychology, Vol. 23, 1993, p. 378, https://onlinelibrary.wiley.com/doi/10.1111/j.1559-1816.1993.tb01093.x (Access, 15.10.2023).
[43] Sandahl, Robertson, op.cit., pp. 58.

research showed that an ecologically aware individual was of an age younger than the average.[44] However recent research negates these opinions and shows that older than average individuals tend to show their proclivity towards being environmentally aware.[45]

Despite all the conflicting data to come out of various research in the field, the parameters stated earlier somewhat have an influence on the subject.[46] However, it is almost universally accepted by scholars that the awareness, knowledge, values, and outlook of a community have more impact than demographics.[47]

Other aspects that are considered fairly important and have been studied extensively are importance and convenience.[48] Importance refers to the extent to which an individual is interested in environmentally sound policies and principles.[49] It shows whether such individuals think of such practices as being good for them or the community in its entirety.[50] Inconvenience is the term used when a consumer knows a certain practice is harmful to the environment but continues to follow it regardless as it causes him some degree of difficulty. Such individuals, though agreeing with recycling in principle, may find it inconvenient to be practised on a personal basis.[51]

As an example, despite knowing that individually packaged single-serve juice or milk packs are more problematic for ecology than larger packs, the consumer might still opt for them as they are more convenient personally. Therefore, it is clear that ecological awareness should be created among

[44] Kent D. van Liere, Riley E. Dunlap, "The Social Bases Of Environmental Concern: A Review of Hypotheses, Explanations and Empirical Evidence", Public Opinion Quarterly, Vol. 44, 1981, pp. 181-197, https://www.jstor.org/stable/2748427 (Access, 01.10.2023).
[45] Georgina Davis, Frances O'Callaghan, Kathy Knox, "Sustainable Attitudes and Behaviours Amongst a Sample of Non-academic Staff – A Case Study from an Information Services Department, Griffith University, Brisbane", International Journal of Sustainability in Higher Education, Vol. 10, No. 2, 2009, pp. 138-140, https://doi.org/10.1108/14676370910945945 (Access 14.10.2023).
[46] Jacob Hornik, Joseph Cherian, Michelle Madansky, Chem Narayana, "Determinants of Recycling Behavior: A Synthesis of Research Results", Journal of Socio-Economics, Vol. 24, No. 1, 1995, p. 108.
[47] Kara Chan, "Market Segmentation of Green Consumers in Hong Kong", Journal of International Consumer Marketing, Vol. 12, No. 2, 1999, pp. 10-11, https://doi.org/10.1300/J046v12n02_02 (Access 02.10.2023).
[48] Maria Anderson, Chris von Borgstede, "Differentiation of Determinants of Low-Cost and High-Cost Recycling", Journal of Environmental Psychology, Vol. 30, No. 4, 2010, pp. 402-408, https://doi.org/10.1016/j.jenvp.2010.02.003 (Access 25.09.2023).
[49] Todd Kennedy Shackelford, "Recycling, Evolution and the Structure of Human Personality", Personality and Individual Differences, Vol. 41, No. 8, 2006, p. 1553, https://www.sciencedirect.com/science/article/abs/pii/S0191886906003084?via%3Dihub (Access, 17.10.2023).
[50] Michel Laroche, Jasmin Bergeron, Guido Barbaro-Forleo, "Targeting Consumers Who Are Willing To Pay More For Environmentally Friendly Products", Journal of Consumer Marketing, Vol. 18, No. 6, 2001, p. 510, https://www.emerald.com/insight/content/doi/10.1108/EUM0000000006155/full/html (Access, 11.10.2023).
[51] Shackelford, op.cit., p. 1553.

consumers.[52] Indeed, raising consumer knowledge is according to Laroche, Bergeron, and Barbaro-Forleo, a shrewd strategy for boosting a corporation's alleged convenience and validating its credibility as an environmentally friendly company, this is what is called eco-literacy; which is an indicator for pinpointing a consumer's proficiency in knowing the concepts and attitudes pertaining to ecological sensitivity.[53]

Laroche, Bergeron, and Barbaro-Forleo have established that eco-literacy is directly related to overall environmental attitude and action.[54] It was argued in literature that possessing recycling knowledge is a prerequisite for green behaviour, although it is not the only factor.[55] Correct eco-friendly behaviour is largely defined by the knowledge one possesses on the issue, but it is also determined by parameters such as intentions, context, values and lifestyle approaches.[56] Intentions or motivations are largely defined by the amount of information one has on the matter, hence being knowledgeable on environmental issues should be a presupposition.[57] Nonetheless, know-how is necessary, as Witter and Young[58] remark, for understanding and applying those actions that can transform intention into solid action or behaviour. Therefore, Alhumoud suggests that a recycling mentality needs to be developed so as to effectively manage waste and boost urban growth.[59] In this sense, it can be said that governmental policymaking that provides adequate social knowledge may have the desired impact on people's behaviour.

Barr's work focused on the horizontal model of how information is disseminated, looking at issues like the objectivity of scientific scholarship, the role of rhetorical contexts, and the adaptation of environmental issues at a local level.[60] Eden's work is a critique of this unilateral model of information

[52] Clare D'Souza, Mehdi Taghian, Peter Lamb, "An Empirical Study on the Influence of Environmental Labels on Consumers", Corporate Communications: An International Journal, Vol. 11, No. 2, 2006, p. 164, https://doi.org/10.1108/13563280610661697 (Access 16.10.2023).
[53] Laroche, Bergeron, Barbaro-Forleo, op.cit., p. 511.
[54] *ibid*., p. 512.
[55] Veronica Sharp, Sara Giorgi, David C. Wilson, "Delivery and Impact of Household Waste Prevention Intervention Campaigns (At the Local Level)", Waste Management & Research, Vol. 28, No. 3, 2010, p. 257, https://doi.org/10.1177/0734242X10361507 (Access, 22.10.2023).
[56] Elham Rahbar, Nabsiah Abdul Wahid, "Investigation Of Green Marketing Tools' Effect On Consumers' Purchase Behaviour", Business Strategy Series, Vol. 12, No. 2, 2011, p. 75, https://www.academia.edu/48822924/Impactof_Green_Marketing_Mixon_Customers_Green_Purchasing_Intention (Access, 18.10.2023).
[57] Sharp, Giorgi, Wilson, op.cit., p.258.
[58] Charlotte F. Young, John A. Witter, "Developing Effective Brochures for Increasing Knowledge of Environmental Problems: The Case of the Gypsy Moth", Journal of Environmental Education, Vol. 25, No. 3, 1994, p. 29, https://doi.org/10.1080/00958964.1994.9941955 (Access, 18.10.2023).
[59] Jasem M. Alhumoud, "Municipal Solid Waste Recycling in the Gulf Co-operation Council States", Resources, Conservation and Recycling, Vol. 45, No. 2, 2005, pp. 142-143, https://doi.org/10.1016/j.resconrec.2005.01.010 (Access 23.09.2023).
[60] Stewart Barr, "Strategies for Sustainability: Citizens and Responsible Environmental Behaviour", Area, Vol. 35, No. 3, 2003, p. 229, https://doi.org/10.1111/1475-4762.00172 (Access 27.09.2023).

spreading, arguing that it only focuses on how science is translated into policies and on how the latter shapes social attitudes.[61] For MacNaghten and Jacobs, their supposedly objective model for change of behaviour is premised on the fact that if people do not take action, then their lack of knowledge is to be blamed.[62] In the same vein, Burgess, Harrison and Filius established that for sustainability to be effective, both people and organisations need to realise their role in effecting pro-ecological change through their actions.[63]

For Eden, the fact that environmental problems have entered the realm of science and politics implies that individuals no longer have the power to compete with scientific knowledge, hence they solely depend on their own experiences and capacities to form attitudes and act.[64] In this context, Barr claimed that the identification of environmental concerns ineluctably brings its politicisation; science can no longer be independent or impartial in policymaking actions, hence, people are more likely to search for knowledge that is of local proximity and relevance.[65]

Nonetheless, even in cases where scientific information is defied, it is still the case that information that is neither scientific nor politicised still is deciphered in terms of individual past experiences, through their own thinking framework.[66] Barr has also indicated that people tend to correlate the mundane with the social, in order to understand incoming knowledge, they actually refer to "rhetorical situation" as a significant factor that helps decipher ecology-focused knowledge. Thus, an adequate amount of research has been dedicated to exploring the relationship between information, its sources and its receivers, as Barr asserts.[67]

The effect of importance and inconvenience on recycling was examined and it was discovered that the belief that recycling was inconvenient led to consumers not following the precept.[68] However, the knowledge about the importance of recycling did not lead to any link with recycling behaviour in any noteworthy manner. It is obvious from this that inconvenience plays a greater role than the awareness of the importance of the choice of recycling

[61] Sally Eden, "Environmental Issues: Knowledge, Uncertainty and the Environment", Progress in Human Geography, 22, 1998, p. 426, https://doi.org/10.1191/030913298676818153 (Access 05.10.2023).
[62] Phil Macnaghten, Michael Jacobs, "Public Identification with Sustainable Development: Investigating Cultural Barriers to Participation", Global Environmental Change, Vol. 7, 1997, p. 9, https://www.sciencedirect.com/science/article/abs/pii/S0959378096000234 (Access, 17.10.2023).
[63] John Burgess, Carolyn Harrison, Philip Filius, "Environmental Communication and the Cultural Politics of Environmental Citizenship", Environment and Planning A, Vol. 30, 1998, p. 1446, https://journals.sagepub.com/doi/pdf/10.1068/a301445 (Access 27.09.2023).
[64] Eden, op.cit., p. 427.
[65] Barr, op.cit., p. 230.
[66] *ibid*, p. 230.
[67] *ibid*, pp. 230-231.
[68] Rahbar, Wahid, op.cit., p. 75.

activities.[69]

Methodology

The main aim of this study is to examine the effects of climate change anxiety, knowledge, attitude and behaviours on recycling behaviour. To achieve this aim university students residing in the UK were chosen the examine in this study. Therefore, the population of this study is the students who are currently studying in the UK. By the year 2022, there are 2,182,560 students studying in the UK. At 95% reliability and 7% error margin, the minimum sample size for this study is determined as 196. A total of 250 questionnaires were sent out and 220 were returned. Therefore, 220 questionnaires were included in the analysis. The study was conducted in London, UK.

In this study, 5 different measurement tools were used. The first one is the Climate Change Anxiety scale developed by Clayton and Karazsia.[70] This scale has 13 items and two subscales namely, cognitive impairment and functional impairment.

The second scale is the Climate Change Knowledge scale which was developed by Tobler et al.[71] This scale has 19 questions and 3 subscales namely, climate change science, climate change causes and change impacts climate.

The third scale is the Climate Change Attitude scale which was developed by Ezeudu, Ezeudu and Sampson.[72] This scale has 16 questions and no subscale.

The fourth scale used in this study is the Climate Change Behaviour scale developed by Hepp et al.[73] This scale has 24 questions and 2 subscales namely, distress and impairment.

The fifth scale used in this study is the Recycling Behaviour used in the

[69] John A. McCarty, L. J. Shrum, "The Recycling of Solid Wastes: Personal Values, Value Orientations, and Attitudes About Recycling as Antecedents of Recycling Behaviour", Journal of Business Research, Vol. 30, No. 1, 1994, p. 54, https://www.sciencedirect.com/science/article/pii/S0301479721022222 (Access, 26.10.2023).
[70] Susan Clayton, Bryan T. Karazsia, "Development and Validation of a Measure of Climate Change Anxiety", Journal of Environmental Psychology, Vol. 69, 2020, p. 101, doi:10.1016/j.jenvp. 2020.1014 34 (Access 12.10.2023).
[71] Christina Tobler, Vivianne H. M. Visschers, Michael Siegrist, "Consumers' Knowledge About Climate Change", Climatic Change, Vol. 114, No. 2, 2012, pp. 189-209, https://link.springer.com/article/10.1007/s10584-011-0393-1 (Access, 04.10.2023).
[72] Ezeudu, Ezeudu, Sampson, op.cit., p. 12.
[73] Johanna Hepp, Sina A. Klein, Luisa Horsten, Jana Urbild, Sean Patrick Lane, "The Climate Change Distress and Impairment Scale: Introduction of the Measure and First Findings on Pro-Environmental Behavior", August 2022, doi:10.31234/osf.io/j6pbu (Access 04.10.2023).

study of Muniandya and Anuar[74]. This scale has 17 questions and 5 subscales namely, attitude, environmental beliefs, subjective norm, perceived behavioural control, and recycling materials.

In data analysis, firstly frequency analysis was performed to determine the demographic characteristics of the participants. Next, the KMO and Bartlett test was performed to understand the suitability of the data set for factor analysis. Then, factor analysis and reliability analyses were applied to the scales. Following this, descriptive statistics for the scales were given and correlation and regression analyses were conducted to determine the relationship between the scales and their sub-dimensions.

Data Analysis

Table 1. Demographic Characteristics of the Participants

		Percentage (%)
Gender	Male	54
	Female	46
Age	18-25	86
	26-35	11
	36-45	3
Marital status	Single	92
	Married	8

According to the results of the analysis, 54% of the participants are male and 46% are female. The majority of the participant students are between the ages of 18-25 (86%) and single individuals (92%).

Firstly, the KMO and Bartlett test was performed to understand the suitability of the data set for factor analysis. Then, factor analysis and reliability analyses were applied to the scales. Following this, descriptive statistics for the scales were given and correlation and regression analyses were conducted to determine the relationship between the scales and their sub-dimensions.

Table 2. KMO and Barlett Test of Climate Change Knowledge Scale

Kaiser-Meyer-Olkin (KMO)		**,837**
Bartlett Test	Approx. Chi-Square	3047,356
	df	133
	Sig.	**,000**

As a result of the KMO and Barlett test analysis, the KMO test result of the Climate Change Knowledge scale was 0.837; the Bartlett test result was also found statistically significant (p=0.00; p<0.05). According to this, there is a high level of correlation between the variables in the scale and the data

[74] Gangga Muniandya, Marhana Mohamed Anuar, "Determinants of Academicians Recycling Behaviour", Management Science Letters, Vol. 10, 2020, p. 1600, doi:10.5267/j.msl.2019.12.007 (Access 14.09.2023).

set is suitable for factor analysis. Below are the results of the factor and reliability analysis applied to the scale:

Table 3. Factor and Reliability Analysis Results of Climate Change Knowledge Scale

Factor name	Factor items	Factor weights	Reliability (Cronbach Alpha) (α)
Climate Change Science	Burning oil, among other things, produces carbon dioxide (CO_2).	,809	.865
	CO_2 is a greenhouse gas.	,880	
	Greenhouse gases partly keep the Earth's heat from escaping into space.	,897	
	CO_2 is harmful to plants.	,899	
	The ozone hole is the main cause of the greenhouse effect.	,835	
	At the same quantity, CO_2 is more harmful to the climate than methane.	,822	
Climate Change Causes	The global CO_2 concentration in the atmosphere has increased during the past 250 years.	,831	.889
	The increase of greenhouse gasses is mainly caused by human activities.	,893	
	With a high probability, the increase of CO_2 is the main cause of climate change.	,844	
	Climate change is mainly caused by natural variations.	,810	
	The last century's global increase in temperature was the largest during the past 1000 years.	,834	
	The decade from 2000 to 2009 was warmer than any other decade since 1850.	,878	
	The amount of CO_2 in the atmosphere has reached the same levels within the past 650,000 years.	,837	
Change Impacts Climate	The majority of climate scientists expect an increase in extreme events, such as droughts, floods and storms.	,822	.876
	The majority of climate scientists expect a warmer climate to increase the melting of polar ice, which will lead to an overall rise in the sea level.	,865	
	The majority of climate scientists expect a cooling-down of the climate.	,825	

	The majority of climate scientists expect a warmer climate to increase water evaporation, which will lead to an overall decrease in the sea level.	,910	
	The majority of climate scientists expect the climate to change evenly all over the world.	,904	
	The majority of climate scientists expect a precipitation increase in every region worldwide.	,890	
Total Climate Change Knowledge			.880

According to the result of factor analysis, there are 3 sub-dimensions of the Climate Change Knowledge scale. The reliability coefficient of the total scale was determined as 0.880, which means that the scale is highly reliable. The reliability coefficients of the sub-dimensions of the scale also vary between 0.865 and 0.889.

Table 4. KMO and Barlett Test of Climate Change Anxiety Scale

Kaiser-Meyer-Olkin (KMO)		**,889**
Bartlett Test	Approx. Chi-Square	2057,748
	df	156
	Sig.	**,000**

As a result of the KMO and Barlett test analysis, the KMO test result of the Climate Change Anxiety scale was 0.889; the Bartlett test result was also found statistically significant (p=0.00; p<0.05). According to this, there is a high level of correlation between the variables in the scale and the data set is suitable for factor analysis. Below are the results of the factor and reliability analysis applied to the scale:

Table 5. Factor and Reliability Analysis Results of the Climate Change Anxiety Scale

Factor name	**Factor items**	**Factor weights**	**Reliability (Cronbach Alpha) (α)**
Functional Impairment	Thinking about climate change makes it difficult for me to sleep	,729	.847
	I have nightmares about climate change	,780	
	My concerns about climate change make it hard for me to have fun with my family or friends	,865	
	I have problems balancing my concerns about sustainability with the needs of my family	,879	
	My concerns about climate change interfere with my ability to get work or school assignments done	,835	

	My concerns about climate change undermine my ability to work to my potential	,812	
	My friends say I think about climate change too much	,786	
Cognitive Impairment	Thinking about climate change makes it difficult for me to concentrate	,849	.869
	I find myself crying because of climate change	,889	
	I think, "Why cannot I handle climate change better?"	,839	
	I go away by myself and think about why I feel this way about climate change	,830	
	I write down my thoughts about climate change and analyse them	,804	
	I think, "Why do I react to climate change this way?"	,839	
Total Climate Change Anxiety			.860

According to the result of factor analysis, there are 2 sub-dimensions of the Climate Change Anxiety scale. The reliability coefficient of the total scale was determined as 0.860, which means that the scale is highly reliable.

Table 6. KMO and Barlett Test of Climate Change Attitude Scale

Kaiser-Meyer-Olkin (KMO)		**,883**
Bartlett Test	Approx. Chi-Square	3082,748
	df	356
	Sig.	**,001**

As a result of the KMO and Barlett test analysis, the KMO test result of the Climate Change Attitude scale was 0.883; the Bartlett test result was also found statistically significant (p=0.01; p<0.05). According to this, there is a high level of correlation between the variables in the scale and the data set is suitable for factor analysis. Below are the results of the factor and reliability analysis applied to the scale:

Table 7. Factor and Reliability Analysis Results of Climate Change Attitude Scale

Factor name	**Factor items**	**Factor weights**	**Reliability (Cronbach Alpha) (α)**
Climate Change Attitude	I believe that there is still plenty of time to prepare for climate change problems.	,802	.880
	I think climate change will bring a period of great adversity.	,806	
	I am seriously concerned with what problem climate change may bring.	,763	
	I think no special preparation is needed for climate change.	,893	

	I believe climate change will pass like other environmental problems, so there is no need to worry.	,780
	I am working hard to educate my friends on climate change.	,849
	I am spreading news of climate change within my area.	,833
	I am preparing myself to manage the effects of climate change.	,897
	I always ask questions about climate change.	,903
	I read available information on climate change.	,920
	I preach to my friends against bush burning to prevent further global climate change.	,859
	I do not think that the global climate is changing.	,807
	I think responding to climate change will be a waste of my time.	,830
	I think participating in climate change-related issues will lead to a waste of national resources.	,820
	I believe climate change will only affect those who cause it.	,833
Total Climate Change Attitude		.880

According to the result of factor analysis, there is one sub-dimension of the Climate Change Attitude scale. The reliability coefficient of the total scale was determined as 0.880, which means that the scale is highly reliable.

Table 8. KMO and Barlett Test of Climate Change Distress and Impairment Scale

Kaiser-Meyer-Olkin (KMO)		**,920**
Bartlett Test	Approx. Chi-Square	3922,743
	df	216
	Sig.	**,000**

As a result of the KMO and Barlett test analysis, the KMO test result of the Climate Change Distress and Impairment scale was 0.920; the Bartlett test result was also found statistically significant (p=0.00; p<0.05). According to this, there is a high level of correlation between the variables in the scale and the data set is suitable for factor analysis. Below are the results of the factor and reliability analysis applied to the scale:

Table 9. Factor and Reliability Analysis Results of Climate Change Behaviour Scale

Factor name	**Factor items**	**Factor weights**	**Reliability (Cronbach Alpha) (α)**
Distress	I feel angry when I see how little is done to combat climate change.	,920	
	When I think about climate change, I worry about the future.	,929	
	I am not sad about climate change. (r)	,890	
	I am enraged that we have missed many chances to stop climate change.	,979	
	I do not fear for my future on this planet. (r)	,935	
	News about climate change makes me feel depressed.	,917	
	I am not mad when others damage the climate. (r)	,986	
	The uncertainty about how climate change will progress scares me.	,892	
	I feel sad that climate change is causing people and animals to suffer.	,897	.922
	I do not get upset when others ignore climate change. (r)	,889	
	I am scared that people will lose their homes because of climate change.	,920	
	I feel sad that some parts of the environment will not recover from the effects of climate change	,802	
	I am not angry that some countries have missed their climate protection goals. (r)	,850	
	The impact that climate change has had on the planet saddens me.	,950	
	I feel carefree when I think about climate change. (r)	,932	
Impairment	Climate change drains all my energy.	,749	
	My thoughts and feelings about climate change do not affect how well I sleep. (r)	,854	
	When I think about climate change, I get a headache or stomach ache.	,847	
	Because of climate change, I am overwhelmed by everyday activities.	,940	
	My thoughts and feelings about climate change do not negatively impact my everyday life. (r)	,804	.901
	I have no trouble mentally tuning out climate change. (r)	,930	
	Constant discussions about climate change are affecting my relationships.	,904	
	When I think about climate change, I cannot bring myself to work/study.	,839	
Total Climate Change Distress and Impairment			.912

According to the result of factor analysis, there are 2 sub-dimensions of the Climate Change Distress and Impairment scale. The reliability coefficient of the total scale was determined as 0.912, which means that the scale is highly reliable.

Table 10. KMO and Barlett Test of Recycling Behaviour Scale

Kaiser-Meyer-Olkin (KMO)		**,830**
Bartlett Test	Approx. Chi-Square	2032,188
	df	216
	Sig.	**,000**

As a result of the KMO and Barlett test analysis, the KMO test result of the Recycling Behaviour scale was 0.830; the Bartlett test result was also found statistically significant ($p=0.00$; $p<0.05$). According to this, there is a high level of correlation between the variables in the scale and the data set is suitable for factor analysis. Below are the results of the factor and reliability analysis applied to the scale:

Table 11. Factor and Reliability Analysis Results of Recycling Behaviour Scale

Factor name	**Factor items**	**Factor weights**	**Reliability (Cronbach Alpha) (α)**
Attitude	I think practising sustainable waste management is a good idea	,804	.810
	I think practising sustainable waste management is positive.	,816	
Environmental Beliefs	Continued use of chemicals on campus will damage the environment.	,830	.859
	Shortages of some important resources will occur soon shortly.	,795	
	Global warming is becoming a problem.	,899	
	Ozone depletion is an environmental problem.	,878	
	The availability of clean water will become a problem in the future	,890	
Subjective Norm	My family think that I should practice sustainable waste management.	,833	.834

	My colleagues think that I should practice sustainable waste management on campus.	,865	
	Most people who are important to me think that I should participate in sustainable waste management activities on campus.	,825	
Perceived Behavioural Control	The decision to engage myself in campus sustainability is completely up to me.	,910	.901
	For me, to practice waste management at my workplace would be an easy task.	,893	
	I have complete control in deciding whether or not to practice sustainable waste management.		
	If wanted to, I could manage sustainable waste management at campus.	,926	
Recycling Materials	I recycle paper.	,926	.927
	I recycle glass.	,928	
	I recycle plastic containers.	,934	
Total Recycling Behaviour			.892

According to the result of factor analysis, there are 5 sub-dimensions of the Recycling Behaviour scale. The reliability coefficient of the total scale was determined as 0.892, which means that the scale is highly reliable. The reliability coefficients of the sub-dimensions of the scale also vary between 0.810 and 0.927.

Table 12. Descriptive Statistics

		N	Min.	Max.	Average	Std. deviation
Climate Change Knowledge Scale	Climate Change Science	220	1,00	5,00	4,18	,9763
	Climate Change Causes	220	1,00	5,00	3,75	1,2455
	Change Impacts Climate	220	1,00	5,00	3,90	1,3456
	Total - Climate Change Knowledge Scale	220	1,00	5,00	3,94	1,3827
Climate Change Anxiety Scale	Functional Impairment	220	1,00	5,00	4,20	,5633
	Cognitive Impairment	220	1,00	5,00	4,10	,2467
	Total - Climate Change Anxiety Scale	220	1,00	5,00	4,15	,3720
Climate Change Attitude Scale	***Climate Change Attitude***	220	1,00	5,00	4,20	,3455
Climate Change Behaviour Scale	Distress	220	1,00	5,00	3,82	1,3399
	Impairment	220	1,00	5,00	3,90	,9223
	Total - Climate Change Behaviour Scale	220	1,00	5,00	3,86	1,2022
Recycling Behaviour Scale	Attitude	220	1,00	5,00	3,90	,8902
	Environmental Beliefs	220	1,00	5,00	3,92	,9283
	Subjective Norm	220	1,00	5,00	4,00	,9373
	Perceived Behavioural Control	220	1,00	5,00	3,10	1,3820
	Recycling Materials	220	1,00	5,00	4,23	1,2839
	Total - Recycling Behaviour Scale	220	1,00	5,00	3,83	,9202

The table above includes descriptive statistics for the scales and their sub-dimensions. According to the results, the "Climate Change Science" sub-dimension (4,18) was the sub-dimension with the highest score among the Climate Change Knowledge scale sub-dimensions. The "Recycling Materials" sub-dimension (4,23) was the sub-dimension with the highest score among the Recycling Behaviour scale sub-dimensions.

Table 13. Correlation Analysis Results

		Attitude	Environmental Beliefs	Subjective Norm	Perceived Behavioural Control	Recycling Materials	Total - Recycling Behaviour Scale
Climate Change Science	Pearson (r)	,743	,355	**,489****	**,467****	**,432****	,356
	Sig. (p)	,090	,145	**,000**	**,036**	**,040**	,232
Climate Change Causes	Pearson (r)	,467	,479	,463	,748	,340	,854
	Sig. (p)	,101	,467	,234	,120	,358	,124
Change Impacts Climate	Pearson (r)	**,284****	**,564****	,899	,442	,332	,468
	Sig. (p)	**,010**	**,004**	,141	,320	,230	,355
Total - Climate Change Knowledge Scale	Pearson (r)	,468	,460	,224	,131	,324	,546
	Sig. (p)	,096	,248	,422	,139	,221	,354
Information management - total	Pearson (r)	,240	,672	,321	,331	,113	,234
	Sig. (p)	,357	,343	,144	,345	,334	,244
Functional Impairment	Pearson (r)	,799	,566	,125	,564	**,466****	,574
	Sig. (p)	,678	,067	,099	,245	**,008**	,053
Cognitive Impairment	Pearson (r)	,789	,543	,579	,356	,325	,532
	Sig. (p)	,568	,368	,364	,467	,454	,134
Total - Climate Change Anxiety Scale	Pearson (r)	,327	,125	,456	,356	,367	,547
	Sig. (p)	,080	,099	,125	,689	,563	,059
Climate Change Attitude	Pearson (r)	**,333****	,568	,374	,394	**,457****	,446
	Sig. (p)	**,032**	,643	,345	,545	**,006**	,072
Distress	Pearson (r)	,535	,546	,535	,570	,643	,467
	Sig. (p)	,174	,357	,677	,336	,245	,090
Impairment	Pearson (r)	,745	,546	,897	,367	,550	,268
	Sig. (p)	,167	,357	,488	,336	,245	,090
Total - Climate Change Behaviour Scale	Pearson (r)	,333	,568	,374	,394	,457	,446
	Sig. (p)	,062	,643	,345	,545	,356	,072

According to the correlation analysis results, there is a positive and statistically significant relationship between the climate change knowledge scale sub-dimension "climate change science" and the recycling behaviour scale "subjective norm" sub-dimension (r=.489, p=0.000<0.05). There is a positive and statistically significant relationship between the climate change knowledge scale sub-dimension "climate change science" and the recycling behaviour scale "perceived behavioural control" sub-dimension (r=.467,

p=0.036<0.05). There is also a positive and statistically significant relationship between the climate change knowledge scale sub-dimension "climate change science" and the recycling behaviour scale "recycling materials" sub-dimension (r=.432, p=0.040<0.05).

It is seen that there is a positive and statistically significant relationship between the climate change knowledge scale sub-dimension "change impacts climate" and the recycling behaviour scale "attitude" sub-dimension (r=.284, p=0.010<0.05). There is also a positive and statistically significant relationship between the climate change knowledge scale sub-dimension "change impacts climate" and the recycling behaviour scale "environmental beliefs" sub-dimension (r=.564, p=0.004<0.05).

There is a positive and statistically significant relationship between the climate change anxiety scale sub-dimension "functional impairment" and the recycling behaviour scale "recycling materials" sub-dimension (r=.466, p=0.008<0.05).

There is a positive and statistically significant relationship between the climate change attitude scale and the recycling behaviour scale "attitude" sub-dimension (r=.333, p=0.032<0.05). There is also a positive and statistically significant relationship between the climate change attitude scale and the recycling behaviour scale "recycling materials" sub-dimension (r=.457, p=0.006<0.05).

Table 14. Regression Analysis Results

	R2	β	Sig (p)
Subjective norm ← Climate change science	.145	.573	.012
Recycling materials ← Climate change science	.456	.345	.001
Attitude ← Climate change attitude	.363	.350	.030
Recycling materials ← Climate change attitude	.242	.678	.008

According to the results of the regression analysis, the "climate change science" sub-dimension of the climate change knowledge scale has a statistically significant positive effect on the "subjective norm" sub-dimension of the recycling behaviour scale (β=.573, p=.012<0.05). Again, the "climate change science" sub-dimension of the climate change knowledge scale has a statistically significant positive effect on the "recycling materials" sub-dimension of the recycling behaviour scale (β=.345, p=.001<0.05).

At the same time, "the climate change attitude" total scale has a statistically significant and positive effect on the "attitude" sub-dimension of the recycling behaviour scale (β=.350, p=.030<0.05). "The climate change attitude" total scale has a statistically significant and positive effect on the "recycling materials" sub-dimension of the recycling behaviour scale (β=.678, p=.008<0.05).

Discussion and Conclusion

The main aim of this study was to examine the effects of climate change anxiety, knowledge, attitude and behaviours on recycling behaviour. To achieve this aim, university students, residing in the UK were chosen the examine in this study. Therefore, the population of this study was determined as the students who are currently studying in the UK. At 95% reliability and 7% error margin, the minimum sample size for this study is determined as 196.

A total of 250 questionnaires were sent out and 220 were returned. Therefore, 220 questionnaires were included in the analysis. The study was conducted in London, UK. In this study, 5 different measurement tools were used. In the analysis, first of all, factor analysis was carried out for each scale used in this study. After, descriptive statistics, mean-median analysis, was carried out to show answers given to all scales used in this study. Following these analyses, correlation and regression analyses were computed to find the possible effects of climate change anxiety, knowledge, attitude and behaviours on recycling behaviour.

Results showed that, there is a positive and statistically significant relationship between the climate change knowledge scale sub-dimension "climate change science" and the recycling behaviour scale "subjective norm" sub-dimension; climate change knowledge scale sub-dimension "climate change science" and the recycling behaviour scale "perceived behavioural control" sub-dimension; climate change knowledge scale sub-dimension "climate change science" and the recycling behaviour scale "recycling materials" sub-dimension; climate change knowledge scale sub-dimension "change impacts climate" and the recycling behaviour scale "attitude" sub-dimension; climate change knowledge scale sub-dimension "change impacts climate" and the recycling behaviour scale "environmental beliefs" sub-dimension; climate change anxiety scale sub-dimension "functional impairment" and the recycling behaviour scale "recycling materials" sub-dimension; climate change attitude scale and the recycling behaviour scale "attitude" sub-dimension; climate change attitude scale and the recycling behaviour scale "recycling materials" sub-dimension.

According to the results of the regression analysis, the "climate change science" sub-dimension of the climate change knowledge scale has a statistically significant positive effect on the "subjective norm" sub-dimension of the recycling behaviour scale; "climate change science" sub-dimension of the climate change knowledge scale has a statistically significant positive effect on the "recycling materials" sub-dimension of the recycling behaviour scale; "the climate change attitude" total scale has a statistically significant and positive effect on the "attitude" sub-dimension of the

recycling behaviour scale; "the climate change attitude" total scale has a statistically significant and positive effect on the "recycling materials" sub-dimension of the recycling behaviour scale.

As mentioned in the literature correct eco-friendly behaviour is largely defined by the knowledge one possesses on the issue, but it is also determined by parameters such as intentions, context, values and lifestyle approaches.[75] Intentions or motivations are largely defined by the amount of information one has on the matter, hence being knowledgeable on environmental issues should be a presupposition.[76] In this study, it is also proved that knowledge has a significant effect on the recycling behaviour of people. Nonetheless, know-how is necessary, as Witter and Young[77] remark, for understanding and applying those actions that can transform intention into solid action or behaviour. This is also proved in this study. It is found that climate change attitude plays an important role in people's recycling behaviour. Nevertheless, the findings of this study showed that climate change anxiety is not as important as other factors in people's recycling behaviour. Based on the results it can be said that increasing knowledge about climate change can increase the recycling behaviour of the people.

Based on the results next study can be done on how to increase knowledge on climate change and climate crisis. In addition, the role of education on climate change can also be examined in the next studies.

[75] Rahbar, Wahid, op.cit., p. 76.
[76] Sharp, Giorgi, Wilson, op.cit., p. 258.
[77] Young, Witter, op.cit., p. 29.

CLIMATE CHANGE AND ITS REFLECTIONS IN TURKISH MEDIA

Hüseyin Çelik[1]

Introduction

After the universe was formed, galaxies, suns, planets and other celestial bodies came into being. This process, which lasts millions of years, consists of continuous change. The universe, which emerged as a result of the Big Bang, was formed approximately 14 billion years ago as a result of an explosion from a very dense and hot point. This situation consists of the universe exploding from an entity, which is expressed as a particular unity, and revealing billions of entities as a result of the big bang. Since the formation of the universe, called the Blanc period, four fundamental forces (gravity, electromagnetic, strong and weak forces) have come together in a particular formation. First the gravitational force, then the others are separated. The separation of forces began to cool the universe, and this cooling caused certain anomalies in the universe. These anomalies caused distortions. These symmetry disruptions have caused various topological defects to occur in the universe. As a result of topological distortions in the universe, symmetrical distortions, zero-dimensional monopoles and one-dimensional string structures have been formed[2]. The universe is constantly expanding. These expansions are like inflating a balloon. What are the mechanisms that inflate this balloon? Thus, what kind of theory can be created that combines the four fundamental forces? Various theories and approaches have been created to answer these questions[3].

The Solar System is a system located near the center of the Milky Way galaxy, one of many galaxies. In this system, there are eight planets, 150 satellites, 5 dwarf planets and the satellites of these planets together with millions of celestial bodies. Planets are round due to the gravitational effect. Everything is pulled equally to the center by the effect of gravity. Thus the planets are held together. The planets rotate both around themselves, around the sun, and within the Milky Way galaxy together with the sun. The Earth consists of a solid crust, active or inactive volcanoes, mountains, valleys, plains, plateaus and similar landforms. On the other hand, oceans make up

[1] Profesor, Aydin Adnan Menderes University Communication Faculty, Türkiye.
[2] Gültekin, Nur ve Can Aktaş (2023) "Creation Field Teoride Yüksek Boyutlu Kaluza-Klein Uzay-Zamanı İçin Bazı Topolojik Kusurlar "Çanakkale Onsekiz Mart Üniversitesi Fen Bilimleri Enstitüsü Dergisi, 2017:3,1, S.: 38-39, https://dergipark.org.tr/tr/download/article-file/307531
[3] Bu teoriler; Sabit evren teorisi, Salınımlı evren teorisi, Nebular hipotezi, Fizyon teorisi, Yakalanış Teorisi, Akresyon teorisi, Gezegensel ve Stellar çarpışma teorisi, Gaz bulutu teorisi ile Proporsiyon veya Oran Teorisidir.(https://acikders.ankara.edu.tr/pluginfile.php/68233/mod_resource/content/0/2.pdf).

70% of the earth's surface. Earth's atmosphere consists mostly of nitrogen gas (78%). There is 21% oxygen in the Earth's atmosphere. Oxygen, which is very important for life in nature and for humans, increased to around 50% to 70% 400 years ago. This increase occurred as a result of the increase in photosynthetic creatures during the formation of the world. However, it seems that these lives have decreased as a result of various events (meteorite impacts, etc.). Today, the world contains enough oxygen for humanity. It is understood that large creatures such as dinosaurs emerged millions of years ago as a result of high oxygen levels, and that they grew because of the advantage of larger creatures due to environmental conditions. It also caused the earth's rotation force to change and the sun to be visible more, thus shortening the days. As a result, black bacteria emerged, and as their numbers increased, the photosynthesis of these bacteria accelerated. This caused the formation of huge amounts of oxygen and methane gas. But the shortening of the days caused the oceans and rocks to absorb oxygen. Days need to get longer for oxygen to be released into the atmosphere. Because when the day is shorter than 12 hours, these black bacteria cover the rocks and prevent the release of oxygen on the rocks. In order for the rock layer to release oxygen into the atmosphere, daylight hours need to be more than 16 hours. Thus, the amount of oxygen in the world remained balanced and protected living things. With the formation of the ozone layer in the Earth's atmosphere, this process was preserved and a protective layer was formed. This process naturally led to the formation of today's climate structure. However, with the industrialization that has occurred in recent centuries, human beings have begun to artificially influence this process in nature. As a result, climate change has come to the fore.

In this part of the book, the world's climate structure is examined and the focus is on world climate change, which has frequently appeared in the open section in recent years. In this context, how climate change takes place in the media and how it is reflected in the media is emphasized. For this purpose, news about climate changes on the TRT News Site throughout 2023 were examined and the news headlines were browsed.

Climate Structure of The World

There have been significant changes in the climate structure of the world from the emergence of the world to the present day. Formations such as the ice age, the little ice age or today's climate zones reveal these changes. Until the 19th century, formations were always of natural origin. Since this time, it has been observed that human-induced climate transformations have occurred in the world. When we look at the last 20,000 years of climate

change in the world, we see that the following processes have occurred[4]. The cold air mass that affected the northern hemisphere 2000 years ago covered Europe with ice, causing the sea level to lower by 125 meters compared to today. As a result of the unification of Alaska and Asia, migration from Asia to America took place. Natives in the United States are said to be of Asian origin. This process lasted for about 4000 years and after this time the temperature started to increase[5]. After this date, the east of Europe and the north-east of the USA were covered with ice from time to time. People have had to constantly migrate due to climate change. It is seen that plants and animals are also significantly affected by this process. Throughout history, cold periods have occurred from time to time and small winter periods lasting for years have been experienced. However, it is claimed that temperature values are increasing today. Scientific research supports this change.

When we look at the climate structure of the world in general, the following situation can be seen: Seasons occur because the Earth is tilted at 23.5 degrees. While it is summer in the northern hemisphere, it is winter in the southern hemisphere. The same is true for the autumn and spring seasons in the northern hemisphere. There are climate zones valid in the world. In the polar climate, the temperature is below 0° since everything is covered with ice. Although the sunshine period is long at the south pole, the temperature does not increase due to the tilted structure of the Earth. In the tundra climate, which is a climate structure combined with the poles, the temperature is low but the vegetation is dense. In an oceanic climate, there is rainfall in every season. This type of climate is observed in regions such as northwestern Europe and western Canada. The climate in the steppes causes the plants to dry out and the formation of steppes. It is seen that there is a continental climate in the central regions of Asia, the inner parts of central Anatolia and the central parts of North America. The Mediterranean climate prevails in the regions around the Mediterranean. In this climate zone, where winters are cold and dry and summers are hot and rainy, a habitat consisting of coniferous trees and forests has emerged. In the continental climate, forests consisting of cold-resistant trees are formed. In the northern hemisphere, this type of climate is seen in the north of Canada, eastern Europe and eastern Anatolia. A desert climate is experienced in North Africa, Arabia, some parts of Iran, the line of the Caspian Sea, eastern Turkestan, the inner regions of Australia and a small region in the east of the United States. Monsoon climate is seen in India, southeast Asia and Japan. The savannah climate is seen in the north and Middle East, South America and central parts of Africa. This order mentioned above, that is, this climate order, has

[4] Öztürk, Kemal (2002) "Küresel İklim Değişikliği ve Türkiye'ye Olası Etkileri", G.Ü. Gazi Eğitim Fakültesi Dergisi Cilt 22, Sayı 1, Ankara, p.: 49-50.
[5] *Ibid*, p.: 50

dominated the world for thousands of years. The climate system described above has been valid except for intermittent periods lasting ten years, at most 100 to 200 years. Climate changes that started in the last century are caused by nature. However, it is seen that after the industrial revolution of the 19th century, it left various effects on nature and with the emergence of human elements, changes in climate occurred. In the next section, these climate changes are discussed and this process is tried to be explained.

Climate Changes

Claims that the world's climate is changing began after the 1970s. This situation was brought to the agenda at the Intergovernmental Panel on Climate Change (IPCC) held in 1988. This meeting was held in a panel held in Geneva, Switzerland, with the aim of evaluating the current scientific, technical and socio-economic information and studies on climate change. At the meeting, it was decided to combat climate change in the light of scientific outputs, to guide decision makers on current issues with climate change, and to provide information and technical evaluation on issues related to climate change and policies in line with the United Nations Framework Convention on Climate Change. It is also aimed to share the obtained reports with the press and decision makers. At the 43rd session of the IPCC in 2016, it was aimed to keep the average global temperature increase below 2°C[6].

As a result of the development of industrialization, temperature increases lead to air and water pollution, and contamination and spoilage of agricultural products. It is assessed that the major impact on the ecosystem will be seen in the long term. As a result of human-induced climate change, a man-made geological period is formed. IPCC's 2001 assessment report revealed that global warming is human-caused. As part of the IPCC fight against climate change, it is aimed to limit global warming to 1.5°C.

Climate change causes many natural challenges and food crises. This situation causes people to migrate, causes terrorism to increase, and brings with it potential dangers that will occur with the spread of nuclear energy. It is necessary to think and evaluate climate change not only about the dangers that may occur with the warming of the world, but also the potential dangers that this change will create[7]. One of the most important problems caused by climate change is the rise in sea and ocean levels, and this situation poses a great threat especially to poor island countries located on the coasts[8]. The poorest parts of the world will be most affected by climate change. For this reason, climate change needs to be on the agenda of rich countries. Because

[6] i%20ve%20Tar%C4%B1m.pdf. 12.01.2024.
[7] Eren, Orçun Emrah (2023) "Çin-ABD Rekabetinde Gri Bölge: İklim Değişikliği Mücadeleleri", Sürdürülebilir Çevre Dergisi Cilt 3 (2), İstanbul, p.: 88
[8] *Ibid*, p.: 88.

the USA and western countries are responsible for the pollution created by the industrial revolution. Today, China is one of the major countries that emit carbon emissions that cause climate change. From time to time, the USA and China have held mutual talks on this issue, but China's carbon reduction commitments have always been postponed[9]. After the Paris Climate Agreement signed in 2015, especially the USA and the EU did not fulfill their obligations. For example, in 2019, US President Donald Trump withdrew from the Paris Climate Agreement, and when Biden came to power, the US rejoined this agreement. The Biden administration, which plans to zero greenhouse gas emissions by 2050, shows positive attitudes on this issue. However, especially the inconsistent attitudes of the USA cause one not to be optimistic about zero greenhouse gas emissions at this date. In addition, the competition between the USA and China shows that the countries will compete with each other on climate change. China does not participate in climate change agreements and practices and continues its intensive industrialization. As a result, it becomes another actor of potential impacts that will cause air and environmental pollution and subsequently climate change. When the issue of climate change comes to the fore in the scientific, economic and political fields, it is seen that these news have increased, especially in the media.

Climate Change and The Media

Disaster is the occurrence and realization of some potential dangers. Hazards bring to mind some risks. Risk is a concept that includes the probability of occurrence of a hazard and the severity of its possible impact[10]. Danger is danger in disaster management; "What could it be?" It is an answer to the question. Because; It can be defined as "a formation, event or chain of events of natural, human and technological origin that has the potential to cause loss of life and property, as well as damage the socio-economic order and activities of the society, the natural environment, natural, historical and cultural resources." In other words, danger is a threat. It is also a source of future disaster[11]. The media is closely interested in disaster news. Because disaster news attracts a large number of viewers. It is seen that many and long-term publications have been made about disasters that occur as a result of climate change.

Climate change can be covered by the media in various ways. Some important elements regarding news creation and media strategies in the media are as follows: First of all, scientifically based journalism needs to be done. When reporting on climate change, it is important to present news that is scientifically based and supported by information from reliable sources.

[9] *Ibid*, p.: 88.
[10] Kadıoğlu, Miktad (2011) Afet Yönetimi, İstanbul, Marmara Belediyeler Birliği, p.:, 23
[11] *Ibid*, p.: 23-24.

Sharing reliable information by collaborating with climate scientists, environmental experts, and scientists can help the media provide accurate and effective information to audiences. Storytelling strategies can be used to make the topic of climate change more attractive and impressive. Real human stories, documentaries showing life in the affected areas, or interviews containing personal experiences can make the subject more approachable and understandable to the audience. Visual Communication materials are an important element in considering the subject. Strong visual content can communicate the issue of climate change more effectively. Through graphs, maps, photos, and infographics, complex information can be simplified and help audiences better understand the topic. Examining climate change news in the context of politics and economy is a positive attempt to draw attention to the issue of climate change.

Climate change is not only an environmental issue but is also linked to politics, economics and social issues. By addressing climate change within these contexts, the media can highlight the role of policymakers and business. This can offer viewers a broader perspective. Various views need to be included in the news. The media should include different expert opinions and stakeholders' perspectives on climate change. This allows for a more fair and balanced news presentation, reflecting the diversity and complexity of the topic. Ensuring the active participation of the society is important in raising public awareness on this issue. Media can call on audiences to actively engage on climate change. Through campaigns, interactive content and social media activities, audiences can be encouraged to participate in various climate actions and reduce their own environmental impact. In line with these suggestions, it is seen that news about climate change is published in the media. However, this rate is lower than other news in Turkey. The reasons for this situation are stated as follows:

It is widely believed that climate change is a subject that requires high intellectual level and special attention, does not interest the reader, viewer or the person on the street much, does not attract readers and therefore does not bring circulation and ratings[12]. Climate change news is often seen as a subheading of environmental news[13]. The lack of expert journalists on this subject causes the news on this subject to be sourced from abroad[14]. The reason why climate change news is not on Turkey's agenda much is that it competes with other agendas. It is emphasized that climate change news is overshadowed by the intense political agenda and is seen as a luxury or elite

[12] Şahin, Ümit ve M. A. Üzelgün (2016) İklim Değişikliği ve Medya, İstanbul Politikalar Merkezi Sabancı Üniversitesi, İstanbul, p.: 12.
[13] *Ibid*, p.: 12
[14] *Ibid*, p.: 12

issue among the country's more pressing problems[15]. A debate about whether climate change is real and the existence of human influence is not on the media agenda in Turkey[16]. It is seen that Turkey's developmentalist political preferences, which attach more importance to economic growth than anything else, find widespread response in the media, making it difficult to handle climate change news together with its causes and economic-political connections[17]. It is important to note that an approach that emphasizes developmental policies is almost sacred[18]. There is an approach in which it is stated that Turkey's responsibility for climate change is low and that the industrialized country is the real culprit[19].

Since there are no climate journalists in Turkey, other journalists have little knowledge and awareness of the issue, and climate change has not been included in the media agenda sufficiently, it cannot be said that this mediation has become functional in the daily field[20]. Climate change is one of the areas where the interaction between science and policy is most decisive. The importance and agenda of journalism and the way it is handled are closely linked to the influence of the media in determining the country's policies and its relationship with the information-based journalist. It can be said that climate news can only become an important area to the extent that science has an effective role in policy making and the media facilitates the science-policy relationship[21].

When the news sites in Turkey were examined, it was seen that TRT, the state broadcasting organ, gave the most coverage to the issue of climate change. News and headlines on climate change on the TRT Haber website throughout 2023 were examined.

News Examples on Climate Changes in Turkey

When you look at the TRT News website, the following news headlines stand out: "4 Million People in Ethiopia Facing Food Crisis". The subheading of the news includes the following statements: "Disasters Caused by Climate Change in Ethiopia Have Left Approximately 4 Million People Facing Food Crisis[22]". Another news article includes the following statements: "Temperature Records Will Continue in 2024 with the El Niño Effect" Below the news, there is the following statement: "Boğaziçi University Climate Change and Policies Application and Research Center Director Prof.

[15] *Ibid*, p.: 12
[16] *Ibid*, p.: 14
[17] *Ibid*, p.: 14
[18] *Ibid*, p.: 14
[19] *Ibid*, p.: 14
[20] *Ibid*, p.: 15
[21] *Ibid*, p.: 15-16.
[22] https://www.trthaber.com/haber/dunya/etiyopyada-4-milyon-kisi-gida-kriziyle-karsi-karsiya-827939.html, 10.01.2024

Dr. Levent Kurnaz announced that 2023 will be the hottest year of all time due to the El Nino effect, and temperature records may continue until the summer months of 2024.[23]" In the news titled "Risks Resulting from Climate Change Increase the Number of Endangered Species", while the number of endangered species has approximately doubled in the last 9 years, it has been stated by experts that the risks arising from climate change have endangered the extinction of many species[24].

It is seen that an expert was consulted in the news about climate change affecting Turkey's rainfall regime. It was written in the news that the expert stated that the average temperatures on Earth are gradually increasing and that extreme weather events such as droughts, floods and storms are starting to occur more frequently[25]. In other news, a study conducted in the USA stated that more than 3.2 million Americans migrated from areas with high flood risk due to climate change[26]. In the news dated 15.09.2023, it was written that the change felt as a result of global warming not only affects human life, but also changes the balances in nature and birds are among the species negatively affected by this change[27]

It was featured in a video news on TRT News website that the 27th United Nations Climate Change Conference, which will be held in Egypt between 6 and 18 November 2022, is sponsored by a soft drink company and that this company is one of the companies that produces large amounts of plastic. It was stated in the news that the company's sponsorship caused various criticisms. The expert in the news said that this initiative was a marketing tactic to advertise that they care about environmental safety and sustainability. He stated that companies act as if they care about environmental safety and engage in environmentally friendly activities. However, in reality, he stated that this was not the case at all and that the sponsor was an organization that was against the interests of the climate summit. He claimed that this situation creates a contradiction not only in terms of environmental pollution but also in the fight against climate change, as the plastic bottles produced by the company ensure the sustainability of fossil fuel use. The expert said that there are more than 150 million tons of plastic waste in the seas and oceans and that they pose a threat to human health because fish feed on them. The guest in the news added that the plastic

[23] https://www.trthaber.com/haber/yasam/2024te-de-sicaklik-rekorlari-el-nino-etkisiyle-devam-edecek-826318.html, 04.01.2024
[24] https://www.trthaber.com/haber/yasam/iklim-degisikligi-kaynakli-riskler-tehlike-altindaki-tur-sayisini-artiriyor-823835.html, 26.12.2023
[25] https://www.trthaber.com/haber/cevre/iklim-degisikligi-turkiyenin-yagis-rejimini-etkiliyor-822874.html, 22.12.2023
[26] https://www.trthaber.com/haber/dunya/abdde-32-milyondan-fazla-kisi-iklim-degisikligine-bagli-sel-riski-nedeniyle-tasindi-821825.html, 19.12.2024
[27] https://www.trthaber.com/videolar/iklim-degisikligi-kuslari-da-olumsuz-etkiliyor-69232.html, 19.09.2023

bottles used extensively by their companies remain in nature for approximately 400 years, according to research conducted by scientists[28].

In the news dated December 1, 2023 published on the TRT News website, a photo news was published about the Climate Change conference being held in the United Arab Emirates[29].

Other news on the TRT News website[30] included news that Anatolia has become arid, that climate change is preparing for the end of the world, that Istanbul Airport has reached the fourth level in the carbon accreditation certificate program, and that Istanbul's forests will be planned to combat climate change. Climate activists painted the grand canal in Venice green, carbon emissions are predicted to reach a historical peak this year, the movement of a huge iceberg may be an indicator of the climate crisis in the coming years, one in 12 hospitals is at risk of closure due to climate change, the former US Vice President said It is seen that there is a news about the announcement of the inventory of facilities that cause emissions, and that "1% of the Targeted Size of the Contribution Provided in Climate Negotiations is not", Other news headlines on the TRT News site are as follows: "The United Arab Emirates Created a 30 Billion Dollar Fund for Climate Change", "It Will Go Down as the Hottest Year on Record: Temperature After 2023 Likely to Increase", "Turkey is Drifting into Permanent Drought: We are going to Water Scarcity", "Climate Change Research: The World Entered an Unknown Region in 2023", "World Health Organization Called for Health Examination in the Fight against Climate Change", "Grant Support for Adaptation to Climate Change to be Given", "Climate Transparency Report: USA is the Most Dependent G20 Country on Oil and Gas, Supports Climate Technologies Resistant to Climate Change", "The Effects of Global Warming on Human Health are at Dangerous Dimensions", "Winter is on the Doorstep in Istanbul. When will the Expected Rain Come?", "Copernicus Climate Change Service: 2023 may be the Hottest Year Ever", "Drought Affects the Number of Fish in the Seas", "It is also Possible to Prevent Climate Disasters and Reduce Carbon Emissions", "Turkey and EU Cities will Develop Joint Projects in the Field of Climate Change", "Micro in Clouds "It Turns Out There are Plastics", "It Increases the Number and Impact of Natural Disasters Combined with the Climate Crisis", "Cities Can Become Resistant to Floods with Flood and Rainwater Storage Area", "Climate Crisis of Developed Countries: Promises not Kept", Changing Weather Conditions Hit Tea Production", "Climate Change Made the Flood Disaster in Libya 50 Times More Likely", "United

[28] https://www.trthaber.com/videolar/iklim-konferansina-ilginc-sponsor-65081.html, 22.10.2022
[29] https://www.trthaber.com/foto-galeri/baede-dunya-iklim-eylemi-zirvesi/61297/sayfa-1.html, 01.12.2023
[30] https://www.trthaber.com/etiket/iklim-degisikligi/sayfa-12/ 12.01.2024

Nations Secretary-General Guterres: Climate Destruction has Begun", "Countries will not Pay Climate Compensation without the USA", "International Organization for Migration: "We Have Officially Entered the Age of Climate Migration", "The Effects of Climate Change will be Explained in Three Dimensions at Teknofest", "Almost All Ski Resorts in Turkey and Europe are at High Risk", "Climate Law Proposal will be on the Agenda of the Grand National Assembly of Turkey", "Global Warming If It Continues, 90% of Emperor Penguin Colonies will Extinct by 2100", "Climate Change may Reveal New Trade Routes", "Climate Change has made Wildfire Conditions At Least Twice Likelier in Canada", "Climate Change will Affect Turkey It Increases the Risk of Forest Fire in Northern Regions", "Director General of the World Health Organization, Climate Change is not a Remote Threat", "The Color of the Ocean Turns Green with Its Effect on Climate Change", "From Pollen Allergy to Asthma, How Does Climate Change Affect Diseases", "Climate Scientists: North Pole will be Unhappy, It's Too Late Now", "Climate Change Threatens the Black Sea Region", "Sea Water Temperature Increased with Climate Change", "Thousands of People in London Are on the Streets to Pay Attention to Climate Change", "We are Sustaining the Intensifying Effects of Climate Change in England" "Strikingly Unprepared", "Climate Increases Both Droughts and Floods", "Climate Change may Cost 9 Billion Euros in Germany", "Climate Change will also Change Sectors", "Polar Regions are most Affected by Climate Change", " "Global Warming Threat is Increasing".

As can be seen from these news headlines, climate change has been tried to be kept on the media agenda in general and on the TRT News website in particular throughout 2023.

Conclusion

The Earth has gone through various cycles over millions of years, resulting in today's climate structure. The world has experienced climate change at different intervals. This change did not last long, and the world climate returned to its previous state. The climate process on Earth has always been determined by natural processes. It is understood that this process has been distorted by humans with industrialization. The natural process that has been going on for millions of years has been introduced into an artificial process by humans. Thus, a human-made geological period was formed. Climate change has many consequences.

As a result of these negative situations, including the food crisis, migration movements can lead to increased terrorism and wars. Poor countries are most affected by this negative situation. Rich and industrialized countries are responsible for climate change. On climate change, the Intergovernmental

Panel on Climate Change was held in 1988 and the United Nations Framework Convention on Climate Change was signed. In accordance with this agreement, it was envisaged to limit the global temperature increase to 1.5°C by reducing greenhouse gases in the world. The commitments made in the agreements made in this direction have not been complied with, and countries such as the European Union, the USA and China have not fulfilled their obligations. It seems that the issue of climate change affects every field, from economy to politics. It seems that the media is always interested in this topic and ensures that it is kept on the agenda. Media organizations in Turkey do not pay much attention to this issue and the issue of climate change always remains in the background due to the busy agenda. Since there are no climate journalists in Turkey, most of the news sources are from foreign countries.

In this book chapter, the news on the TRT News website was examined as a sample. The reason for this is that TRT News site is a state organization and pays more attention to these issues than other sites. In the news on this site, it is seen that especially poor countries are negatively affected by climate changes. Additionally, news about potential threats to future climate change attracts attention. It has been stated that climate change increases the number of living species in the world and this puts many species in danger of extinction. It has been pointed out that there are floods, storms and temperature increases due to climate change in the world and that these negative situations will continue in the coming years. It is stated that as a result of industrialization, plastic waste in the seas and oceans increases and this causes environmental pollution. There are reports that lives are negatively affected by this situation. There are reports that Turkey has been dragged into permanent drought and is affected by climate change. It was stated that developed countries did not keep their promises and that the USA would not pay compensation to poor countries. The subject of climate change, which will cause global migration movements and an increase in hungry and poor people, is frequently covered in the news. There are reports of various demonstrations and actions regarding climate change. It is understood from the news on the TRT News website that industrialized countries do not attach much importance to this issue. The reason why climate change is so much on the public agenda is that people experience this situation and show that they are not satisfied with it. Industrialized countries cause climate change with the pollutants they release to the world, but they do not show a positive attitude towards their responsibilities. Poor countries are the countries most affected by this situation. Attempts by the United Nations and non-governmental organizations to protect nature are also useless. Countries such as the European Union countries, the USA and China need to be more sensitive about climate change. In the future, climate change may cause diseases, food crises and wars. For this reason, the issue of climate change needs to be covered more in the media and put on Turkey's agenda.

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CLIMATE CHANGE AND ENVIRONMENTAL POLITICS

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In today's world, it is more crucial than ever to navigate the intricate and multifaceted challenges posed by climate change and chart a course toward a more sustainable future. The pressing necessity to address these issues has become a defining feature of our century, compelling nations and individuals alike to take decisive action.

The paramount objectives for the 21st century are clear: mitigating the adverse consequences of climate change, protecting both national and international public health, and ensuring a sustainable and prosperous future for generations to come. These goals are not just aspirational but essential for the well-being of our planet and its inhabitants.This book provides a comprehensive exploration of climate change, highlighting the immense power of scientific research and the importance of disseminating this knowledge widely. Through its chapters, the book offers an in-depth examination of various facets of climate change, presenting a synthesis of research findings, theoretical frameworks, and practical strategies.

By presenting a multifaceted examination of climate change, this book aims to inspire action and foster a deeper understanding of the complexities involved. It is a call to action for individuals, communities, and nations to come together, leveraging the power of knowledge, innovation, and cooperation to build a more sustainable and resilient future.Together, through concerted efforts and a shared commitment to sustainability, we can navigate the complexities of climate change and pave the way for a brighter, more sustainable tomorrow.

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