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Araştırma Makalesi / Research Paper *Cilt 3 (2), sh. 41-51, 2023*

Assessment of the International Ban on the Trade of Ivory in Light of Sustainable Development Principles

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Abstract

The African elephant (Loxodanta africana) is regulated under the Convention on International Trade in Endangered Species of Wild Fauna and Flora, and as a rule, international trade of it and of its parts such as ivory is banned. Throughout this study, the international ban on the trade of ivory is critically assessed as to whether it is consistent with the principles of sustainable development. The definition, scope and principles of sustainable development are already controversial in environmental politics. In this paper, the principles of sustainable development are regarded as sustainable use, equity, common but differentiated responsibilities, participation, good governance, integrity and precautionary principles in line with New Delhi Declaration of Principles of International Law Relating to Sustainable Development. In this paper, it is argued that the international ban on the trade of ivory is not consistent with these principles since it disregards sustainable use of natural resources, equity, needs and participation of local people, necessity of good governance and integration of different policy areas. While resorting to a trade ban might seem feasible as an alternative to taking environmental risks within the framework of the precautionary principle, this principle alone does not constitute the sole basis for a trade ban.

Keywords: Ivory, international trade, sustainability

Fildişi Ticaretindeki Uluslararası Yasağın Sürdürülebilir Kalkınma İlkeleri Işığında Değerlendirmesi

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Özet

Afrika fili (Loxodanta africana), Nesli Tehlike Altında Olan Yabani Hayvan ve Bitki Türlerinin Uluslararası Ticaretine İlişkin Sözleşme kapsamında düzenlenmektedir ve genel bir kural olarak fildişi gibi parçaları da dahil olmak üzere uluslararası ticareti yasaklanmıştır. Çalışma boyunca, fildişi ticaretine getirilen uluslararası yasağın sürdürülebilir kalkınma ilkeleriyle tutarlı olup olmadığı

eleştirel bir şekilde değerlendirilmektedir. Sürdürülebilir kalkınmanın tanımı, kapsamı ve ilkeleri çevre siyasetinde halihazırda tartışmalıdır. Bu yazıda sürdürülebilir kalkınma ilkeleri; Yeni Delhi Sürdürülebilir Kalkınmaya İlişkin Uluslararası Hukuk İlkeleri Bildirgesi doğrultusunda sürdürülebilir kullanım, eşitlik, ortak ancak farklılaştırılmış sorumluluklar, katılım, iyi yönetişim, bütünlük ve ihtiyatlılık ilkeleri olarak kabul edilmiştir. Bu yazıda, doğal kaynakların sürdürülebilir kullanımını, eşitliği, yerel halkın ihtiyaçlarını ve katılımını, iyi yönetişim gerekliliğini ve farklı politika alanlarının entegrasyonunu göz ardı ettiği için fildişi ticaretine ilişkin uluslararası yasağın bu ilkelerle tutarlı olmadığı savunulmaktadır. İhtiyatlılık ilkesi çerçevesinde çevresel risk almak yerine ticaret yasağına başvurmak makul gibi görünse de bu ilke de ticaret yasağı için tek başına dayanak oluşturmaz.

Anahtar Kelimeler: Fildişi, uluslararası ticaret, sürdürülebilirlik

1. Introduction

Along with the improvements in the industry after the outset of the industrial revolution, natural resources have been consumed more rapidly compared to the pre-industrial era. Moreover, industrialization has not remained limited to Western European countries and has spread across the globe. This has prompted people to consider the limits of natural resources, recognizing that they are not unlimited, and that industrial development may deplete them. In the end, as discussed in this paper, the idea of sustainable development has become one of today's international political issues.

Some of the natural resources that humans consume rapidly are animal and plant species and their parts, such as ivory. As a result of human activities and rapid development, some species face the risk of extinction. Therefore, conservation and restoration of the ecosystem are important pillars of sustainability works (Robertson, 2014, p.121). Since ancient times, wild animals have been utilized for their skins, plumage or other parts as luxury commodities or components of several medicines and perfumes. Considerable efforts can be traced back to at least Roman times to protect the population of certain animals against extinction (Reid, 2002, p.300). However, these efforts seem to be systematic and placed in a policy framework aftermath of the industrial revolution and sustainable development views. Inspired first by Victorian reactions against over-exploitation, perceptions towards the value of wild plants and animals, and their protection have become desired policy objectives justified by moral, religious arguments, aesthetic concerns, as well as utilitarian views (Reid 2002, p.1).

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (hereinafter referred to as 'CITES'), signed in 1973, is an essential international legal instrument to protect wildlife (CITES, 2022). CITES aims to protect wild flora and fauna against over-exploitation through international trade by regulating or prohibiting their cross-border trade, and thousands of species of plants and animals are subject to CITES today (Sands et al, 2018, p.409-410). The African elephant (Loxodanta africana) is regulated under CITES, and as a general rule, its international trade, including its parts such as ivory, has been prohibited.

The international ban on the trade of ivory has been controversial among scholars as well as representatives of states under CITES negotiations. In fact, regarding the regulation of international trade of endangered species, protectionists and sustainable use supporters come face to face (Reeve, 2002, p.14). This is evident in the ivory case. During the debates under CITES regarding the imposition of the international ban on the trade of ivory, the status of the African elephant was controversial about whether its long-term conservation is best served by a ban on the trade of ivory or the continuation of limited and controlled trade (Reid, 2009, p.309). From a conservative view, Bennett (2015) asserts that legal ivory trade is conducted along with the illegal ivory trade since ivories

harvested by illegal methods and traded by poachers cannot be distinguished from legal ivories, and poachers are able to obtain required certifications by means of bribery. Furthermore, Lee and Lindsay (2016) claim that CITES gives a strong impression that ivory trade is potentially acceptable and propose stricter measures, such as listing all African elephants in Appendix I of CITES, closing domestic markets, destruction of stockpiles, ending decision-making mechanisms under CITES and prohibiting the exportation of live elephants completely. On the other hand, Jenkins (2000) argues that the trade ban on ivory does not recover the population of elephants and, more importantly, does not hinder illegal poaching, as a trade ban does not affect the demand for ivories. Likewise, Martin (2000) suggests supporting sustainability rather than banning trade and criticizes the system generally prescribed by CITES. Therefore, the issue should be assessed with all its dimensions within the framework of sustainable development principles. The purpose of this paper is to discuss the international ban on the trade of ivory in light of principles of sustainable development.

In this vein, after examining the evolution and context of the trade ban, the concept of sustainable development with its scope and content will be discussed. Thereafter, it will be critically assessed as to whether the international ban on the trade of ivory is consistent with the principles of sustainable development. This paper argues that the international ban on the trade of ivory is not consistent with the principles of sustainable development because it disregards the sustainable use of natural resources, equity, needs and participation of local people, the necessity of good governance, and integration of different policy areas, which are certain elements of sustainable development. In addition, the precautionary principle, as a part of sustainable development, does not provide a basis for a complete ban.

2. CITES Convention and International Ban on Trade of Ivory

2.1. General Framework of CITES

CITES is based on an appendix system and is composed of three appendices. In the appendix system of CITES, Appendix I includes all species threatened with extinction that are or may be affected by trade. Species in this category may be traded only for non-commercial purposes and under certain conditions, with export and import permits provided by scientific and management authorities in exporting and importing countries (Article II/1, III). On the other hand, Appendix II includes species that may become threatened with extinction unless their trade is strictly regulated, and other species that must be subject to regulation for effective control of trade (Article II/2). Species covered in Appendix II can be traded under strict rules, only with export certificates provided by the scientific and management authorities of the exporting country (Article IV). Reeder (2002) classifies Appendix I as a 'blacklist' because trade in Appendix I species for primarily commercial purposes is prohibited. Trade for non-commercial purposes, such as scientific or educational purposes, is subject to both import and export permits under certain requirements. Appendix II is classified as a 'grey list' because trade in species listed under it is controlled, but an import permit is not required. However, it is important to note that the absence of an import permit requirement does not imply a lack of control by the importing country, as Article IV/4 stipulates that the prior presentation of either an export permit or a re-export certificate is required at the time of importation. Double-checks by both importing and exporting countries are important pillars of CITES (Klem and Shine, 1993, p.117). Finally, Appendix III includes species which any Party identifies as being subject to regulation within its jurisdiction and co-operation of other Parties in the control of trade is needed, and it requires export permits issued by authorities of exporting country.

In line with the explanations on the CITES appendices system above, the distinction between Appendix I (blacklist) and Appendix II (grey list) is essential, as the rules for the appendices differ in international trade. Finally, specimens of captive-bred animals listed under Appendix I are deemed to

fall under Appendix II (Article VII/4). Therefore, ivories harvested by captive-bred elephants are subject to Appendix II rules even if they are listed under Appendix I.

2.2. Evolution of the International Trade on the Trade of Ivory

Ivory has been used as a precious material, employed in sculpture and jewelry, as well as a raw material. Ivories have been transported to carving centers, traditionally in Japan and Hong Kong, and subsequently to consumers of worked ivory, mainly in the US and European countries (Barbier et al, 1990, p. 8). Moreover, it seems that the US and China are currently the main importers of unworked ivory, classified under the harmonized system code of 050710 (TradeMap, 2023). The trade in wildlife generally flows from developing countries rich in biodiversity to affluent developed countries, especially European countries, the US, and Japan (Reeve, 2002, p.9). It is hardly surprising that the international movement of ivory occurs from developing or least-developed African or Asian countries to developed countries.

The African elephant, along with its parts, including ivory, was originally listed in Appendix II of CITES. This listing was backed by the Management Quota System, designed to ensure trade within the context of planned domestic management programs in 1985. Finally, in 1989, African elephants were transferred to Appendix I (Barbier et al, 1990, p. 8). While major western environmental groups supported the complete ban, and the majority of CITES parties voted for the listing of African elephants in Appendix I, eight African countries opposed this listing, arguing that they had the capacity to regulate the trade. However, their opposition was disregarded in the end (Sos-Rolfes, 2000, p.76). The process was initiated by the African Elephant Conservation Act, adopted unilaterally by the US upon the failure of the CITES ivory-quota system. The Appendix I listing for African elephants was proposed by a range of countries, including the US, Austria, Kenya, and Tanzania. Four countries, including Japan, abstained from voting while southern African countries and China (subsequently withdrew its reservation) registered reservations to the listing (Mofson, 2000). After several failed attempts by some African states, especially by South Africa, to downlist its elephant into Appendix II, in 1997, Botswana, Namibia and Zimbabwe finally achieved having their elephant populations transferred to Appendix II (Sos-Rolfes, 2000, p.76-77). As of 2022, African elephant populations in Botswana, Namibia, South Africa and Zimbabwe are listed in Appendix II under certain conditions. Therefore, it seems that parties had different views and interests during the debates over listing of African elephants under CITES.

The geographical distinction among species regulated in CITES, including elephants, is worth assessing. Under CITES, split-listing different populations of the same species based on geographical origin is possible and has become common, as in the case of African elephants (Reeve, 2002, p.32; Reid, 2009, p.309). In fact, Article I of CITES defines species as any species, subspecies, or geographically separate population. In this regard, African elephants (Loxodanta africana) are treated differently from Asian elephants (Elephas maximus), which have been included in Appendix I since the inception of CITES. Secondly, African elephants in Botswana, Namibia, South Africa and Zimbabwe are treated differently from other African elephants and deemed to be under Appendix II.

3. The Principles of Sustainable Development

Sustainable development has become a crucial topic in today's global environmental discourse, and its scope and principles need to be addressed properly. Although concerns about the limits of natural resources have made people contemplate sustainability since ancient times, international efforts to balance economic, social and environmental policies and address natural resource exploitation have gained momentum over the past two decades. The World Commission on Environment and Development, also known as 'Our Common Future' or 'the Brundtland Report,' played a pivotal role in popularizing the term

of sustainable development globally (Cordonier Segger and Khalfan, 2006, p.15).

The UN, in the Brundtland Report (1987, p.41), defines sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Until the 1980s, the dominant idea was that continuous economic growth could not be environmentally sustainable, which was later replaced by the concept of sustainable development. Therefore, it can be assumed that the definition of sustainable development in the Brundtland Report emphasizes the necessity of development in a sustainable way to meet the needs of generations.

Critics argue that this definition is inherently complex and ambiguous, as the 'needs' of people can vary across time and societies. While the concept of sustainable development adopted at the Rio Summit is not legally binding, it holds a significant place in international soft law (Cordonier Segger and Khalfan, 2006). Thus, it is essential to analyze the international ban on the trade of ivory in light of the principles of sustainable development.

Various principles can be deduced from the definition and perception of sustainable development. Lafferty (1996) highlights the four elements of sustainable development as physical sustainability concerning the limits of nature and ecological balance, global equity, generational equity, and the precautionary principle. Gladwin et al (1995) argue that sustainability is closely related to democracy, liberty, equality, and security, outlining the components as inclusiveness, connectivity, equity, prudence, and security. Sands et al (2018) assess the elements of sustainable development as the principle of intergenerathe principle of intra-generational equity, the principle of sustainable use, and the principle of integration.

Lastly, the New Delhi Declaration of Principles of International Law Relating to Sustainable Development (United Nations, 2002) outlines the principles of sustainable development as follows: sustainable use of natural resources, equity and the eradication of poverty, common but differentiated responsibilities, precautionary approach, public participation and access to information and justice, good governance, and integration and interrelationship. In this study, the international ban on the trade of ivory is critically assessed in light of these principles.

4. International Ban on Trade of Ivory Under Sustainable Development Principles

4.1. Sustainable Use of Resources and International Ban on Trade of Ivory

Sustainable use of resources is arguably the most crucial principle of sustainable development. In this context, it is appropriate to categorize resources into two types: renewable and non-renewable. Following the principles of sustainable development, renewable resources must be utilized at rates lower than, or at least equal to, the rate at which they regenerate to ensure availability for future generations. Concurrently, the consumption of non-renewable resources must be minimized, and substitutes should be developed (Reid, 1995). International legal documents refer to the concept of 'sustainable use' by mentioning conservation measures or plans that are 'rational,' 'wise,' 'sound,' 'appropriate,' or a combination of these concepts (Sands et al, 2018, p.224). As an example of this, the African Nature Convention of 1968 stipulates ensuring the wise use of faunal resources under Article VII, which is relevant to the scope of this study.

In the sustainable use dimension, it can be argued that elephants cannot be sustainably utilized for their ivories. Research indicates that elephant mortality rates are unsustainable,

and the decline in elephant populations is evident across the continent (Wattmeter et al, 2014; Yu et al, 2016). Lussa and Lee (2017) also find that the sustainability space is very small compared to the demand for ivory. However, Moore (2011) contends that sustainable use of ivories can be seen as an aspect of a neo-liberal approach, and the trade ban reduces the value of elephants, thus deprives of revenue that could be used for protection. Instead of resorting to a total ban on the international trade of ivory, ways and methods to ensure the wise use of ivory should be explored in light of sustainable use of natural resources.

It is argued that CITES aims to prevent unsustainable use rather than promoting sustainable use over non-use (Reeve, 2002, p.29). However, the need to promote sustainable use of natural resources cannot be completely disregarded in today's world. At the seventh meeting of the Conference of the Parties to the Convention on Biological Diversity, the Addis Ababa Principles and Guidelines for the Sustainable use of Biodiversity were adopted. The document stipulates, "Although CITES does not have a definition of sustainable use, the case studies show that the elements of the Addis Ababa Principles and Guidelines for the Sustainable Use of Biodiversity that are generally relevant to CITES are either already implicit in the language of CITES or are promoted by CITES." Therefore, the regime under CITES cannot be indifferent towards the need for sustainable use of natural resources, including wildlife. Finally, sustainable use has been a fundamental principle of sustainable development, and hindering sustainable use would not be consistent with the concept of sustainable development.

Furthermore, the ivories of naturally dead elephants could be traded and utilized in light of the principle of sustainable use. While a simplistic notion supports the destruction of ivories and claims that trade in ivory stored in stockpiles would fuel poaching and illegal ivory trade, it is argued that legal ivories could decrease the value of illegal ivories (Sas-Rolfes et al, 2014). In light of sustainable use of natural resources, bad governance to control the ivory trade should not be an excuse for prohibition of the utilization of ivories and the destruction of ivory stockpiles. International trade in legally stockpiled ivories should be permissible to meet societal needs since it does not directly lead to the decline in the population of elephants.

Thus, the trade ban on ivory does not seem to be consistent with the principle of sustainable use of natural resources. Plans and methods to promote sustainable use should be explored instead of resorting to a total ban on the trade of ivory. Promoting the sustainable use of ivories could contribute to conservation efforts by increasing the value of the African elephant.

4.2. Principles of Equity, Common But Different Responsibilities and International Ban on Trade of Ivory

Equity, defined as the fair and just distribution of resources, gains, and losses within and between generations, is considered a central dimension of sustainable development (Gladwin et al, 1995; Beder, 2006). The concept regarding that states have an obligation to ensure a just allocation between past, present, and future generations forms the core of intergenerational equity, while intra-generational equity involves ensuring a fair distribution of resources among the members of present generations (Cordonier Segger and Khalfan, 1996, p.124-125). Aligned with the principle of sustainable use, resources should be utilized in accordance with the needs of future generations.

On the other hand, Agyeman (2007) argues that intra-generational equity has a limited place on the sustainability agenda compared to intergenerational equity. He emphasizes the gap between the green agenda of the global North and the brown agenda focused on poverty alleviation and infrastructural development in the global South, highlighting intra-generational equity and justice. Sustainability, according to this perspective, ensures a better quality of life for all present and future generations in both the global

North and South by providing a just allocation of resources.

Common But Differentiated Responsibilities (CBDR), closely related to the equity principle, is a crucial aspect of sustainable development. It refers to the common responsibility of states for environmental protection, considering their different circumstances, especially their historic contributions to evolving environmental problems (Cordonier Segger and Khalfan, 1996, p.124-125). While addressing specific environmental problems, such as the protection of endangered species, it should be emphasized that the environment belongs to the common heritage, and all of humanity has a responsibility to protect it. However, countries bear different historical responsibilities and possess diverse capabilities to tackle environmental issues.

The trade ban should be evaluated in light of equity, particularly intra-generational equity, and common but differentiated responsibilities, as they are essential elements of sustainable development.

As demonstrated above, the trade predominantly flows from the global South to the global North. According to TradeMap (2023) statistics, nine of the top ten exporters of unworked ivory, classified under the 050710 harmonized system code, are developing countries. Mainly, developing countries in Africa, such as South Africa, Tanzania, Kenya, Ethiopia and Congo, have been hosting African elephants. Swanson (2000) argues that the trade ban punishes the users of wildlife, treating the sustainable alongside the unsustainable, resulting in unequal treatment towards countries where elephant populations are increasing, and ivory is required for economic purposes.

Therefore, it is crucial to establish equity between different societies on the international stage and avoid disregarding the needs and respective capabilities of countries. Supporting the sustainable use of ivories could contribute to equity and CBDR between developed and developing countries. Collaboration among developed and developing countries is essential to share best practices and promote the sustainable use of ivories to address the needs and concerns of developing countries.

4.3. Principle of Participation and International Ban on Trade of Ivory

Participation, a crucial aspect of sustainable development, encompasses the right to information and, beyond this, public involvement in decision-making processes (Beder, 2006). It is argued that sustainable development is not solely the concern of governments, and the most effective planning emerges through a participatory process that allows diverse social groups, including women, young people, indigenous people, workers, and NGOs, to discuss the opportunities and challenges in reconciling development and the environment (Reid, 1995). As asserted by Cordonier Segger and Khalfan (1996, p.164), "Neither environmental nor developmental strategies are likely to be sustainable unless all affected actors, both State and non-State, and particularly those with special dependencies on the resources at issue, are involved in decision-making." In other words, the participation of both states and non-state actors plays a crucial role in the decision-making process regarding sustainable development issues.

The needs and participation of local people are also essential during the process of implementing a trade ban, as the involvement of people is a cornerstone of sustainable development. CITES is criticized for its listing process, which has been seen as neglecting the needs of local people while imposing trade restrictions (Cooney and Abensperg-Traun, 2013). In the case of ivory, it is argued that the support of local people is crucial for protecting the elephant population. The utilization of elephants might serve as an incentive for them to participate in conservation efforts rather than collaborating with poachers (Barbier et al, 1990; Sinclair-Brown, 2003). However, the international trade ban on ivory deprives

local people of utilizing elephants and governments of support from the local community. Therefore, the participation of local people has not been ensured during this process.

In other words, it should have ensured the participation of various segments of the population, particularly local people in East and South Africa, where the African elephant is predominantly located. This approach would be consistent with the principles of sustainable development. Furthermore, the support of local people could have been secured in the fight against poaching and illegal ivory trade if this approach had been adopted.

4.4. Principle of Good Governance and International Ban on Trade of Ivory

Good governance, as a pillar of sustainable development, refers to reliable and effective decision-making and the respect for the rule of law (Cordonier Segger and Khalfan, 1996, p.166). The United Nations identifies eight characteristics of good governance: "It is participatory, consensus-oriented, accountable, transparent, responsive, effective and efficient, equitable and inclusive, and follows the rule of law" (UN-ESCAP, 2009).

The transfer of African elephants to Appendix I of CITES is an outcome of the lack of good governance in the implementation of CITES. Although the design of CITES aims to regulate and control species listed in Appendix II (grey list), it is argued that species listed in Appendix II are at the mercy of exporting countries, as no import license is required. The only solution is regarded as transferring to Appendix I (total ban) in the absence of effective implementation (Jenkins, 2000). In other words, in the case of ivory, the international community failed to control and regulate the international trade of ivory sustainably and found a solution towards a total ban by preventing the sustainable use of ivories. This approach, however, is likely controversial in light of the requirement for good governance, which is among the principles of sustainable development. Moreover, since the participation of local people is not assured, it is scarcely feasible to regard the trade ban as participatory and consensus-oriented. Accordingly, the process lacks important characteristics of good governance.

Nevertheless, a new system should have been developed and implemented instead of listing African elephants in Appendix II, which would jeopardize the population of African elephants, or in Appendix I, which means a total ban on international trade. In this system, participatory, consensus-oriented, accountable, transparent, responsive, effective and efficient, equitable and inclusive control of trade should have been assured. In this process, the participation of stakeholders should have been granted, and this mechanism should have been funded in accordance with the financial power of the countries. The market and price of ivory could have been controlled so that poachers are excluded from the system.

Therefore, ways to promote the sustainable use of ivory should be provided to ensure good governance in the international trade of wildlife. To achieve this, the control on Appendix II species under CITES should be developed, and an effective control regime should be introduced instead of resorting to a total ban on ivory trade.

4.5. Principle of Integrity and International Ban on Trade of Ivory

The principle of integrity underscores the integration of economic, environmental, and social aspects within the concept of sustainable development. Sustainable development goals should be achieved by considering relevant socio-economic dimensions, such as addressing the specific needs of local people or other vulnerable groups before implementing conservation projects (Cordonier Segger and Khalfan, 1996, p.103-104). Gladwin (1995, p.879) draws attention to the "connectivity" dimension of sustainable development by emphasizing that sustainable development is systematically interconnected and interdependent with global issues like poverty alleviation, population stabilization, or the distribution of economic opportunities. In fact environmental challenges and their solutions

encompass intricate socio-economic aspects, and the success of policies relies on the proper consideration of relevant policy priorities. This complexity necessitates public participation and good governance, as discussed above.

The reasons behind the decline in the population of African elephants, potential effects of a trade ban, the respective capabilities and needs of countries and local people should have been assessed with an integrated approach. A system that controls and monitors international ivory trade should have been implemented as an example of good governance practice. Instead, the international community opted for a complete ban on international ivory trade.

4.6. Precautionary Principle and International Ban on Trade of Ivory

Sustainable development is rooted in the equitable and sustainable use of resources. However, the inherent uncertainty and unpredictability in the pursuit of sustainable development necessitate precaution, safety margins, and preparedness for unwelcome surprises. Prudence, in this context, refers to care and prevention (Gladwin et al, 1995). The precautionary principle, which has been regarded as a tool to prevent sovereign states from using scientific uncertainty as an excuse for inaction, focuses on taking actions to avoid or diminish scientifically plausible but uncertain harm (World Commission on the Ethics of Scientific Knowledge (COMEST), 1995, p.14).

The precautionary principle comprises the components of threat of harm, uncertainty of impact and causality, and precautionary response, although their levels are contentious (Gardener, 2006). Controversies surround the precautionary principle, including its content and boundaries. Carolan (2008) argues that environmental problems inherently involve uncertainty, and a precautionary attitude is valuable, especially for endangered species that cannot afford to wait for scientific results. On the other hand, Sunstein (2005) contends that the precautionary principle may not be maximin principle and could impede rational priority. He emphasizes the importance of careful consideration even in the face of catastrophic risks under uncertainty, as some steps could lead to significant and unexpected costs with little or no gain.

While not explicitly included in the text of CITES, the parties endorsed the precautionary principle in 1994 (Cordonier Segger and Khalfan, 2006, p.147). However, resorting to the precautionary principle is problematic and subject to criticism. Dickson (2000) highlights the ambiguity surrounding the meaning and scope of the precautionary principle and asserts that it does not preclude consideration of different policy options and other reasons for the extinction of species. Cooney (2003) also argues that the precautionary principle does not provide sufficient guidance to restrict international trade within the framework of CITES. In the case of ivory, while it might seem feasible to avoid environmental risks and implement a complete ban in light of the precautionary principle, it should be noted that the scope of this principle is already controversial, and the potential effects of a trade ban should have been assessed in any case.

Furthermore, the effects of a trade ban should be comprehensively reevaluated, considering that the ban may have negative impacts on the conservation efforts for the African elephant. This is because the trade ban reduces the value of the elephant, as explained above.

5. Conclusion

In this paper the international ban on the trade of ivory is critically assessed in the context of sustainable development principles and the guidelines outlined in the New Delhi Declaration of Principles of International Law Relating to Sustainable Development. Aligned with the principle of sustainable use of natural resources, sustainable development advocates exploring avenues for the wise use of ivory rather than opting for a complete ban. In addition, the multifaceted causes of African elephant extinction suggest that the ivory

trade might contribute positively to conservation efforts. The trade ban appears to neglect considerations of equity among states, the specific needs and capacities of states, the participation of local communities, and principles of good governance.

In conclusion, a comprehensive evaluation of the ban is essential by reflecting the integrated approach mandated by sustainable development, which demands cohesion across social, environmental, and economic dimensions. Furthermore, while the precautionary principle urges action in the face of uncertain environmental harm, it does not preclude the exploration of alternative policy options beyond a complete ban and addressing various reasons for elephant extinction. Policymakers should refrain from using the precautionary principle as a shield, carefully analyze the overall effects of the trade ban on the African elephant population and avoid its rationalization solely through the precautionary principle, which is already contentious in scope and meaning.

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A Look at The Cities' Climate Change Adaptation Action Plans for Türkiye: Challenges and Opportunities†

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Abstract

IPCC Sixth Assessment Report on Impacts, Adaptation and Vulnerability provides an in-depth assessment of Mediterranean Region where annual mean warming is projected to vary between 0.9 to 5.6°C under different emission scenarios by the end of the century while precipitation will decrease by 4% to 22% in most areas. Cities are hotspots of vulnerability to climate change impacts such as floods, drought and heatwaves, and need to adapt their operations in view of expected climate change impacts. On the other hand, cities are providing a unique ability to address those challenges as near-term measures implemented in urban infrastructure will determine global capacity for emission reductions and adaptation to climate change impacts. Urbanization influences climate change substantially and rapid urbanization may offer a unique potential for the creation of sustainable cities if decision-makers choose the right pathways and measures. Therefore, it is very important to make cities an integral part of the solution while combating climate change.

Cities have significant effects on climate change due to Greenhouse Gas (GHG) emissions occurring within their boundaries and urban heat island effect on temperatures. Meanwhile, they contain sensitive structures against the impacts of expected climate change. For this reason, a city action plan for climate change should consider actions both to reduce GHG emissions within the city and to increase the adaptation capacity of the city to the consequences of climate change. This study discusses the general approach adapted by the local governments, and evaluates adaptation measures. The study addresses economical, political, and social obstacles and opportunities in developing adaptation strategies and implementing adaptation measures. Furthermore, this study discusses in detail the following steps in developing cities' Climate Change Action Plan (CCAP): Determination of in-city GHG emission sources and emission factors, stakeholders' inclusion, preparation of GHG inventories, assessment of GHG emission reduction scenarios, sectors' vulnerability and risk assessments, identification of adaptation measures for the sectors, and finally preparation of the city's climate change action plan.

Keywords: Climate change, mitigation, adaptation, risk, vulnerability

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Türkiye'deki Şehirlerin İklim Değişikliğine Uyum Eylem Planlarına Bakış: Zorluklar ve Fırsatlar

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Öz

IPCC'nin Etkiler, Uyum ve Kırılganlık konulu 6. Değerlendirme Raporu Akdeniz Bölgesine ilişkin derinlemesine bir değerlendirme sunmakta olup; yüzyılın sonuna kadar farklı emisyon senaryoları altında yıllık ortalama ısınmanın 0,9 ila 5,6°C arasında değişeceği ve yağışların ise çoğu bölgede %4 ila %22 oranında azalacağı öngörülmektedir. Sel, kuraklık ve sıcak hava dalgaları gibi iklim değişikliğinin etkilerine karşı hassas noktalar olan şehirlerin operasyonlarını iklim değişikliğinin beklenen etkilerine göre uyarlamaları gerekmektedir. Öte yandan, kentsel altyapıda uygulanan kısa vadeli önlemler, emisyon azaltımı ve iklim değişikliği etkilerine uyum konusunda küresel kapasiteyi belirleyeceğinden, şehirler bu zorlukların üstesinden gelmek için benzersiz bir kabiliyete sahiptir. Kentleşme iklim değişikliğini önemli ölçüde etkilemekte olup, hızlı kentleşme, karar vericilerin doğru yolları ve önlemleri seçmesi halinde sürdürülebilir şehirlerin yaratılması için benzersiz bir potansiyel sunabilmektedir. Bu nedenle iklim değişikliğiyle mücadelede şehirlerin çözümün ayrılmaz bir parçası haline getirilmesi büyük önem taşımaktadır.

Şehirler, sınırları içinde meydana gelen Sera Gazı Emisyonları (SGE) nedeniyle iklim değişikliği üzerinde önemli etkilere sahiptir. Aynı zamanda beklenen iklim değişikliğinin etkilerine karşı da hassas yapılar içermektedir. Bu nedenle, şehrin iklim değişikliğine yönelik eylem planı, hem şehirdeki sera gazı emisyonlarını azaltacak hem de şehrin iklim değişikliğine uyum kapasitesini artıracak eylemleri dikkate almalıdır. Bu çalışmada yerel yönetimlerin benimsediği genel yaklaşım ele alınmakta ve uyum tedbirleri değerlendirilmektedir. Çalışma, uyum stratejilerinin geliştirilmesinde ve uyum önlemlerinin uygulanmasında ekonomik, politik ve sosyal engelleri ve fırsatları ele almaktadır. Ayrıca, çalışma şehirlerin İklim Değişikliği Eylem Planının (İDEP) hazırlanmasında gerekli olan; şehir içi sera gazı emisyon kaynaklarının ve faktörlerinin belirlenmesi, paydaşların katılımı, sera gazı envanterlerinin hazırlanması, sera gazı emisyon azaltım senaryolarının değerlendirilmesi, sektörlerin hassasiyet ve risk değerlendirmeleri, sektörlere yönelik uyum tedbirlerinin belirlenmesi ve son olarak şehrin iklim değişikliği eylem planının hazırlanması adımlarını ayrıntılı olarak tartışmaktadır.

Anahtar kelimeler: İklim değişikliği, azaltım, uyum, risk, kırılganlık

1. Introduction

Climate change, as one of the key challenges that humankind facing within current century, is expected to increase the severity of hazardous phenomena such as heat waves, draughts, heavy precipitation and floods. Cities are estimated to account for 60% of the global greenhouse gases (GHG) emissions and can therefore contribute substantially to the global efforts of mitigating GHG emissions (UN, 2021). According to a model-based estimate of carbon footprint, there are 7 Turkish cities in a list of top 500 cities worldwide. Istanbul, as the largest city of Türkiye in terms of population, ranks 26th while Ankara follows it on 80th place (GGMCF, 2022).

In Türkiye, almost 70% of population lives in urban areas and an increase of this figure is expected in near future, which will challenge infrastructures in combination with the climate change related risks. Direct impacts of climate change such as increase in extreme weather events, sea level rise and change in precipitation patterns may result in food distress, water scarcity, poverty and health related concerns. IPCC Sixth Assessment Report on Impacts, Adaptation and Vulnerability classifies risk in urban areas into two categories, i.e. compound and cascading risks, where former implies events that can be initiated via climate hazards and latter occur when an extreme weather condition triggers secondary impacts on several areas such as health conditions of citizens, food security, key infrastructure systems, land-use, immigration (IPCC, 2022). Report also provides an in-depth assessment of Mediterranean Region where annual mean warming is projected to vary between 0.9 to 5.6°C under different emission scenarios by the end of the century while precipitation will decrease by 4% to 22% in most areas. IPCC Sixth Assessment Report on The Physical Science Basis underlines that without the implementation of intense mitigation measures, temperatures will exceed the threshold of 2°C between early 2040s and 2050s (IPCC, 2021). Report also highlights the importance of heatwaves resulting in enhanced urban heat islands and defines three factors that are amplifying the consequences of warming in urban areas, i.e. urban geometry absorbing and storing more heat, human activities providing heat and lack of vegetation and heat absorbing materials. 2021 Adaptation Gap Report prepared by UNEP to provide recent development and progress of global adaptation process in terms of planning, financing, and implementation, underlines that the estimated costs of adaptation could reach 280-500 billion USD per year by 2050 for developing countries while estimated adaptation costs and financing needs will be five to ten times greater than current international adaptation finance flows (UNEP, 2021).

Cities are hotspots of vulnerability to climate change impacts such as floods, drought and heatwaves, and need to adapt their operations in view of expected climate change impacts for their regions. The vital importance of cities and their roles in climate change adaptation have already been pointed out by global conventions. Paris Agreement, which mainly aims at limiting global greenhouse gas emissions and keeping global temperature increase below 1.5°C, was prepared at the 21st Conference of the Parties held in 2015 with the participation of 196 countries. The agreement was approved by the Grand National Assembly of Türkiye in October 2021. Although the negotiations for the implementation of the agreement are still ongoing, most of the countries have declared their contribution on reduction of global greenhouse gas emissions and will update their targets on a regular basis. The agreement also requires countries to carry out actions for the protection of GHG sinks and biodiversity and to provide support to the developing countries and the most vulnerable countries in terms of financing, technology transfer and capacity building. The goals of the Paris Agreement can only be realized through coordination in global, regional, national and local levels. Cities provide a unique ability to address those challenges as near-term measures implemented in urban infrastructure will determine global capacity for emission reductions and adaptation to climate change impacts. Urbanization influences climate change substantially and rapid urbanization may offer a unique potential for the creation of sustainable cities if decision-makers choose the right pathways and measures. For this reason, it is very important to make cities an integral part of the solution while combating climate change. The Urban Climate Change Research Network's Second Assessment Report on Climate Change in Cities (ARC3.2), provides a pathway constituting the following five steps; integration of mitigation and adaptation actions, coordination on disaster risk reduction, co-generation of risk information, special focus on vulnerable populations, advanced governance, finance, and knowledge networks. Report also states that

cities not following these steps may experience difficulties on realizing their potential in terms of climate change solutions (Rosenzweig et al., 2018).

Several projects have been built upon the importance of cities in the fight against climate change. The Cities and Climate Change Initiative as one of UN-Habitat's programmes on sustainable urbanization and climate change, providing support to cities in addressing the climate challenge by assessing vulnerabilities in a participatory framework, informing urban planning processes, developing climate change plans and strategies, bridging the climate financing gaps, and prioritizing and implementing mitigation and adaptation actions. The Global Covenant of Mayors (GCoM) for Climate and Energy brings together more than 13,000 cities and local governments voluntarily committed to achieve the goals of the Paris Climate Agreement in building a resilient and low-emission society. As of today, 68 municipalities from Türkiye are part of GCoM and they are required to develop a Sustainable Energy and Climate Action Plan (SECAP) outlining the key actions they plan to undertake (GCoM, 2023). Local Governments for Sustainability (ICLEI) is a global network working with more than 2,500 local and regional governments aiming at sustainable urban development, almost 20 municipalities from Türkiye are a member of ICLEI (ICLEI, 2023). Türkiye is currently working on a national law on climate change, under which local governments are expected to develop their climate change action plans (CCAP), therefore a guidance is needed for the local authorities on their cycle of CCAP preparation.

2. Climate Change Action Planning for Cities

It is utmost important to develop a common methodology for a robust planning of actions to support local authorities while combatting the impacts of climate change. The SECAPs prepared within the GCoM were evaluated by the European Commission Joint Research Center and the results were reported to provide guidance on plans to be prepared in the following years (Bertoldi et al., 2020). On the other hand, there are various studies on the evaluation of local climate action plans prepared on a regional basis (Alexander, 2020; Pietrapertosaa et al, 2018; Reckien et al., 2018; Wheeler, 2018; Mendez, 2015; Walsh et al., 2011; Basset and Shandas, 2010; Tang et al., 2010).

There are several initiatives that are established to fill in knowledge gaps on adaptation planning such as EU's Climate-ADAPT, Stockholm Environment Institute's We-ADAPT, GIZ's Adaptation Community, World Adaptation Science Programme (WASP), UK Climate Impacts Programme etc. Several tools have been established to help local planning process on climate change adaptation such as; Urban Adaptation Support Tool (UAST) prepared by EEA, Climate-ADAPT and C40, Climate Action for Urban Sustainability (CURB) prepared by World Bank, Toolbox developed within the project "Reconciling Adaptation, Mitigation and Sustainable Development for Cities (RAMSES)", URBANPROOF toolkit developed within the Life project "Climate Proofing Urban Municipalities", Climate-Proof City tools created by ILKKA-project.

Co-benefits of the mitigation and adaptation actions are already evident, as investment to a low-carbon and resilient infrastructure comprise lower costs while providing many benefits. For example, implementation of sustainable transportation modes within the city may help in reducing traffic related concerns and improve local air quality together with the reduction of greenhouse gas emissions, while providing alternative means of transportation to reduce vulnerability of citizens in case of a disaster. Adaptation and Mitigation Interaction Assessment (AMIA) tool created by C40 aims to assist cities in maximizing synergies between adaptation and mitigation actions.

An evaluation of current local CCAPs in Türkiye have been performed with aim of assessing CCAPs based on several indicators determined under the following themes: development procedure, emission inventory,

goal setting, implementation of the plan, monitoring and evaluation. Nine local CCAPs that have been prepared by metropolitan municipalities were evaluated. All of them has prepared an emission inventory for a given base year and emission reduction targets were determined in a much broader term, while in few plans action-based information were provided. Not only many of the plans examined in this study did not cover adaptation to climate change but also, they contained limited information on the administrative structure, institutional arrangement and awareness raising in relation to the implementation of the plan. Sea level rise, urban heat islands, decrease in air quality, limited availability of water resources, damage to infrastructure due to extreme weather events and health effects are among the areas that are expected to be highly vulnerable to climate change at the urban scale. In this framework, 4 out of 9 CCAPs have prioritized the following sectors in terms of climate change related risks; public health, land use, forestry, agriculture, biodiversity, infrastructure and water resources management. In all plans, it is stated that vulnerability assessment and risk analysis have been carried out prior to the determination of actions. However, a variety of methodologies has been implemented where in many cases background is not clear. A common methodology needs to be developed to help the local actors and to the other stakeholders that will review the CCAPs (such as policy makers, research institutions).

3. Requirements for a Successful CCAP

The first step of the action plans is to define a realistic but ambitious vision that will clearly specify the source of motivation such as "low carbon development", "climate friendly city" and "sustainability". For the sake of the implementation and sustainability, multi-participant structure, usually through stakeholder workshops and survey studies must be formed in the process of the CCAP development. Sector experts, experts from different units within local governments, non-governmental organizations, academics and private sector representatives can be defined as stakeholders. The realization periods of the targets determined in the plans should be included in the planning processes as long, medium and short term.

Within the scope of the CCAP, the greenhouse gas inventory must be prepared for the cities. GHG emissions from all fixed and mobile sources operating within the boundaries of cities are evaluated as Scope 1 and GHG emissions from energy purchased outside the provincial borders are evaluated as Scope 2. Other sources of GHG emissions that occur outside the boundaries of cities due to the activities of cities are evaluated under Scope 3. Inventory studies are carried out for the residential, commercial and institutional buildings, transportation, manufacturing industries, energy production, treatment of waste and agriculture, livestock, forestry and land use. The sectors considered within the scope of the inventory should be evaluated and examined based on how much they represent the city. During the preparation of the inventory, the criteria determined by the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) can be taken into consideration. In addition to the methodology used in creation of greenhouse gas emission inventories, the data collection process, data sources and assumptions made in the calculation should be reported in detail in terms of both the continuity of the inventory update process and informing the stakeholders. GHG emission inventories prepared for cities in Türkiye mostly follow the GPC methodology. In addition, some inventories also include institutional GHG emission inventories that address categories such as transportation vehicles operated within the municipality, energy consumption in municipal buildings, street lighting and traffic lights.

Greenhouse gas inventories are a critical first step for CCAP as they are essential to monitor changes in GHG emissions while identifying mitigation opportunities. However, changes in GHG inventories over time cannot reveal the effects of policies or actions as they will not be sufficient to explain the causes of changes in emissions over time.

The construction of mitigation scenarios and the assessment of greenhouse gas impacts should be carried out as a complement to developing a GHG inventory. The first step in the process of determining the targets in the action plan is to estimate the change that the city will undergo during the inventory preparation period in the light of socioeconomic indicators. For this purpose, projections of greenhouse gas emissions for a base year should be calculated, taking into account of various factors such as expected changes for the country and social transformations that may occur in the province. In action plans, alternative emission projections can be created taking into account different parameters such as growth rate. There are two main methods used to set GHG emission reduction targets: absolute reduction and reduction compared to the reference scenario (GPC, 2014). In general, emerging economies set reduction targets according to the reference scenario, taking into account of their growth status. Two methods are generally preferred in action plans for digitizing the reduction targets: determining the sectoral reduction ratios by distributing the total reduction target to the sectors (top-down) and calculating the reduction amount for each action that can be quantified (bottom-up) and specifying these amounts as performance indicators.

It is anticipated that the increase in the frequency and severity of extreme weather events will cause great hazards in the province and pose significant threats to the urban infrastructure. Access to basic resources such as water and food is expected to be restricted as floods, frosts, hail and sea level rise will also affect agriculture. For these reasons, public health, land use, forestry, agriculture, food safety, biodiversity, infrastructure and water resources management should be among the priority areas in climate change adaptation plans prepared for cities. Determining actions to increase the city's capacity to adapt to climate change is important for CCAP. Before determining the actions in the plans, vulnerability assessment and risk analysis studies should be carried out. Actions determined on a sectoral basis are prioritized with the participation of stakeholders, CCAP include information on the relevant institution/organization, the realization time of the action, performance indicators and estimated costs. Evaluations of the measures set forth in the preparation of CCAP are carried out using methods such as cost analysis and multi-criteria analysis. CCAPs are intended to consist of actions to build capacity building and support management systems, such as the establishment of compliance options and supportive institutional frameworks. The difference in emissions between the mitigation scenarios and the baseline scenario will represent the impact of the policy or action on GHG emission reduction. In addition to evaluating the effects of the policies and actions according to GHG emissions mitigation potential, the broader social, economic, and environmental impacts such as contribution to air quality, public health and job creation are also examined in a general framework.

According to the guidelines published by the European Commission Joint Research Center for the CCAP documents being prepared within the CoM, the CCAP strategy should be formed under three pillars; emissions inventory, climate change risk and vulnerability assessment and finally mitigation and adaptation actions. Within same guide, the basic elements defined in order to create a successful action plan are as follows (Bertoldi, 2018):

- Formal acceptance of the planning process by the city council (or equivalent decision-making body)
- Clearly setting mitigation and adaptation targets
- Scientific assessment of the local situation (emissions inventory, risk and vulnerability analysis)
- Dealing in detail with the main sectors that profile the city
- Clearly defining the strategies and actions to be completed by 2030
- Mobilization of all relevant units of the municipality
- Involvement of the public and other

stakeholders in the process
- Identification of financial resources
- Establishing the framework for monitoring and evaluation of the plan

4. Risk Analyses: Hazards, Exposure and Vulnerability

Researches on the regards of the impact analyses of climate change in Türkiye mainly follow the "top-down" approach at which climate risks are evaluated based on the results of simulations of regional climate models dynamically downscaled using initial and boundary conditions taking from the global climate model projections, historical records and past events. In order to assess and anticipate climate-related risks, and appraise adaption options, it is imperative to understand the physical aspects of climate change, uncertainties in global climate models and regional impacts. Three methodologies namely "top-down", "bottom-up", and "storylines or narratives" are extensively used for risk assessments and adaptation appraisal.

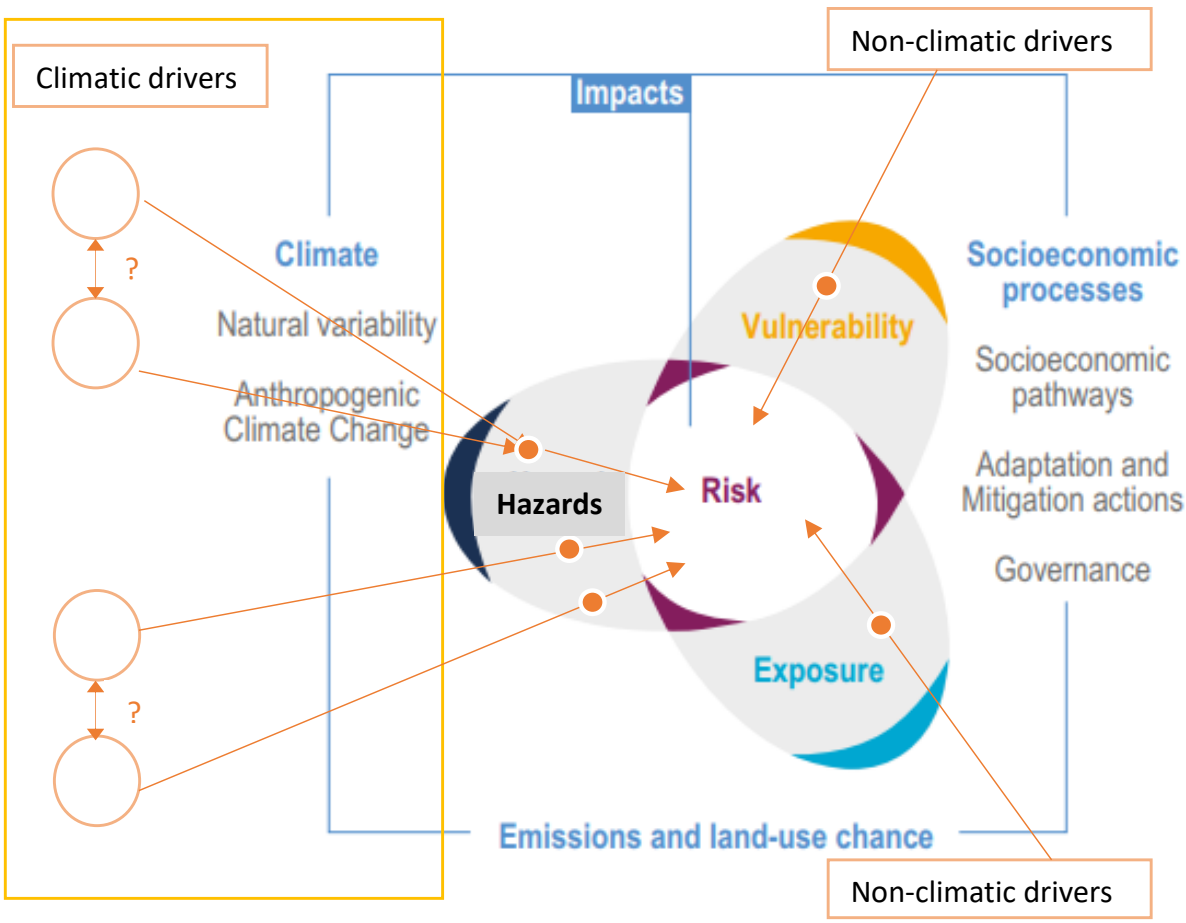

Figure 4.1. Risk Framework (adapted from Zscheischler et al. (2018) and IPCC (2014) WGII AR5. Multiple climatic drivers cause one or multiple hazards leading to societal and environmental risk. The Climate drivers and/or hazards may be mutually dependent. Non-climatic drivers related to vulnerability and exposure may also contribute to risk

Figure 4.1 adapted from Zscheischler et al. (2018) and WGII AR5 of IPCC (2014) depicts the relationships among the hazard, vulnerability, exposure, and climatic and non-climatic drivers. Exposure, as described by the IPCC, is the presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected. Vulnerability, on the other hand, is the propensity or predisposition to be adversely affected.

Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt (IPCC, 2014). The term hazard refers to climate-related physical events (e.g., floods, heatwaves, wildfire) or their physical impacts. Therefore, risks are the combination and/or function of hazards (events), vulnerability, and exposure. Climatic drivers including climate and weather processes, variables, and phenomena cause climate-related hazards while non-climatic drivers will have impact on vulnerability, exposure, and risks. Climatic drivers could interact with each other, trigger one another leading to compound or cascading hazards which increase the impact and risks, and make the estimation of events even more difficult due to the complexity of their interaction (Zscheischler et al., 2018).

In order to evaluate risk assessments and appraise adaptation options for a specific sector, reliable and thorough scientific information with known uncertainties about the impacts of changing climate, and sector's vulnerability as well as exposure to a single or combined impacts of events need to be known as detailed and accurate as possible. For the water sector for instance, The General Directorate of Water Management of the Republic of Türkiye, Ministry of Agriculture and Forestry implemented and studied climate impacts on water resources at basin scale (GDWM, 2016). In that study, climate projections using several RCP scenarios at 10 km spatial resolution were obtained using a regional climate model taking initial and boundary conditions from three different global climate models. The sectorial risk analyses will then be followed based on hydrological modelling scenarios, in-depth analyses of the past events and statistical behavior of the historical meteorological variables, and determining the capacity of the regions' social and economic conditions. The above approach more or less describes the "top-down" methodology. Many studies conducted in worldwide including in Türkiye fall into this category. As Zscheischler et al. (2018) argue that the top-down approaches unlikely represent the real risks since they are dependent on climate change scenarios which possess great uncertainties and don't provide the whole spectrum of possible future conditions. In top-down approaches, an individual hazard or an impact has been estimated based on individual or combination of meteorological or climatic drivers, creating doubts on its capability on predicting impacts associated with multiple interacting drivers or hazards (i.e., cascading or compound events).

The bottom-up approaches as described by Culley et al. (2016) are an alternative to the top-down procedure, and have been designed to identify performance thresholds without considerations of climate models' projections. Instead of focusing on how the system performs under scenario-based global model projections, the approach is rather interested in identifying the exposures under which a particular system performs satisfactorily (Lempert and Collins, 2017). To implement the approach, climate exposures are generated for a range of plausible changes in climate, including range of changes not projected by the global climate models, and system response is assessed against each climate exposure (Lempert et al., 2004, Prudhomme et al., 2010, Brown et al., 2012, Brown and Wilby, 2012). The approach takes the system of interest (e.g., river management) to the center, and starts with exploring and understanding the vulnerability or sensitivity of the whole system to the climatic drivers. The bottom-up approach which is used by many sectors to explore system resilience to the climate impacts, especially for the compound events, is more ideal for vulnerability assessments since it focuses on the combined effects of individual drivers and/or hazards that could cause system failure; this in turn results in invaluable information for the assessment of vulnerability analyses.

Frequently observed, low-impact atmospheric phenomena could cause high-impact extreme events if they occur concurrently or at the same time. Thus, understanding the physical aspects of these phenomena (e.g., planetary scale systems like waves, jet streams, large/synoptic scale atmospheric systems like fronts and low-high pressure systems, and

mesoscale processes like land-sea interactions and topographical effects) is a critical key for the assessment of reliable risks. It would be useful and very beneficial to take into account of extreme events as being a compound event and study and understand each of its' integral parts (multi-drivers causes). Studies on the hazard projections concentrate on extreme climate computed using spread of univariate quantities like the number of coldest days, magnitudes of heat waves or precipitation. Nevertheless, impacts are, many times, associated with multiple climatic/atmospheric drivers. In addition, studies on the extreme events don't give desirable information about the spatial and temporal resolution in order to make reliable risk assessments. Furthermore, extreme/catastrophic events occur in the lower end of the probability distributions and may not be quantifiable. Therefore, the climate model projections come with great and unknown uncertainties. These necessities the use of storyline (stories as short for storylines/narratives/storytelling) approaches which have recently been extensively used in energy and climate change research, and can create a linkage between the physical aspects of climate change and its' human dimension. At the intersection of multiple interpretations, stories can be useful to provide a different perspective and serve as a complementary source of information the above mentioned approaches. Moezzi et al. (2017) provides a different way of explaining stories and explains that stories offer alternative perspectives looking through "lenses" from social sciences, humanities, and practitioners. As stated in the study, stories are used to 'zoom out' and see the bigger picture, 'zoom in' to better understand micro-dynamics, local scale, and refine models of how things work, 'zoom through' by looking what's behind the surface. The method can help connect diverse stakeholders and create an environment for collaborative and cooperative actions.

5. Suggestions and Final Comments

Cities are responsible for about 60% GHG emissions globally and therefore, have significant effects on climate change. At the same time, they are hot spots of exposure and vulnerability to the adverse impacts of climate change. Therefore, it is imperative for cities to develop strategic plans and climate actions for both reducing GHG emissions and improving adaptation capacities. With the Draft Climate Law prepared by the Directorate of Climate Change of the Ministry of Environment, Urbanization and Climate Change, it is aimed to prepare Local Climate Change Action Plans in 81 provinces of Türkiye. It is considered that there is a need for capacity building on climate change in all municipalities, especially metropolitan municipalities, and in this context, through the Climate Portal, which is also planned to be commissioned by the Directorate of Climate Change, an infrastructure will be established where both the studies carried out in the field of climate change will be shared and local stakeholders will carry out monitoring studies on action plans. Moreover, the preparation of guidance documents and calculation tools that will contribute to the preparation of greenhouse gas emission inventories by municipalities is also underway.

In order for CCAPs to be successful and actionable, a few criteria are listed below:

1. For a successful and sustainable CCAP, local governments or municipalities should accept their responsibilities and take ownership of prepared CCAPs. The willingness and ambitions of local governments on the issue of climate change are important keys for sustainability. Action plans should be ambitious but have realistic goals, clearly specifying the source of motivation such as "low carbon", "climate friendly city" and "sustainability".
2. The CCAPs must follow scientifically established standards and certain international protocols so that they can be monitored and evaluated easily, and compared with other CCAPs.
3. Mitigation targets and adaptation options must be identifiable, applicable, actionable, implementable. The short, medium and long term-realization periods of the targets should be included in the planning process.

5. Strategies and actions defined in CCAPs should be aligned with and, even further, should support and contribute to the national climate action plan, national strategies and climate goals.
6. For each mitigation or adaptation action, the main responsible parties or branches within the local governments or municipalities should clearly be identified and determined. The contributing actors such as provincial directorates and stakeholders should also be assigned in CCAPs.
7. Each action defined in CCAPs comprises multiple measures associated or attributed to clearly defined performance criteria. It is essential and a requirement to continuously monitor, update, and improve CCAPs, and therefore, policy consistency and long-term devotion are critical aspects, and consortiums within municipalities are recommended. All relevant branches within the municipalities (e.g., Depts. of the Environment Protection and Control, Transportation, Zoning and Urbanization, and the Climate Change and Zero-Waste) must be fully engaged and contribute to the cause.
8. High engagement of the stakeholders is the key to success. Public awareness on the impacts of climate change is crucial. Therefore, municipalities must keep organizing systematic and effective awareness raising activities on climate change. Local actors such as NGOs, union of chambers, private sectors must be included in planning from the start. It is important for the sake of the implementation and sustainability of the plan to create a multi-participant structure, usually through stakeholder workshops and survey studies. Typical stakeholders for city CCAPs are the sectorial experts, experts from different units within the local government, non-governmental organizations, academicians and private sector representatives.
9. Financial resources and funding mechanisms should be planned ahead, and actions should be prioritized accordingly. To give an example; one of the criteria for the sake of prioritization would be the low-cost and high benefit criterion (e.g., the actions with low-cost, high impact providing co-benefits). Certain funds received from the Central government can be allocated in fulfilling both the main responsibilities of the municipality and climate actions at the same time.

In most of the action plans of cities evaluated within the scope of this study, actions for adaptation to climate change were not determined. This situation can be explained by factors such as the issue of adaptation to climate change has come to the fore in recent years compared to mitigation, adaptation actions can be considered in a much broader framework, and the results of adaptation actions provide benefits at the regional level. Although it is seen that stakeholder participation in the preparation of action plans is generally provided through survey studies, workshops and focus group meetings, it has been determined that the targets/activities for public participation and awareness raising are missing, especially at the point of disseminating the results of the action plan. While information on the prioritization methodology used to transform mitigation targets into actions is provided in a limited number of plans, for those plans that do not include numerical targets on action basis, there is a significant deficiency for monitoring and evaluation of the plan.

In general, although the first step towards a solution is taken with the action plans prepared for climate change, the failure to clearly set out the responsibilities and performance indicators for the actions determined, the failure to address the other benefits and impacts of the actions, and the failure to establish a timetable for the implementation and financing of the actions are considered as important problems that may hinder the success of the process. In the coming period, when climate action plans will gain importance, it will be useful to create guidance documents/tools on a national basis regarding the planning process

and minimum requirements, both for new plans and for updating existing plans. Increasing the sharing of experience and knowledge among local governments in the planning process will also increase the consensus on the planning process and contribute to raising the level in terms of scope and quality.

As preparing and implementing mitigation and adaption measures, varying degree of challenges and certain opportunities arise; these difficulties and opportunities appear and manifest themselves differently from nations to nations, and even among cities.

Some of the challenges and opportunities obtained through studies of CCAPs can be listed as the followings;

1. Risk assessments rely on known uncertainties and reliable climate change information. One of the biggest problems is uncertainties in climate model projections, their inability to produce past climate and even seasonal variations. Use of dynamically downscaled "Regional Climate Modelling" approach can provide scenario-based projections for risk assessments, and could reduce uncertainties, improve forecast skills due to higher spatial and temporal resolutions, high resolution of digital elevation mapping and land use / land cover, and better representations of physical aspects of land-sea interaction (Shepherd et al., 2018; Meredith et al., 2015).
2. Lack of financial mechanisms to support developing and underdeveloped countries has vital consequences. This has been one of the key issues since the Paris Agreement which is to establish financing mechanisms both mitigation and adaptation actions. Developing or underdeveloped nations don't have enough expertise and technological resources.
3. Lack of necessary funding that municipalities need to carry out adaptation actions which can be solved in part by prioritizing co-beneficial actions, low-cost and high-impact choices. For instance, as for adaptation options against flooding, one measure would be to create artificial wetlands, structures to hold water with permeable surfaces. This allows water to infiltrate and reach groundwater reservoir enhancing water resources and biodiversity. As for mitigation actions, implementation of sustainable transportation modes within the city reduces GHG emissions, and at the same time reduces traffic related problems, improves local air quality and public health, creates alternative means of transportation to reduce vulnerability.
4. Lack of institutional capacity and understaffing within local governments and municipalities may result in an inapplicable CCAP. Sharing experience and knowledge between local governments during planning process would increase the consensus on CCAPs and contribute to raising their scope and quality.
5. Economic and political instabilities around the world pose serious threats. Crises due to wars, economic bans, worldwide refugee problems and such will bring additional obstacles to fight against climate change and better climate resilient communities.
6. Limited understanding of risks for adaptation and lack of acceptance of risks are another issue for sustainability reasons. Choosing a right language is important for the public even for politicians to understand the climate and climate change, and its potential impacts. Utilizing conventional and social media coverages are critical to inform the public, and to provide science-base evidence.
7. In some parts of the world, supportive policies, standards, and regulations on the mitigation of and adaptation to climate change do not exist. Especially, underdeveloped countries have understandably different and legitimate priorities such as accessing quality of drinkable water, electricity, nutrition and food safety, and water scarcity and education, and many more.
8. Climate change and its adverse impacts are now recognized and accepted by the

public, and it is considered to pose great threats. Majority of people and sectors representatives believe that climate change is real and its adverse impacts will be great. This could leverage climate actions plans, cause more community support, and provide an opportunity to tackle climate related problems; turning obstacles into opportunities.

9. Lack of confidence in measures could play a negative role. Scientific results (science-base evidence) should be translated using clear, understandable, appropriate languages and or mechanisms. Important questions about feasibility, efficacy, acceptability and sustainability of actions must be answered satisfactorily, providing information about the cost-benefit and timescale information, and showing robustness of the actions within the uncertainty. Action plans must consider, and take equity and fairness seriously, and flexible enough.
10. To date, no studies conducted in Türkiye on the sectorial risk assessments and or vulnerability analyses using bottom-up or storyline approaches have been appeared in the literature. These methods have certain advantages as discussed previously and can bring relevant actors, improve risk awareness by framing risk in an event-oriented rather than a probabilistic manner. Storylines can strengthen decision-making by reliving and learning from the past events and combining local impacts of climate change including compound risks. In addition, storylines can be used to explore probable range of extreme events by utilizing improved regional climate model scenarios where multi-divers can be employed.

Co-beneficial features of the mitigation and adaptation actions are already evident, as investment to a low-carbon and resilient infrastructure comprise lower costs while providing many benefits. Adaptation actions to climate change create multiple benefits such as cleaner air and greener cities as mentioned earlier. Studies on the preparations of CCAPs will contribute to awareness raising about climate change and help better resilient society. These studies will reveal the current situation in terms of GHG emissions and climate risks. If and when the mitigation and adaptation measures are well integrated in the CCAPs, it will also serve to contribute to some of the sustainable development goals mentioned by the United Nations.

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Effects of Vermicompost on Sustainable Agriculture Under Different Growing Conditions

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Abstract

Sustainable agriculture aims to providing a healthy food source and a habitable environment for future generations, plays the fundamental role in agriculture, ensuring both food security and environmental sustainability. Organic fertilizers are frequently utilized in achieving these objectives in crops production. Vermicompost is a natural and high-valued organic fertilizer used in sustainable agricultural practices, resulting of organic waste breakdown by earthworms. The organic matter digested by worms forms vermicompost, containing beneficial nutrients for the soil and plants. This fertilizer enhances soil health and promotes plant growth. However, the growing environments of plants also hold significance in terms of sustainability. This study, focusing on the impact of vermicompost on plants grown under different conditions such as field, greenhouse, and soilless environments, emphasizes the role of vermicompost in improving soil health, reducing chemical fertilizer use, and serving as a significant component of sustainable agriculture. According to information gathered from literature studies, vermicompost contributes to plant yield and quality, predominantly in greenhouse conditions. It has been observed that vermicompost can serve as an alternative to chemical fertilizers or effectively reduce their usage and enhance sustainability, deciding optimal doses.

Keywords: Field, greenhouse, soilless agriculture, sustainable agriculture, vermicompost

Vermikompostun Farklı Yetiştirme Koşullarında Sürdürülebilir Tarım Üzerine Etkisi

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Öz

Sürdürülebilir tarım, gelecek nesiller için sağlıklı bir gıda kaynağı ve yaşanabilir bir çevre sağlama amacıyla tarımda temel bir rol oynamaktadır. Organik gübreler, bu hedeflere ulaşmada sıkça kullanılan araçlardandır. Vermikompost, toprak solucanları tarafından organik atıkların ayrıştırılması

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sonucunda elde edilen doğal ve yüksek değerli bir organik gübredir. Solucanların sindirdiği organik madde toprak ve bitkiler için faydalı besinleri içeren vermikompostu oluşturur. Bu gübre, toprak sağlığını iyileştirir ve bitki büyümesini teşvik eder. Ancak bitkilerin büyüdüğü çevrelerin de sürdürülebilirlik açısından önemi bulunmaktadır. Bu çalışma, farklı koşullar altında yetiştirilen bitkiler üzerinde vermikompostun etkisine odaklanmakta; tarla, sera ve topraksız ortamlarda vermikompostun toprak sağlığını iyileştirme, kimyasal gübre kullanımını azaltma ve sürdürülebilir tarımın önemli bir bileşeni olarak rolünü vurgulamaktadır. Literatür çalışmalarından elde edilen bilgilere göre, vermikompost farklı yetiştirme koşullarında bitki verimi ve kalitesine katkı sağlamaktadır. Verimli dozajların belirlenmesiyle, vermikompostun kimyasal gübrelere alternatif olarak kullanılabildiği ve onların kullanımını etkili bir şekilde azaltabildiği gözlemlenmiştir.
Anahtar Kelimeler: Sera, sürdürülebilir tarım, tarla, topraksız tarım, vermikompost

1. Introduction

The utilization of chemical fertilizers significantly rises all over the world approximately 60 years ago due to increasing global population, resulting an increasing demand for nutrients. Over time, it became apparent that these fertilizers had harmful effects for both on the environment and human health (Throat and More, 2022; Türkmen et al., 2021). Therefore, there has been a growing interest in organic fertilizers, leading to the using of fertilizers such as food waste, green manure, animal manure, and vermicompost generated through composting methods.

Sustainability is a critical concept that takes part at the center of modern agriculture and food production. Sustainable agriculture aims to balance agronomic, environmental, economic, and social aspects. To hand down a healthy food source and a habitable environment for future generations, agricultural practices and food production need to be sustainable (Turhan, 2005).

Vermicompost has gained substantial attention in sustainable agriculture due to being an organic fertilizer, nature and its non-hazardous impact on soil pollution (Dayar, 2019). As a reliable, economical, and environmentally friendly resource, vermicompost (worm castings) represents an effective fertilizer that positively contributes to sustainable agricultural crops (Kayabaşı and Yılmaz, 2021). Examining the potential effects of vermicompost on seed germination, plant growth, and productivity is a crucial step toward sustainable agriculture and food production. This article presents studies concerning the impact of vermicompost on sustainable agricultural crops under field, greenhouse, and soilless conditions.

2. Sustainable Agriculture

Sustainable agriculture is a sort of organic farming aimed at increasing yield, maintaining soil health, reducing the use of chemical fertilizers and pesticides, effectively conserving water resources, preventing environmental pollution and eliminating harmful effects on human health (TOB, 2021a; TOB, 2021b) (Figure 1). Particularly, soil health and organic matter content are crucial for ensuring sustainability in agricultural production. Organic matter has positive effects on soil physical, chemical, and biological properties, high water retention capacity and cation exchange capacity (Xu and Mou, 2017). On the other hand, it's known that the use of chemical fertilizers is harmful to both the environment and health (Thorat and More, 2022). For these reasons, the use of organic soil regulators or organic fertilizers, which positively affect yield and quality in consumed foods, is essential for sustainability. While there are many fertilizers obtained from plant and animal waste, vermicompost has been frequently used lately due to its impact on soil regulating and plant growth. Numerous studies have highlighted its contribution to improving plant yield and quality, considering it an important tool for sustainable agriculture (Arancon et al., 2003; Jahan et al., 2014; Rahman et al., 2018; Spheia et al., 2020).

Figure 1. Sustainable Agriculture Purposes

3. Vermicompost

In soil, one can typically find bacteria, fungi, insects, and earthworms. The quantities of these organisms in the soil vary depending on factors such as climate, soil pH, structure, water retention capacity, nutrient element content, and organic matter (Demir, 2010). Earthworms secrete a fluid to sustain vital activities underground, facilitate movement, and defend against diseases. The surface of earthworm casts is coated with this fluid, known as the coelomic fluid. Earthworm casts are rich in amino acids, organic carbon and nitrogen, various nutrients, enzymes, humic acid, and fulvic acid. By dissolving in the soil, these casts create an optimal environment to increase microbial diversity and the population of microorganisms in the soil (Tunç, 2021). In short, earthworms, which positively impact soil fertility by decomposing organic waste, enrich the physical properties of soil, humus formation, and organic matter content (Demir, 2010). The decomposition results in the formation of an organic fertilizer called as vermicompost or biohumus (Abacıoğlu, 2020).

Due to the increased activity in the soil structure imparted by vermicompost, beneficial organisms proliferate, facilitating the uptake of nutrients that plants couldn't access otherwise. This contributes to plant development and enhances plant resistance. Its significant improvement of soil's physical, chemical, and biological properties, as well as its characteristics of leaving no waste in the soil, makes it a preferred choice for producers interested in sustainable and organic agriculture (Dayar, 2019). Numerous studies also indicate its role in protecting plants against various abiotic and biotic stresses, enhancing both yield and quality (Peyvast, 2008; Wang et al., 2017; Calderon and Mortley, 2021).

Among thousands of species, only a few earthworm species are used in vermicompost production. These earthworms can grow in nearly all vegetable wastes and produce waste equal to their own weight in a single day. Under suitable conditions, their numbers can double every 40 days. The most commonly used species is Eisenia fetida, known as the Red Californian Earthworm. These earthworms are used in vermicompost production due to both their secretion of coelomic fluid after being fed with manure and their rapid reproduction. The optimal temperature for these earthworms is 20-25°C, with a pH range of 5-9 and a moisture content between 70-85%. Their reproduction rates vary in different facilities and conditions. Vermicompost can be produced using burial systems, continuous flow systems, and box systems (Dayar, 2019; Özen, 2019)

So, how is vermicompost produced? Are earthworms directly used or their waste? There are two phases in vermicompost production. The first is the active phase, where soil biomass is processed. This biomass generally includes animal manure. During this phase, the physical condition and microbial composition of the soil change. The manure they feed on undergoes changes as it passes through the earthworms' digestive system, known as gut-associated processes (GAPs). The second phase is the maturation phase, which involves waste-associated processes. In this phase, earthworms move towards the

undigested newly added manure, indirectly facilitating waste breakdown by microbes. Processed and ready-to-use vermicompost is obtained in the opposite direction of movement (Nasiru et al., 2013; Özen, 2019). The duration of the maturation phase depends on how efficiently the active phase proceeds. The efficiency of the active phase is determined by the species of earthworms, their density, and the ratio of applied residue (Dominguez, 2012).

Vermicompost is suitable for use in various cultivation conditions such as field, greenhouse, and soilness system, in solid or liquid forms (Roberts et al., 2007). While both forms are used in field and greenhouse applications, the liquid form is mostly preferred in hydroponic environments. Liquid vermicompost is also referred to as vermicompost tea or vermitea. Each cultivation environment has its unique advantages, and the choice of method varies based on regional conditions, plant type, and sustainability goals.

3.1. Vermicompost's Impact on Sustainable Agriculture Crops: Studies and Findings

Vermicompost has shown positive effects on various plants as a soil regulator. Studies have been conducted on numerous plants such as parsley (Peyvast et al., 2008), tomato (Arancon et al., 2003, 2012), bell peppers (Arancon et al., 2003), lettuce (Arancon et al., 2012), mustard (Srivastava et al., 2011), strawberries (Arancon et al., 2003, 2004), grass (Tognetti et al., 2005), sorghum (Gutierrez-Miceli et al., 2008), petunias (Arancon et al., 2008), cassava (Padmavathiamma et al., 2008), tomato (Haghigi et al., 2016), spinach (Xu and Mou, 2017), watermelon (Göksu and Kuzucu, 2017), cabbage (Tavalı, 2014), cauliflower (Jahan, 2014) and pepper (Aydın and Demirsoy, 2020) (Table 1). Some of these studies were conducted under field conditions, some in greenhouses, and some in soilness environments. It's crucial to determine the appropriate cultivation environments for achieving the highest yield, best quality, and alignment with sustainability goals. Agricultural practices involving soil utilize fields and greenhouses, while soilless practices involve the application of a mixture of water and liquid nutrients. Each agricultural approach has its advantages and disadvantages, and their suitability depends on environmental conditions, plant species, and the specific objectives of the studies conducted. Below is a brief overview of how vermicompost has been utilized under these different conditions and the resultant effects. It is based on that what the variety, growing area, fertilizer doses are and how the fertilizers are used. Some studies including vermicompost treatments and their effects on some crops is shown in Table 1.

Table 1. Some studies including vermicompost treatments and their effects on some crops (VC: Vermicompost, CF: Chemical fertilizer, C: Combined)

Crop	Variety	Growing Area	Fertilizers and fertilizer doses used in some studies	Using Type	The best result in the study	References
Tomato	F1-Troy	Field	1. Control, 2. Farm Fertilizer (2.5 t/da), 3. Farm Fertilizer + CF N:P:K (18:42:16 kg/da) 100% 4. VC (0.5 t/da), 5. VC + CF N:P:K (9:21:8 kg/da) 5%	C and VC	Recommended: VC should have been used with NPK	Türkmen et al., 2020
	BHN 543 F1	Greenhouse	CF: 130-95-95 kg/ha. VCs produced from dairy cow manure, supermarket food wastes and recycled paper wastes were applied at rates of 10 or 20 t/ha	C	Vermicompost. No statistical difference between VC levels	Arancon et al., 2003
	Ranger F1	Greenhouse	VC: 0, 40, 80 g/plant	VC	Recommended: 160 g/plant	Teke et al., 2019

Table 1. continued

Crop	Variety	Growing Area	Fertilizers and fertilizer doses used in some studies	Using Type	The best result in the study	References
Tomato	Grandella	Hydroponic-Greenhouse	CF: 110-250 mg/l N, 60-140 mg/l P_2O_5, 140-280 mg/l K_2O for germinating. VC and (MSWC) municipal solid waste compost are separately used after germination.	C	VC can improve tomato growth physiology when used as one part of the substrate in hydroponic culture Recommended: MSWC:peat:perlite-25:25:50	Haghigi et al., 2016
Pepper	King Arthur	Greenhouse	CF: 80-75-75 kg/ha. VCs produced from dairy cow manure, supermarket food wastes and recycled paper wastes were applied at rates of 10 or 20 t/ha	C	Vermicompost. No statistical difference between VC levels	Arancon et al., 2003
	Pasarella RZ F1	Soilless	Control: Peat and perlite Each treatment (not control) has 5 g compose fertilizer (15-15-15) with transplanting and 7.5 g urea (CF) for 10 L pots Treatment 1: + waste mushroom compost Treatment 2: + waste mushroom compost + seaweed mixture (2500 ppm) Treatment 3: + solid VC Treatment 4: + solid VC + seaweed mixture (2500 ppm) Treatment 5: + Peat Treatment 6: + Peat + seaweed mixture (2500 ppm)	C	Recommended: VC + seaweed	Aydın and Demirsoy, 2020
Water-melon	Crimson Sweet	Field	CF: 7 kg/da N (NH_4NO_3) and 8 kg/da NH_4SO_3 for 15 kg/da N VC: 300 and 600 kg/da	VC	Positive effect	Göksu and Kuzucu, 2017
Cabbage	Brassica oleracea var. Alba Fieldrocket F1	Field	Basic Fertilizer: 6 kg/da N, 3 kg/da P_2O_5 and 6 kg/da K_2O VC: 100, 200, 400, 800 kg/da	C	400 kg/da VC + NPK	Tavalı et al., 2014
Eggplant	S. melongena	Field	VC: 0 t/ha (Control), 2, 4, 6 t/ha Macrophyte based vermicompost.	VC	6 t/ha	Najar et al., 2015
Cauli-flower	Brassica oleracea L. var. botrytis sub. var. cauliflora CV	Field	Total 12 treatment included RDCF (Recommended Chemical Fertilizer), CF and VC	C, CF and VC	100% RDCF and 1.5 t VC per ha	Jahan et al. 2014
Spinach	Spinacia oleracea L.	Greenhouse	Control: without treatment only soil VC: 5% and 10% solid vermicompost and 40 mL liquid VC extract at 0, 14, 21, 28 days after transplanting	VC	Positive effect	Xu and Mou, 2016
Parsley	(Petroselinum crispum Mill.)	Greenhouse	0:100, 10:100, 20 :100 30:100; VC:Soil (v:v)	VC	Recommended: 10:100	Peyvast et al., 2008
Lettuce (Lactuca sativa L.)	var. capitata cv Bombola	Greenhouse	CF: 15 kg/da N, 10 kg/da P_2O_5, 18 kg/da K_2O as basal fertilizer VC: 0, 100, 200 and 400 kg/da Microbial Fertilizer: M- and M+	CF and VC	VC and M have the same effect with chemical	Altunlu, 2021
	'crispa'	Plastic Uncontrolled-Greenhouse	Ammonium sulphate: 15 kg N/da, triple super phosphate:10 kg P_2O_5/da, potassium sulphate: 15 K_2O/da kg VC: four different doses and control	CF and VC	Positive effect	Karademir, 2019
Straw-berries	Chandler	Greenhouse	CF: 85-155-125 kg/ha. VC: VCs produced from supermarket food wastes and recycled paper wastes were applied at rates of 5 or 10 t/ha	C	Vermicompost. No statistical difference between VC levels	Arancon et al., 2003
Corn	Pioneer P2088	Greenhouse	Basic Fertilizer before sown: 200 mg/kg N(NH_4SO_3), 100 mg/kg P and 125 mg/kg K (KH_2PO_4) VC: 0%, 10%, 20%, 30%, 40%, 50% (w/w)	C	Recommended: %40	Durukan, 2020
Ryegrass	Lolium perenne L.	Greenhouse	Municipal Compost (MC): 20% and 40% Municipal VC (MV): 20% and 40% Backyard VC (BV): 20% and 40%	VC	No generalization result regarding the higher quality of vermicomposts vs. composts	Tognetti et al., 2005
Mustard (Yellow)	Brassica compestris L.	Field	Vermicompost and compost (without earthworm): 0% (Control), 5%, 10%, 20%	VC	Positive effect Particularly %20 VC	Srivastava et al., 2011

3.2. The effect of vermicompost in field conditions

Applications conducted in the field are applied onto the natural soil. However, the own components of the soil alone are not affective and sufficient on the yield, quality, and sustainability of plants. Although chemical fertilizers rapidly facilitate plant nutrition, they tend to disturb soil structure, thereby posing disadvantages in terms of sustainability (Pek, 2023). As mentioned earlier, due to their adverse effects on both the environmental and human health, organic fertilizers is preferred. Vermicompost is among the preferred organic fertilizers that enhance soil productivity and quality. Like other fertilizers, vermicompost is also applied directly to the soil or mixed in the field conditions. For this, nutrient analyses of the soil and vermicompost are conducted, and fertilizer doses are determined performing necessary calculations.

It is known that the application of vermicompost in field conditions has a positive effect on plants such as peppers, tomatoes, strawberries, and watermelons (Arancon et al., 2003, 2004, 2005; Göksu and Kuzucu, 2017). In watermelons, two different doses of vermicompost were used under field conditions, and the highest values in fruit weight, fruit size, and plant yield were obtained with the application of 600 kg per hectare of vermicompost. Simultaneously, an increase in organic matter, phosphorus, and copper content in the soil was observed (Göksu and Kuzucu, 2017) (Table 1).

Najar et al. (2015) applied increasing doses of vermicompost to eggplant (2 tons/ha, 4 tons/ha, and 6 tons/ha), stating that as the doses increased, the germination rates also increased. The germination rate observed in eggplants treated with 6 tons/ha of vermicompost was 44%, while it was 35% at 4 tons/ha, and 21% in the control plants without any application. All growth characteristics and yield-related outcomes were highest at the 6 tons/ha vermicompost application rate (Table 1). These results also indicate that vermicompost application improves soil characteristics under field conditions.

Türkmen et al. (2020) have investigated effect of vermicompost and combined vermicompost with chemical fertilizer on tomato in field conditions (Table 1). They have used five different treatment: 1. Control groups, 2. 2,5 tones/da farm fertilizer, 3. 2.5 tones/da farm fertilizer with N:P:K/18:42:16 chemical fertilizer as full dose (100%), 4. 0,5 tones/da vermicompost and 5. 0,5 tones/da vermicompost with N:P:K/9:21:8 chemical fertilizer as half dose (50%). As a result of the study, vermicompost increased the yield of tomato, farm fertilizer was not effective compared to other treatments. Nevertheless, vermicompost combined with NPK was more efficient compared to only vermicompost. They have suggested that the combined use of vermicompost and chemical fertilizers could contribute to the reduction in the use of chemical fertilizers.

However, fertilization alone is insufficient to improve plant yield and quality and ensure sustainability. Ecological requirements such as temperature, light, and humidity for the plant should also be considered and provided. Controlling these factors in field conditions is quite challenging. Uncertain rainfall, wind, or temperature changes negatively affect the plant's development, resulting in undesired levels of yield. Additionally, pests and microbial pathogens pose a threat to the plant. Hence, greenhouses, where environmental factors can be controlled, are used (Chacha et al., 2023).

3.3. The effect of vermicompost in greenhouse conditions

Greenhouses are areas for cultivating plants enclosed in glass or plastic structures. Within greenhouses, just like in fields, direct sowing into the soil or in specific-sized pots is feasible. The ecological requirements of the plant can be controlled. However, this

controllability is more effective in smart and modern greenhouses created with recent technologies. Chacha et al. (2023) examined the effect of field and greenhouse conditions on tomato plant development, noting a significant increase in growth parameters such as plant height, leaf count, flower, and fruit number in greenhouse plants. Vermicompost is also applied to the soil in greenhouses, similarly to field conditions. Studies have investigated the effect of vermicompost on various plants under greenhouse conditions, such as corn (Durukan et al., 2020), tomatoes (Wang et al., 2017), lettuce (Karademir, 2019), parsley (Peyvast, 2008), mustard (Srivastava et al., 2011), spinach (Özkan, 2016; Xu and Mou, 2017) (Table 1).

In a study on corn plants, different doses of vermicompost were applied, resulting in increased above-ground weight and an increase in nutrient element concentration and dry matter content. It was indicated that vermicompost could be used as an alternative to chemical fertilizers (Durukan et al., 2020) (Table 1), which holds significant importance for sustainability.

Lettuce is a food with high nitrate accumulation and excessive consumption of such foods can lead to toxic effects and diseases (Márquez-Quiroz et al., 2014; Zhang et al., 2019). Research on vermicompost in lettuce shows positive effects on plant yield, quality, and nutrient element content. To minimize nitrate accumulation and as an alternative to chemical fertilizers, a study applied 400 kg of vermicompost and microbial fertilizer per hectare, resulting in plant growth similar to chemical fertilization, with a substantial decrease in nitrate accumulation compared to chemical fertilization (Karademir, 2019; Altunlu, 2021) (Table 1).

According to Peyvast et al. (2008), vermicompost applied to the soil in the greenhouse increased plant height, leaf count, yield, and the quantity of certain nutrient elements in parsley plants. Another study conducted on mustard showed increases in root and stem length, branch, leaf, and flower numbers, as well as live and dry weights (Srivastava et al., 2011) (Table 1).

Tomatoes, commercially valuable plants, have been the subject of many studies on the effects of vermicompost on yield and quality. Several studies have particularly shown a positive impact on yield (Teke et al., 2019; Durukan et al., 2019; Gerusa et al., 2019; Wang et al., 2017; Calderon and Mortley, 2021). For instance, Wang et al. (2017) observed a 74% increase in tomato yield with the application of vermicompost in a greenhouse. Another study using increasing doses of vermicompost indicated an increase in tomato yield, with the best yield observed in plants treated with 160 grams of vermicompost per plant.

3.4. The effect of vermicompost in soilless conditions

Soilless refers to environments where nutrients are delivered to plants through water or air, enabling the transmission of essential elements without soil. When obtained through air, it's referred to as aeroponic; when obtained through water, it's termed hydroponic (Lakkireddy, 2012). As a modern and sustainable cultivation method, hydroponic systems involve growing plants in soilless environments using liquid nutrient solutions. These solutions contain fundamental nutrients like N, P, K, Ca, Mg, Fe, Zn, Cu, Mn and Mo, crucial for plant growth. They are vital to maintain the solution's electrical conductivity and pH levels continuously, as these levels are essential for nutrient concentration and uptake by the plants. These controls are maintained through smart systems and human intervention to achieve desired characteristics in yield and quality (Pomoni, 2023).

Supplemental fertilization is required based on the growth stages and needs of the plants in soilless systems. Therefore, plants are germinated on medias containing the aforementioned nutrients. After germination the seedlings is transplanted into the tubes added different substrate mixtures and this

growing condition is principally combined with various chemical fertilizers (Haghigi et al., 2016). Fertilization is finely tuned and conducted in a fully controlled environment. Vermicompost provides organic matter containing vital elements such as nitrogen, phosphorus, potassium, and other trace elements essential for plant growth. Studies on the effect of vermicompost in soilless conditions are scarce compared to the other two environments.

In a study, the inclusion of vermicompost in hydroponic systems was reported to enhance the physiological development of tomatoes. Researchers have used 110-250 mg/L N, 60-140 mg/L P2O5 and 140-280 mg/L K2O as chemical fertilizer for germinating. After germinating vermicompost and municipal solid waste compost (MSWC) are separately treated. The use of vermicompost increased fresh and dry root weight, root volume and fruit number compared to control plants. Although vermicompost has positive effect on plant development, recommended treatment is MSWC:peat:perlite/25:25:50 (Haghighi et al., 2016).

In soilless-grown pepper plants, the application of vermicompost led to an increase in developmental features such as chlorophyll content, plant height, stem thickness, and fruit yield. In the study, six treatment are used, and each treatment (not control) has 5 g compose fertilizer (15-15-15) with transplanting and 7,5 g urea as chemical fertilizer for each 10 L pots. They investigated effect of waste mushroom compost, vermicompost and peat with 2500 ppm seaweed mixture and without it. Vermicompost and seaweed treatment have recommended in the study. (Aydın and Demirsoy, 2020) (Table 1).

Effect of soilless media on tomato nutrient uptake and yield have studied by Spehia et al. (2020). In the study, T1 growing media consists of vermiculite and vermicompost (70:30), T2 is cocopeat and vermicompost (70:30) and T3 is cocopeat and control. According to the results, adding vermicompost improved the quality and crop yield. Additionally the most effective combination was T2 treatment.

Soilless conditions were simulated for lettuce and tomatoes, and the effects of both solid and liquid vermicompost were examined. Different doses of liquid vermicompost were added to the nutrient solution, and the results were evaluated. According to the findings, in tomatoes and lettuce with the lowest application of vermicompost tea, higher yields were observed (Arancon, 2019). This suggests that minimal usage could suffice for plant yield, which also provides economic advantages. Parallel studies indicate an increase in germination, growth, flowering, and yield even with minimal mixing ratios in soilless-grown plants in greenhouses (Xu and Mou, 2017).

4. Conclusion

This study examines the effect of vermicompost on sustainable agricultural under some growing conditions, particularly in field, greenhouse, and soilless systems. Sustainable agriculture aims to provide future generations with a healthy food source and a habitable environment. Vermicompost is a natural fertilizer obtained through the decomposition of organic waste by earthworms, enhancing soil health while contributing to plant growth. The study reveals the positive effects of vermicompost on crops such as peppers, tomatoes, strawberries, and watermelons under field conditions. In greenhouse settings, it promotes the growth of tomatoes, lettuce, and mustard, demonstrating an increase in yield. In soilless systems, vermicompost has shown to improve the growth status of plants like tomatoes and peppers, enhancing their development. These findings emphasize that vermicompost can enhance plant cultivation conditions and increase seed productivity, positioning it as a significant component of sustainable agriculture. In most of these studies, vermicompost have been applied without chemical fertilizer treatment and some studies suggest that vermicompost should combine with chemical fertilizer, particularly soilless

conditions. Nevertheless, it remains important for sustainable agriculture due to the reduced usage of chemical fertilizers in any case.

Considering various studies, it is evident that vermicompost is predominantly utilized in greenhouse and field conditions, yielding better results with its soil application. However, its liquid form alone does not yield significant advantages, indicating better outcomes when supplemented with additional fertilizers. Regardless of the cultivation environment, the use of vermicompost as a supplementary agent positively influences plant growth, yield, and quality. This highlights its significance as a crucial option for obtaining sustainable agricultural crops.

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Balancing Responsibilities: The Integration of CBDR in the Montreal Protocol

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Abstract

The principle of common but differentiated responsibilities (CBDR) has been a central concept in international environmental politics, recognizing the shared yet distinct responsibilities of developed and developing countries in addressing global environmental challenges. This study delves into the practical application of the CBDR principle within the international ozone regime, primarily established by the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol. Employing a content analysis of key international treaties, official reports, and academic literature, this paper reveals how the CBDR principle is operationalized through specific mechanisms like trade bans, phasedown/phaseout schedule postponements for developing countries, and the Multilateral Fund. It argues that the tangible incorporation of CBDR into the regime's framework is a pivotal factor in its success, enhancing global participation and compliance, particularly among developing countries.

Keywords: Montreal Protocol, international environmental politics, international ozone regime, common but differentiated responsibilities, international environmental cooperation

Sorumlulukların Dengelenmesi: CBDR'nin Montreal Protokolü'ne Entegrasyonu

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Öz

Ortak fakat farklılaştırılmış sorumluluklar ilkesi (CBDR), uluslararası çevre politikasının temel bir kavramı olarak gelişmiş ve gelişmekte olan ülkelerin küresel çevre sorunlarına karşı paylaşılan ancak farklı sorumluluklarını tanımlamaktadır. Bu çalışma, Ozon Tabakasının Korunmasına Dair Viyana Sözleşmesi ve Montreal Protokolü tarafından kurulan uluslararası ozon rejimine CBDR ilkesinin nasıl entegre olduğunu incelemektedir. Bu makale uluslararası antlaşmalar, resmi raporlar ve akademik literatür kullanılarak, CBDR ilkesinin, ticaret yasakları, gelişmekte olan ülkeler için aşamalı sona erdirme takvimi ertelemeleri ve Çok Taraflı Fon gibi belirli mekanizmalar aracılığıyla

nasıl işler hâle getirildiğini ortaya koymaktadır. Çalışma, CBDR ilkesinin ozon rejiminin çerçevesine somut bir şekilde dahil edilmesinin, özellikle gelişmekte olan ülkeler arasında küresel katılımı ve uyumu artıran, rejimin başarısında belirleyici bir faktör olduğunu savunmaktadır.

Anahtar Kelimeler: Montreal Protokolü, uluslararası çevre politikası, uluslararası ozon rejimi, ortak fakat farklılaştırılmış sorumluluklar ilkesi, uluslararası çevre işbirliği

1. Introduction

The principle of common but differentiated responsibilities (CBDR) is a fundamental concept within the purview of international environmental law. In essence, this principle posits that every country bears responsibility for the deterioration of the global environment. However, the historical pattern of this phenomenon has not been uniform among countries. CBDR recognizes the historical relationship between higher levels of development and the damage to the global commons and expresses responsibility-sharing accordingly (Epstein C., 2015). Hence, the principle of CBDR expresses the shared yet distinct responsibilities of developed and developing countries in combating environmental change, considering their historically divergent developmental trajectories.

The pace of global environmental degradation gained momentum in the aftermath of the industrial revolution, as the magnitude of adverse externalities engendered by economic pursuits intensified. Negative externalities refer to the transference of costs stemming from economic activities to unrelated parties. Pollution caused by economic activities serves as a case in point (OECD, 2008, p. 177). Throughout 19th and 20th centuries, contemporary developed countries have enjoyed the prerogative of transferring the burden of externalities on the global commons without any restraints or accountability as they pursued industrialization. This practice has exerted undue pressure on the global commons. Conversely, owing to the exponential rise in global environmental degradation following the industrial revolution, policies aimed at preventing environmental damage have emerged at the national level. Concomitantly, international cooperation on environmental issues has advanced since the latter half of the 20th century (Mitchell, 2002).

Regulations implemented at national and international levels seek to halt and forestall further global environmental degradation. These regulatory policies have curtailed developing countries' capacity to transfer the burden of externalities on the global commons unrestrictedly, resulting in additional costs for their economies, which contrasts with the historical advantage enjoyed by developed countries. Thus, the unbridled generation of negative externalities on the global commons by developed countries while reaping economic benefits gives rise to questions of equity and equitable responsibility-sharing between developed and developing countries. The concept of CBDR, while formally articulated in the 1992 Rio Earth Summit, finds its roots in the 1972 United Nations Conference on the Human Environment held in Stockholm (A/CONF.48/14/Rev.1, 1972). This conference marked the first significant international meeting focused on environmental issues and set the stage for future environmental policies and principles, including CBDR. Although not explicitly named, the essence of CBDR was present in the discussions and outcomes of the Stockholm Conference. It laid the groundwork for recognizing that different countries have varying capabilities and responsibilities in addressing environmental degradation, considering their stages of development and contributions to global environmental issues (A/CONF.48/14/Rev.1, 1972, pp. 3–4). This early acknowledgment of differentiated responsibilities paved the way for the formal introduction and acceptance of the CBDR principle in later international environmental treaties and agreements, reflecting a growing understanding of the

complexities and inequalities in global environmental challenges. Subsequently, this principle has evolved into one of the central pillars of international environmental cooperation.

In this context, the study argues that the international ozone regime established by the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol puts the principle of CBDR into operation and that the CBDR principle, which is functional in the Convention and Protocol, is embedded in the architecture of the international ozone regime, predating its formal articulation at the 1992 Rio Summit. Tangible applications of the principle of CBDR in the Montreal Protocol are as follows: (i) trade bans, these bans emphasize shared responsibility; (ii) The existence of Article 5 status for developing countries, (iii) the possibility of postponing the ozone depleting substances (ODS) phaseout schedule for the countries receiving this status, (iv) the financing of the ODS phaseout projects of the countries receiving Article 5 status by the Multilateral Fund consisting of grants from developed countries. (ii), (iii), and (iv) differentiate the developing states' responsibilities with more favorable schedules and financing options. The fact that the CBDR principle is embedded in the regime with mechanisms established with tangible provisions has been one of the reasons for the success of this regime in the later period.

2. Methodology

This study adopts a qualitative research approach, focusing on primary sources. The approach is aimed at understanding and interpreting the operational aspects of the CBDR principle within the international ozone regime. In this context, the study focuses on the period during which the regime was designed to demonstrate how CBDR was incorporated into the regime. The primary sources for this research are a collection of documents including international treaties (specifically the Vienna Convention and the Montreal Protocol), official reports, and resolutions from relevant bodies such as the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO). Secondary sources include academic literature, journal articles, books, and other scholarly writings that discuss international ozone regime.

The content analysis focuses on identifying, examining, and interpreting the provisions and mechanisms within the Vienna Convention and the Montreal Protocol that operationalize the CBDR principle. Special attention is given to understanding how these provisions incorporate trade bans, phasedown/phaseout schedule postponements, and the structure and functioning of the Multilateral Fund.

3. Incentive and Sanction Architecture of the International Ozone Regime in terms of CBDR

During the 1970s, scientific studies identified potential mechanisms for the depletion of the ozone layer in the atmosphere (Stolarski & Cicerone, 1974, p. 1610). This discovery initiated the development of regulatory policies in various countries regarding the use of aerosols, particularly in USA and Nordic countries (Parson, 2003, pp. 39–50). In the following decade, the international coordination of scientific studies and the implementation of these regulatory policies gained momentum, culminating in the establishment of the Vienna Convention. This Convention provided a cooperative framework for protecting the ozone layer through international cooperation in scientific research, information exchange, and policy development ('Vienna Convention for the Protection of the Ozone Layer', 1985).

The Vienna Convention laid the foundation for the later development and adoption of the Montreal Protocol, which established binding measures to phase out the production and consumption of ODS in 1987. Notably, the Convention's initial framework did not incorporate obligatory measures for ODS elimination. However, the principle of CBDR was articulated in its text, acknowledging the specific circumstances and requirements

of developing countries ('Vienna Convention for the Protection of the Ozone Layer', 1985). The Montreal Protocol, formulated in response to the discovery of the Antarctic ozone hole (Farman et al., 1985) and ensuing public concern, built on the creation mechanism outlined in the Vienna Convention.

In response to this global challenge, it became necessary to eliminate the use of ODSs worldwide. In this context, efforts have commenced to develop a prescriptive framework dedicated to the phasedown of ODSs, drawing upon the protocol formulation mechanisms established by the Vienna Convention. Consequently, this led to the emergence of the Montreal Protocol (UNEP/WG.151/2, 1986; UNEP/WG.167/2, 1987; UNEP/WG.172/2, 1987). The Montreal Protocol's implementation necessitated the transformation of user sectors reliant on ODS to alternative technologies. This transformation required a comprehensive program encompassing both ODS producer sectors and ODS user sectors, such as Heating, Ventilating, Air Conditioning (HVAC), and refrigeration industries. For these sectors, converting to non-ODS refrigerant gases often necessitates technological changes in equipment (UNEP, 1999). The obligations under the Protocol have highlighted the need for producing sectors to manufacture chemicals that are not ODS but can perform similar functions in related products. This means user sectors must procure these alternative chemicals and adapt their equipment to new technologies, a coordinated effort between producers and users to ensure a smooth transition while meeting industry needs.

In order to achieve a global phasedown[1] of ODSs the incentive and sanction architecture of the Montreal Protocol was based on three core pillars embedded in Article 4 and 5: trade bans, phasedown schedule postponements for developing countries, and the Multilateral Fund (UNEP, 2020). An examination of these pillars also sheds light on the self-enforcement mechanism of the Montreal Protocol, illustrating how it implements this principle in practice.

3.1. Trade Bans: A Common Responsibility

Article 4, entitled 'Control of Trade with Non-Parties' plays a pivotal role in regulating trade in controlled substances with states that have not ratified the Protocol. This Article aims to bolster the global commitment to reducing ODSs by utilizing trade-related measures. A fundamental aspect of Article 4 is its mandate that, within one year following the enforcement of the Protocol, all parties must implement a ban on importing controlled substances from non-participating states ('Montreal Protocol on Substances That Deplete the Ozone Layer', 1987). This provision serves a dual purpose: it restricts market access for controlled substances from non-party states and simultaneously serves as an incentive for these states to join the Protocol, thereby fostering its universal adoption Furthermore, in an effort to ensure that the global reduction in ozone-depleting substances is not compromised, the Protocol mandates, effective from January 1, 1993, that parties prohibit the export of controlled substances to non-party states ('Montreal Protocol on Substances That Deplete the Ozone Layer', 1987). This measure is instrumental in preventing the diversion of these substances to countries outside the regulatory framework of the Protocol.

Article 4 also addressed the need to identify and regulate products containing controlled substances. Within three years of the Protocol's entry into force, parties are tasked with developing a list of such products. Subsequent to the annex's effectiveness, parties are expected to ban the import of these products from non-party states within a year, barring any objections to the annex ('Montreal Protocol on Substances That Deplete the Ozone Layer', 1987).

Article 4 additionally mandated that parties, within five years, assess the feasibility of prohibiting or restricting imports from non-party states of products manufactured using, but not containing, controlled substances. Upon determining feasibility, a corresponding list of such products is to be compiled. Subsequently, parties are obligated to enact bans or

[1]*The Montreal Protocol initially set phasedown targets for ODSs. However, following the 1990 London Amendment, these targets transitioned into a total phaseout objective.*

restrictions on these imports within one year following the annex's implementation ('Montreal Protocol on Substances That Deplete the Ozone Layer', 1987). A crucial aspect of Article 4 is its emphasis on discouraging the export of technology to non-party states that could be used in producing controlled substances. Furthermore, parties are directed to abstain from providing financial assistance for exporting products, equipment, plants, or technology to non-party states that could aid in the production of controlled substances ('Montreal Protocol on Substances That Deplete the Ozone Layer', 1987).

Overall, Article 4 functions as a mechanism to sanction non-Parties to the Protocol and to create incentives for their accession (Brack, 1998, p. 101). The implementation of Article 4 has resulted in trade bans on countries that are not Parties to the Protocol, which continue to demand ODS for their user sectors. These countries must become a Party to the Protocol to maintain their supply of ODS. By restricting trade in ODS with non-Party states, the Protocol effectively aligned economic interests with environmental objectives, compelling countries, and industries to adhere to more sustainable practices.

A potential vulnerability of Article 4 lies in the risk of ODS production shifting to developing countries not party to the Protocol. To mitigate this risk, the differentiated approach of Article 5 status was introduced. This approach acknowledges the unique needs and circumstances of developing countries, offering them greater flexibility in terms of phasedown schedules to fulfill their obligations under the Protocol.

3.2. Phasedown/Phaseout Schedule Postponements for Article 5 Countries: A Differentiating Mechanism

Article 5 of the Protocol, titled 'Special Situation of Developing Countries' acknowledges the unique challenges faced by developing countries in adhering to the Protocol's provisions. This article is pivotal in balancing environmental objectives with developmental needs.

A core component of Article 5 is the provision allowing certain developing countries to postpone their compliance with the control measures outlined in Article 2. This postponement is applicable to developing countries whose annual calculated level of consumption of controlled substances is less than 0.3 kilograms per capita at the time of the Protocol's entry into force or any time within ten years of its entry into force. These countries are permitted to postpone their compliance with the control measures by ten years beyond the timeline specified for developed countries. However, these countries must ensure that their annual consumption does not exceed the threshold of 0.3 kilograms per capita. For compliance purposes, these countries can use either the average of their annual consumption for 1995 to 1997 or a level of 0.3 kilograms per capita, whichever is lower, as their baseline ('Montreal Protocol on Substances That Deplete the Ozone Layer', 1987).

The Protocol explicitly commits to aiding developing countries in accessing environmentally safe alternatives to ODSs. This facilitation includes not only access to alternative substances but also the technology required for their use. The aim is to assist developing countries in transitioning to safer options expeditiously, thereby aligning their developmental needs with global environmental goals. Article 5 also emphasizes the importance of supporting developing countries through various means, including subsidies, aid, credits, guarantees, or insurance programs. This support is directed towards the adoption of alternative technology and substitute products that are environmentally friendly ('Montreal Protocol on Substances That Deplete the Ozone Layer', 1987).

The phasedown schedule postponements for Article 5 countries, integral to the Montreal Protocol, underscore the differentiated aspect of the CBDR principle in the ozone regime. This mechanism grants developing countries additional time and flexibility to meet their phaseout obligations, acknowledging their varying capacities and historical contributions to ozone depletion.

Initially the defined postponements in the Article 5 failed to meet the expectations of developing countries, notably India and China. These countries advocated for the coverage of phase-out expenses by developed countries via a financial mechanism (Andersen & Sarma, 2012, p. 101; Parson, 2003, pp. 203–204). This stipulation proved to be a principal impediment to attaining global participation in, and adherence to, the Protocol. The Multilateral Fund played a crucial role in assisting these countries to transition away from ODS, ensuring that the economic impact of trade bans did not impede their development goals.

3.3. The Multilateral Fund: A Differentiating Mechanism

The Protocol initially appeared to be an agreement among developed countries, with minimal participation from most developing countries (UNEP/OzL.Pro.1/5, 1989). The Protocol's arrangements, including schedule postponements and trade bans, provide incentives for country participation while imposing sanctions on non-Parties. There was no financial support mechanism in place. The initial version of Article 10 was entitled 'Technical Assistance' and solely encompassed technical support, provided upon request, to developing countries ('Montreal Protocol on Substances That Deplete the Ozone Layer', 1987). However, there was still a risk that countries outside of the Protocol may form a bloc to circumvent these regulations and avoid trade restrictions resulting from non-participation (DeSombre, 2000, p. 71). This scenario enabled developing countries, particularly China and India, to voice demands such as financing of ODS phaseout processes by developed countries, securing technology transfer, and equitable management mechanisms (Biermann & Simonis, 1999, p. 241). The Multilateral Fund, established at the Second Meeting of the Parties in London, addressed these demands (UNEP/OzL.Pro.2/3, 1990, p. 40). Its main objective is to assist developing countries with ODS annual consumption levels of less than 0.3 kilograms per capita in complying with control measures (Secretariat of the Multilateral Fund for the Implementation of the Montreal Protocol, 2022). The Fund includes technical assistance, credit, and in-kind support, with resources provided by developed countries and used by developing countries in executing ODS phaseout projects (UNEP/OzL.Pro/ExCom/5/16, 1991, p. 24).

The Multilateral Fund was established through the modification of Article 10, achieved via amendment. The Montreal Protocol, governed under the framework of the Vienna Convention, allows for adjustments and amendments, as outlined in Article 9 ('Vienna Convention for the Protection of the Ozone Layer', 1985). Upon the adoption of an amendment, re-ratification by the existing parties is mandatory, resulting in the creation of a revised version of the agreement. The renewed Article 10 of the Montreal Protocol, introduced with the London Amendment in 1990, established a financial mechanism for providing financial and technical cooperation, including the transfer of technologies, to Parties classified under Article 5 - those developing countries with low-level consumption of controlled substances. This mechanism was tasked with covering all agreed incremental costs of Article 5 countries, through grants or concessional means, as deemed appropriate, these Parties incur to comply with the control measures, which were first phase down, then phaseout. The establishment of an indicative list of incremental cost categories was mandated to be decided by the Parties in their meetings measures. The financial backbone of the Multilateral Fund is formed by contributions from non-Article 5 Parties ('Amendment to the Montreal Protocol on Substances That Deplete the Ozone Layer', 1990).

Operating under the authority of the Parties, the Multilateral Fund is governed by policies decided by the Parties. These policies are determined during the Meeting of the Parties. This ensures alignment with the overarching goals of the Montreal Protocol. An Executive Committee is established for developing and monitoring specific operational policies, guidelines, and administrative arrangements of the Fund. The Multilateral Fund is managed by this Executive Committee with equal representation from developed and developing

countries. Decisions require a two-thirds majority, preventing any one group from imposing its will on the other (DeSombre, 2006, p. 114). Typically, decisions are made unanimously (DeSombre, 2000, p. 71). Article 10 promotes consensus in decision-making but allows for a two-thirds majority vote if consensus is unattainable, ensuring democratic and balanced resolutions. This Committee, with balanced representation from both Article 5 and non-Article 5 Parties, collaborates with international bodies such as the World Bank, UNEP, and UNDP, leveraging their expertise.

The Fund's existence has significantly enhanced the effectiveness of the international ozone regime. It has enabled Article 5 countries to conduct ODS phaseouts under the supervision of the Multilateral Fund Executive Committee. To benefit from the Fund, these countries must first present an ODS phaseout plan (Andersen & Sarma, 2012, p. 238). The financing of these phaseout projects, subject to Executive Committee approval, involves an audit and follow-up function, increasing the regime's effectiveness. Consequently, developing countries have to diligently comply with the Protocol to maintain their eligibility for funding. In fact, as phaseout projects are executed following World Bank guidelines, financing is disbursed incrementally to each country, corresponding with their attainment of specified targets. This is the Montreal Protocol's self-enforcement mechanism for developing countries. Therefore the Fund ensures that the on-the-ground transformation is equitable and orderly (DeSombre & Kauffman, 1993, p. 121). Thus, the Multilateral Fund ensured effectiveness, achieving not only extensive participation but also high levels of compliance.

China and India, both major producers and consumers of ODSs, initially expressed reservations about the Montreal Protocol (Andersen & Sarma, 2012, p. 101). They eventually joined and complied with its provisions after the financial mechanisms were clarified under the Protocol (Andersen & Sarma, 2012, p. 135). At this juncture, it is pertinent to observe that Türkiye also postponed the submission of its accession letter until it was granted Article 5 status, which entitled it to access the financial mechanism stipulated under the Protocol (B.02.0.KKG/101-750/03761, 1994). Such actions by developing countries underscore the significance of the financial mechanism in fostering participation and ensuring compliance. The financial mechanism, embodying the principle of CBDR, plays a strategic role in providing financial assistance, facilitating technology transfer, and enhancing capacity building. This has significantly contributed to the regime's success in terms of both universal participation and compliance.

4. Discussion

The international ozone regime, through its unique application of the CBDR principle, represents a model, particularly when contrasted with its application in other environmental agreements such as the Kyoto Protocol and Paris Agreement.

The Kyoto Protocol, for example, set binding emission reduction targets exclusively for developed countries. However, this approach encountered challenges in engaging major emerging economies, significant greenhouse gas emitters, but not obligated under Kyoto Protocol's framework approach ('Kyoto Protocol to the United Nations Framework Convention on Climate Change', 1997). One significant distinction between the Montreal Protocol and the Kyoto Protocol lies in the former's requirement for all parties, irrespective of their status as developed or developing countries, to be accountable for the phaseout of relevant substances. This accountability is facilitated by the Montreal Protocol's balanced sanction and incentive structure, which includes trade bans and a financial mechanism embodying the principle of CBDR.

The application of the CBDR principle in the international ozone regime presents a stark contrast to its implementation in the Paris Agreement on climate change. The Montreal Protocol exemplifies a structured approach, with clear, differentiated responsibilities and

support mechanisms for developed and developing countries, contributing to its success in phasing out ODS. Contrary to Paris Agreement, there is a well-defined prescriptive guidance for phasedown/phaseout purposes in Article 2 ('Montreal Protocol on Substances That Deplete the Ozone Layer', 1987). In contrast, the Paris Agreement relies on Nationally Determined Contributions (NDCs), which grant countries the flexibility to set their emission reduction targets ('Paris Agreement', 2015). While this flexibility allows for tailored strategies aligned with national capacities and circumstances, it lacks the prescriptive guidance on responsibilities that characterizes the Montreal Protocol. This approach in the Paris Agreement can lead to varied levels of commitment and action among countries, posing challenges in achieving global climate objectives (Streck et al., 2016).

In terms of CBDR, within the framework of the Kigali Amendment to the Montreal Protocol, there has been an update regarding the implementation of the principle of CBDR in Article 5. This update involves dividing Article 5 countries into two subgroups based on ambient temperatures. This subdivision introduces a differentiated timetable for transitioning to alternatives among developing countries ('Amendment to the Montreal Protocol on Substances That Deplete the Ozone Layer', 2016). The reason for this is that the transition to alternatives for hydrofluorocarbons (HFCs), which are used in the HVAC and refrigeration sectors focused on by the Kigali Amendment, is more complex compared to the phase-out of ODS. As alternatives to HFCs, hydrocarbon solutions present varying challenges in terms of safety and efficiency, depending on the scale of use and ambient temperatures (Directorate General for Climate Action, 2023). This poses additional difficulties, especially for countries with higher ambient temperatures where the demand for cooling is greater.

Group 1 of Article 5 countries, comprising most developing countries such as China, Brazil, and all African countries, are assigned a later baseline period (2020-2022) for HFC reduction calculations and an extended phase-down commencement timeline (2024) ('Amendment to the Montreal Protocol on Substances That Deplete the Ozone Layer', 2016). Group 2, which includes countries with high ambient temperatures, predominantly in the Middle East and parts of Asia (including India, Pakistan, Iran, and the Gulf countries), is given an even more deferred phase-down schedule, starting in 2028 ('Amendment to the Montreal Protocol on Substances That Deplete the Ozone Layer', 2016). This distinction within Article 5 countries underscores a nuanced implementation of CBDR, taking into account not only the developmental status but also the unique climatic challenges and increased reliance on HFCs for cooling purposes in these regions.

5. Conclusion

This study provides an examination of the operationalization of the CBDR principle within the international ozone regime. Through a content analysis of international treaties, official reports, and academic literature, this research has highlighted the pivotal role of CBDR in the regime's relative success. The analysis underscores the critical role that this principle has played in fostering effective international cooperation, particularly in accommodating the varied capacities and historical contributions of developed and developing countries towards ozone layer depletion. The operation of the principle of CBDR embedded in the international ozone regime has been a factor in the participation of developing countries in this regime and has basically led to two results:

(i) The operation of CBDR embedded in the international ozone regime has expanded the number of countries covered by this regime. As tangible mechanisms under the status of Article 5, such as schedule postponements and the Multilateral Fund, balanced the trade bans towards non-parties regulated in Article 4, which is a sanction practice for developing countries, therefore providing their participation in

the regime. This delicate balance was effective in the universal ratification of the Vienna Convention and the Montreal Protocol.

(ii) The embedded operation of the principle of CBDR in the international ozone regime has contributed to its effectiveness. This has been achieved through the operation of the Multilateral Fund and phaseout schedule postponements. The postponements of phaseout schedules have allowed developing countries to have adequate time to comply with the ODS phaseout process. Furthermore, the Multilateral Fund links the financing to the implementation of projects in a step-by-step manner, thus enabling close monitoring of the ODS phaseout processes of the Article 5 countries and timely intervention in the event of any disruptions. This has played a vital role in enhancing the effectiveness of the regime.

The experience of the ozone regime offers lessons for other areas of environmental governance, particularly in dealing with climate change and biodiversity loss. The regime's success in balancing equity with effectiveness, and in dynamically adjusting to scientific and economic developments, provides a blueprint for the operationalization of CBDR in other contexts.

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Çin-ABD Rekabetinde Gri Bölge: İklim Değişikliği Müzakereleri

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Öz

İnsanlığın karşılaştığı en büyük zorluk olarak nitelendirilen iklim değişikliği ile mücadelede küresel iş birliği yapılması gerekliliği bir gerçektir. Hem uluslararası sistemdeki konumları hem de iklim değişikliğine sebep olan karbon emisyonu hususunda en büyük pay sahibi ülkeler olmaları sebebiyle, normalde rakip olan Çin ve ABD'nin istisnai iş birliği tüm dünya için önemlidir. Ne var ki yakın zamanda yaşanan Tayvan krizinin akabinde ilk vazgeçilen de bu iş birliği olmuştur. Bu durum, iklim diplomasisinin sadece bilimsel değil aynı zamanda etik bir çerçeveden de incelenmesi gerektiğini ortaya koymaktadır.

Tüm insanlığın ortak geleceğini etkileyen iklim değişikliği gibi bir konuda dahi küresel güçlerin dış politikalarının net olmadığı, ülkeler arası- hatta liderler arası- ilişkilere bağlı olarak dalgalanmalar gözlendiği söylenebilir. Uluslararası sistemde en önemli aktör olan devletlerin kimi zaman uluslararası sorunlar konusundaki duruşları, sorunların çözümü noktasında kısır döngüye sebep olmaktadır. Uluslararası örgütler zaman zaman küresel güçlerin etkisi altında önemli bildiriler ve anlaşmalar ortaya çıkarmayı başarmış olsa da somut adımlar atma hususunda "çıkar" ve "göreceli kazanç" anlayışı devreye girmiştir. Bu denklemde kuzey- güney ülkeleri arasındaki ilişkilere "çevresel (yeşil) adalet" kavramı da eklenmiştir.

İklim değişikliği sorununa karşı iş birliğine dayanan çok taraflı bir müzakere sürecinde özellikle Çin'in ve ABD'nin rolleri gelecek nesiller için son derece hayatidir. İklim değişikliği müzakereleri küresel rekabetten ayrı düşünülmemelidir. İklim değişikliği ile mücadelede önemli role sahip uluslararası örgütler ve anlaşmalar bu açıdan küresel güçler için yeni bir mücadele alanı haline gelmiştir. Bu çalışmada Çin ve ABD bağlamında küresel güçlerin iklim değişikliği mücadelesindeki tutarsız duruşları 2022'deki Tayvan krizi ışığında incelenecektir.

Anahtar Kelimeler: İklim değişikliği, müzakere, Çin, ABD, diplomasi

The Gray Zone in The Competition of China-USA: Climate Change Negotiations

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Abstract

It is a fact that global cooperation is necessary in the fight against climate change, which is described as the greatest challenge facing humanity. The exceptional cooperation of normally rivals China and the USA is important for the whole world, both because of their position in the international system and because they are the countries with the largest share in carbon emissions that cause climate change. However, this cooperation was the first to be abandoned after the recent Taiwan crisis. This situation reveals that climate diplomacy should be examined not only from a scientific but also from an ethical perspective.

It can be said that even in an issue such as climate change, which affects the common future of all humanity, the foreign policies of global powers are not clear and fluctuations are observed depending on the relations between countries - even between leaders. The stances of the states, which are the most important actors in the international system, on international problems sometimes cause a vicious circle at the point of solving the problems. Although international organizations have managed to come up with important declarations and agreements under the influence of global powers from time to time, the understanding of "interest" and "relative gain" has come into play in taking concrete steps. In this equation, the concept of "environmental (green) justice" has been added to the relations between north-south countries.

The roles of China and the USA in a cooperative multilateral negotiation process against the problem of climate change are extremely vital for future generations. Climate change negotiations should not be considered separately from global competition. International organizations and agreements, which have an important role in the fight against climate change, have become a new field of struggle for global powers in this respect. In this study, the inconsistent stances of global powers in the fight against climate change in the context of China and the USA will be examined in the light of Taiwan crises in 2022.

Keywords: Climate change, negotiation, China, USA, diplomacy

1. Giriş

4,374 milyar yaşındaki dünyada yaklaşık olarak 200.000 yıldır var olan insanoğlu, son 250 yıl içinde doğanın bir parçası olmaktan vazgeçip efendisi olmaya başlamıştır. Fakat çevre kimseye ait değildir; her insan bir diğerinin çevresinin parçasıdır (Art, 1995). Robert Kaplan, The Coming Anarchy adlı eserinde, dünya üzerinde geçmişten bu güne Hobbes'un "bencil, kötücül, zavallı ilk adamı" ile Hegel ve Fukuyama'nın "sağlıklı, iyi beslenmiş ve teknolojiyi iyi kullanan son adamı"nın yaşadığını belirtmektedir. İkisi de çevresel tehditlere maruz kalsa da "son adam" diğerinin aksine doğaya hükmeder ve onu değiştirir (Kaplan, 2000). Fakat bu "Goldilocks koşulları" – yaşamın ortaya çıkıp gelişmesi için optimal koşullara atfen kullanılan terim- sonsuza dek sürmeyecektir. Nitekim dünya üzerinde bugüne dek yaşamış tüm türlerin yaklaşık %99,9'unun nesli tükenmiş; yerini yeni

türler almıştır. Bostrom ve Cirkovic bunu 1988"gezegenimizdeki yaşamın vazgeçilmez kaderi" olarak görmektedir (Ferguson, 2023: 38). Gerek doğal kaynakların kontrolsüzce kullanımı gerekse bu kaynak kullanımındaki adaletsizlik ve doğa üzerinde yarattığı baskı, tarihimizin en mühim ve de en büyük zorluğunu karşımıza çıkarmaktadır: iklim değişikliği.

İklim şartlarının alışılmışın dışına çıkmasıyla açıklanan "iklim değişikliği" kavramı ilk defa 1988'de kurulan Hükümetlerarası İklim Değişikliği Paneli (Intergovernmental Panel On Climate Change- IPCC) ile ekonomik ve politik bir sorun olarak gündeme gelmiştir (Kılıç, 2009). Medeniyet ve gelişim, uzun yıllar boyunca, yapılaşma, kentleşme, sanayileşme olarak görülmüş; bu süreçte ekolojik denge pek dikkate alınmamıştır. Nordhaus bu durumu "iklim kumarı" olarak tanımlamaktadır. Nordhaus'a göre ekonomik ilerlemenin kasıtlı olmasa da iklim ve ekosistemler üzerinde yarattığı değişiklikler ileride tehlikeli sonuçlar doğuracaktır (Nordhaus, 2020). Esasen iklim değişikliğinin etkileri günümüzde ciddi olarak görülmektedir. Artık "ileride" denilecek bir tehlike olmayan iklim değişikliği günümüzün ve geleceğimizin en ciddi problemidir. İnsan kaynaklı iklim değişikliği sebebiyle, 2000 yılında Nobel ödüllü atmosferik kimyager Paul J. Crutzen, Sanayi Devrimi'nden bugüne devam eden dönemi yeni bir jeolojik çağ –antropojenik (insan etkisi)- (Crutzen, 2002) olarak isimlendirilmiştir. Wilson ise geleceğimiz için "6. Büyük yok oluşu" yani "insanlığın sonunu" (Wilson, 1992: 343) öngörmektedir.

Sanayi Devrimi ile başlayan makineleşme sürecinde gelişmiş devletlerin ekonomik rekabeti ve gelişmekte olan devletlerin gelişmiş devletleri yakalama hevesi, çevre sorunlarının da sanayileşme gibi küreselleşmesine yol açmıştır. 4. sanayi devriminin (endüstri 4.0) 2011 yılında başladığı kabul edilse de gelişmekte olan ülkeler hala fiziksel güce dayalı bir sanayileşme modeli izlemektedir. Nitekim IPCC 2001 Değerlendirme Raporu'nda özellikle son 50 yılda sera gazları emisyonlarına bağlı küresel ısınmanın büyük oranda insan kaynaklı olduğu ortaya konulmuştur (IPCC, 2001). Yine IPCC'nin 2018 tarihli 1,5ºC Küresel Isınma Özel Raporu'nda da şu ifadeye yer verilmiştir:

> Kuzey Avrupa'daki kuraklık ve rekor sıcaklıklardan ABD'deki orman yangınlarına, Çin'deki sıcak hava dalgalarından ve kuraklıktan Güney Hindistan'ın geniş bölgelerini harap eden olağanüstü derecede güçlü musona kadar aşırı hava olayları, etkilerini dünyanın dört bir yanında gösteriyor (IPCC, 2018).

Bu raporların dikkat çektiği 1,5 ºC hedefi, 20 Mart 2023'te IPCC'nin yayınladığı 6. İklim Değişikliği Sentez (AR6) raporundaki değerlendirmeye göre, iklim değişikliği ile mücadelede harekete geçmekteki eksiklikler sebebiyle, alınan önlemler mevcut durumu geri çevirmek için yeterli değildir. Sanayi Devrimi öncesine göre dünyamızın hâlihazırda 1,1 ºC ısındığı ve küresel ısınmadaki her artışın daha fazla kayıp ve zarara katlanarak sebep olduğunun da altı çizilen raporda, yoksul ülkelerin özellikle daha çok etkilendiğine dikkat çekilmektedir (IPCC, 2023). Germanwatch tarafından 8 Aralık 2023'te yayınlanan 2024 İklim Değişikliği Performans İndeksi (CCPI) de Paris Anlaşması ile hedeflenen 1,5 ºC hedefinin hala masada olduğunu ama ülkelerin ve özel sektörün vaatlerinin uzağında kaldıkları için bu hedefi gerçekleştirmenin zor olduğunu vurgulamaktadır (Burck vd., 2023).

2. Yeşil Adalet

Çevre sorunlarının, oldukça başarılı olarak nitelendirilen (Sohn, 1973), 1972 yılındaki Stockholm Konferansı ile Birleşmiş Milletlerin de gündemine dâhil olması (UN, 2023) bir milat olarak kabul edilebilir. Zira bu konferans ile iklim değişikliğinin sadece etkilerinin sınır aşan bir sorun olmadığı, çevre sorunları ile mücadelenin de küreselleşmesi gerekliliği ortaya koyulmuştur. Milat olarak kabul ettiğimiz 1972 yılından günümüze gerek çevre sorunları gerekse iklim değişikliği ile mücadele konusunun kimi zaman –özellikle iç siyasette- politize edildiği görülmektedir. Bu sebeple mücadele ya yavaşlamakta

ya da tamamen durmakta ve gerilemektedir. Bu durum, özellikle üçüncü dünya ülkeleri olarak ifade edilen devletler için tehlikeyi daha da arttırmakta ve Rob Nixon'ın ifade ettiği gibi "iklim adaletsizliğine" (Nixon, 2011) sebep olmaktadır.

2006 yılında Oxford Araştırma Grubu'nun yayınladığı "Küresel Tehditlere Karşı Küresel Tepkiler: 21. Yüzyıl İçin Sürdürülebilir Güvenlik" raporunda şu noktalar vurgulanmaktadır: 1) İklim değişikliği birçok doğal zorluğa ve gıda krizine yol açmaktadır. Bu durum kıyı ve delta bölgelerdeki insanları yer değiştirmeye zorlayabilir; sosyal dengesizliğe ve yaşam tarzlarını değiştirmeye sebep olabilir. 2) İklim değişikliğinin şiddeti ve yıkıcılığı uluslararası terörizmi tırmandırabilir. 3) Nükleer enerjinin artan kullanımı iklim değişikliğine uyum sağlamak için bir yol olarak görülmemelidir. Dengesiz bir dünyada nükleer teknolojinin artması ve yaygınlaşması durumunda, düşman devletlerin ve aşırılıkçı grupların sahip olma potansiyeli artabilir (Abbott vd, 2006). Görüldüğü gibi iklim değişikliği sadece sağlık veya çevre konularına değil; terörizm, radikalleşme, güvenlik gibi pek çok konuya sirayet edebilecek potansiyele sahiptir.

İnsani ve güvenlik boyutunun yanında maddi olarak da gelişmiş ve gelişmekte olan –veya fakir- devletlerin iklim değişikliği karşısında yaşayacağı ekonomik sıkıntıların farklı olacağı bilim insanları tarafından ön görülmektedir. Germanwatch tarafından Aralık 2019'da 15.'si yayınlanan Küresel İklim Riski İndeksi raporunda ABD ve Japonya gibi zengin ülkelerin bir milyar USD kayıplarının bile, iklim değişikliğinin fakir ülkelerde yaratacağı ekonomik zarardan daha az etkili olacağı belirtilmiştir (Eckstein vd, 2019). Bu ifadeye göre iklim değişikliğinin etkilerine karşı, fakir ülkeler olarak ifade edilen gelişmekte olan ve az gelişmiş ülkelerin ekonomik açıdan kırılganlıkları daha fazladır.

Çizelge 1'de görülebileceği gibi herhangi bir artış gelişmekte olan ülkeler için ekonomik zarar anlamına gelirken, 3ºC'a kadar olan artışta gelişmiş ülkeler zarara uğramayacaktır. Hatta 2 ºC' a kadar olan bir sıcaklık artışında ekonomik olarak kazanç ön görülmektedir. Sadece bu projeksiyon bile çevre ahlakı ve çevresel adalet –ya da yeşil adalet- konusunda tüm dünyanın, hem devletler hem de bireysel bazda, üstüne düşen rolü oynaması gerektiğini göstermektedir.

Çizelge 1: İklim Değişikliğinin Makroekonomik Etkileri (Değer ve Anbar, 2008)

Ülke Kategorisi	**Sıcaklık Artışı**	**Sıcaklık Artışının Etkisi**
Gelişmekte Olan Ülkeler	Herhangi bir artış derecesi	Net ekonomik zarar
Gelişmiş Ülkeler	0ºC-2ºC	Net ekonomik kazanç
	2ºC-3ºC	Nötr
	3ºC üzeri	Net ekonomik zarar

İklim değişikliğinin yaratacağı en önemli sorunlardan olan okyanus ve deniz seviyelerinin yükselmesi senaryoları gelişmiş ülkelerin kıyı kesimlerini tehdit etse de, yoksul ada ülkeleri için daha ciddi bir tehdittir. İklim değişikliğine adaptasyon için gerekli ekonomik imkânlara sahip olmayan gelişmekte olan ve az gelişmiş ülkelerin uzun süredir talep ettikleri (BM, 2023) kayıp-zarar fonundan yetenince yararlanması "yeşil adaletin" sağlanması için oldukça önemlidir.

Kayıp-zarar fonu esasen 1991'de gündeme gelmiş; Vanuatu, Gelişmekte Olan Küçük Ada Devletleri (SIDS) adına karbon emisyonunda tarihsel sorumluluklarının çok düşük olmasına karşın, iklim değişikliğinin etkilerinden en fazla etkilenen ülkeler olmaları

sebebiyle, kayıp ve hasarlarının değerlendirilmesi çağrısında bulunmuştur. 2007'de düzenlenen COP 13 sonrası açıklanan Bali Eylem Planı'na dek gündeme alınmayan bu konu 2013'deki COP 19 Varşova Uluslararası Kayıp ve Hasar Mekanizmasının (WIM) kurulması ve Paris'teki COP 21'de "kayıp ve zarar" konusunun resmi olarak kabul edilmesi ile (Yeşil Ekonomi, 2023) bir yol haritasına kavuşmuştur. Ne var ki bugüne dek yeterli destek verilmemiştir.

Birleşik Arap Emirlikleri'nin Dubai şehrinde 30 Kasım- 12 Aralık 2023 tarihlerinde düzenlenen COP 28 toplantısının ilk gününde uzun zamandır masada olan kayıp-zarar fonu, fona katılım gönüllülük prensibine dayandırılarak kabul edilmiştir. Taahhüt edilen miktar 2023 Aralık itibariyle 700 milyon USD'yi aşmıştır (Yeşil Ekonomi, 2023). Böylece özellikle sel, çölleşme, orman yangınları gibi iklim değişikliği kaynaklı sorunlarla boğuşan az gelişmiş ülkelerin finansmanı konusunda olumlu ve umut verici –fakat yetersiz- bir adım atılmıştır. Climate Action Network International başkanı Harjeet Singh de kayıp-zarar fonu ile ilgili verdiği demeçte fonun kurulmasında geç kalındığını ifade ederek, *"varlıklı ulusların, özellikle de tarihin en büyük kirleticisi olan ABD'nin yetersiz katkılarıyla birleştiğinde, gelişmekte olan dünyanın kötü durumuna karşı kalıcı bir kayıtsızlığın sinyalini veriyor."* (Lakhani, 2023) demiştir.

İklim müzakereleri boyunca daha önce de gündeme gelen "karbon ticareti" ve "kirleten öder" prensibini, hatta COP 28'de kabul edilen kayıp-zarar fonunu, "sırf maddi bir çerçeveden iklim değişikliğine yaklaşıldığı" yönünde eleştirmek mümkündür. İklim değişikliği ile, finansmandan öte; daha kararlı ve istikrarlı bir emisyon azaltma politikası, sıfır karbon taahhütleri, kısacası ulusal katkı beyanlarının (NDCs) geliştirilmesi ve bunlara uygun yasal düzenlemelerin hayata geçirilmesi yolu ile mücadele edilmelidir.

3. Tarihsel ve Güncel Sorumluluk

Tüm küresel konularda olduğu gibi iklim diplomasisinde de esas değişkenler günümüzde "süper güç" olarak gösterilen –ABD ve Çin- ana aktörlerdir. Ana aktörler iklim değişikliği konusundaki sorumlulukları yanında uluslararası sistem tarafından kendilerine yüklenen misyon ile ortaya çıkmaktadırlar. Soğuk Savaş sonrası Batı dünyasının lideri konumuna gelmiş, dünyanın en büyük ekonomisi olan, ayrıca tarihsel olarak en fazla karbon emisyonundan sorumlu olması sebebiyle ABD; dünyanın en fazla nüfusa sahip ülkesi olması, son yıllarda yakaladığı inanılmaz büyüme ivmesi ve bu büyüme sonucu günümüzün en fazla karbon emisyonu yaratan ülkesi olması sebebiyle Çin, iklim diplomasisinde de ana aktörler olarak belirmektedir.

ABD ve Çin arasındaki çok boyutlu bir küresel rekabet artık aşikârdır. Fakat başarılı bir iklim rejiminin oluşması için normalde rakip olan ABD ve Çin'in istisnai iş birliği son derece önemlidir. Özellikle Obama döneminde ABD-Çin arasındaki anlaşmalar ile iklim değişikliği müzakereleri son derece olumlu bir ivme yakalamış, 2015 yılında Paris İklim Anlaşması imzalanmıştır. Çevre konusunda çalışan akademisyenler, aktivistler ve tüm dünya kamuoyu için büyük bir umut sebebi olan Paris Anlaşması sonrası yaşanan gelişmeler ise derin hayal kırıklığı yaratmıştır. Zira ABD'nin Trump döneminde anlaşmadan çekilmiş olmasının yanında, kimi ülkeler tarafından verilen karbon azaltma taahhütleri ötelenmiş ve söz verilen fonlar ve ekonomik destekler üçüncü dünya ülkelerine yeterince ayrılmamıştır. Bu dönemde, başta AB (özellikle Fransa ve Almanya) olmak üzere müzakere masasındaki diğer ülkelerle işbirlikçi ve çok taraflılığı önceleyen bir iklim diplomasisi izleyen ve yenilenebilir enerjiye yaptığı yatırımlar ile tüm dünyaya model olan Çin'in, iklim değişikliği müzakerelerinde de öneminin arttığı görülmektedir. 2019'da başlayan Covid-19 pandemisinin ve ABD'de Biden'ın seçilmesinin bu liderliği sekteye uğrattığı öne sürülebilir. Zira Biden yönetimi iklim değişikliği müzakerelerinde ABD'yi tekrar lider ülke konumuna getirmeyi amaçlamıştır.

Batının lideri olarak kabul edilen ABD'nin iklim değişikliği konusuna yaklaşımının çevre-ekonomi- politika eksenli olarak, yönetimdeki

başkanın tutumuna göre dalgalandığının en somut örneği Obama- Trump- Biden dönemlerinde karşımıza çıkmıştır. Obama, çok taraflı bir iklim diplomasisine katkıda bulunmuş; Paris Anlaşması'na giden yolda Çin ile uyumlu bir görüntü çizmiştir. Trump ise göreve geldikten sonra Paris Anlaşması'nı terk etmiştir. Nitekim Paris Anlaşması'nı terk etmek Washington'ın uluslararası kamuoyunda çokça eleştirilmesini (Kohen, 2019; Sanger ve Perlez, 2017; Swaine, 2017) de beraberinde getirmiştir. Trump'ın Paris Anlaşması'ndan çekilmesi ile ilgili MIT'den ekonomist Jake Jacoby de cezanın ekonomik olmadığını, utanç olduğunu ve bunun "ABD liderliğini zayıflattığını" (The Associated Press, 2019) ifade etmiştir. Biden ise göreve geldikten sonra Paris Anlaşması'na ABD tekrar katılmış; küresel sorunlara kayıtsız kalmayarak "lider ülke pozisyonuna ABD'nin geri döndüğünü" (America is back) (Rogers ve Tankersley, 2021) belirtmiştir. 2035'e kadar daha yeşil bir ekonomi hedefi bulunan (Frontier Group, 2021); 2050 yılına kadar sera gazı emisyonunu sıfırlamayı planlayan Biden yönetiminin, 2022 Temmuz ayında yeni bir yasa tasarısı ile iklim değişikliği ile mücadele ve temiz enerji için 369 milyar USD kaynak ayırması –şimdiye kadar ABD'de yapılan en büyük yatırım- (Köksal, 2022) bu liderlik yolunda atılmış adımlardır. Söz konusu tasarı metni genel olarak olumlu tepkiler alsa da iç kamuoyunda farklı açılardan da eleştirilmiştir. Fosil yakıt endüstrisini destekleyen hükümlerin olması bu eleştirilerin odak noktasıdır (Malakoff, 2022).

Mayıs 2019'daki Arktika Konseyi'nin resmi sonuç bildirisinde dönemin ABD Dışişleri Bakanı Mike Pompeo'nun baskısı ile iklim değişikliğinin etkilerine yer verilmemiştir. Dönem başkanı Finlandiya'nın dış işleri bakanı tarafından ayrıca yapılan değerlendirmede ise iklim değişikliğinin Arktik bölgedeki etkileri, alınan ve alınması gereken önlemler belirtilmiş, acil bir eylem planı oluşturulmasının gerektiğine vurgu yapılmıştır (WMO, 2019). Pompeo, buzulların erimesi için "yeni yollar açılması ve ticaret için yeni fırsatlardan fazlası değil" yorumunu yapmıştır (Cole, 2019). Trump yönetiminin bu tutumunu, Biden başkanlık seçimi sürecinde sıkça eleştirmiştir. Nitekim 2023 itibariyle Washington, iklim değişikliği ile mücadelede –Biden'ın ifadesiyle- "pratikte acil durum" ilan etmiştir (Akgün, 2023). Ayrıca iklim özel temsilcisi John Kerry aracılığıyla, özellikle AB ve NATO ile (Temizer, 2023) çok taraflı bir iş birliği içinde ilişkileri geliştirme yolunu izlemektedir. Dönemin temsilciler meclisi başkanı Nancy Pelosi'nin Tayvan ziyareti sonrası ABD ile iklim değişikliği müzakerelerini donduran Çin ile tekrar ortak noktada buluşulması da önemli bir adım olmuştur. John Kerry, COP 27 sonrasında Şi Zhenhua ile görüşerek 20 Kasım 2022'de "tekrar masadayız" açıklamasını yapmıştır. Çin tarafından da "ortak çalışmaya devam edileceği" (The Economist, 2022) mesajı verilmiştir. Bu açıklamalar ışığında müzakerelerin tekrar başlatıldığı kabul edilse de Obama dönemindeki gibi bir iş birliğine süratle dönülebileceği şüphelidir. Zira Biden yönetiminin 2022'de açıkladığı Çin'e yönelik ticari sınırlamaların henüz kaldırılmadığı ve ABD yatırımlarından bazılarının –özellikle ileri teknoloji ve yapay zekâ (AI) yatırımları- ulusal güvenlik sebebiyle Çin'de yasaklandığı göz önünde bulundurulmalıdır. Çin Dışişleri bakanlığı bu durumu "teknolojik zorbalık" olarak nitelendirmiş; karşılığında Çin-ABD şirketlerinin birleşmesini yasaklamış, gelişmiş yongaların üretiminde kullanılan kritik minerallerin Çin sınırları dışına ithalatını sınırlamıştır (Berman, 2023). Tüm bunların ötesinde bir ABD'li yetkilinin yeni bir Tayvan ziyaretinin, pek çok konuda olacağı gibi, iklim müzakerelerinin tekrar dondurulmasını da beraberinde getirebileceği unutulmamalıdır.

İklim değişikliği müzakerelerini açıklamaya çalışan teorilerin ortak noktaları ana aktörlerin devletler olmasıdır. Bu noktada rekabet de kaçınılmazdır. Sınırsız iş birliği ve tavizler, özellikle ABD ve Çin ilişkileri göz önüne alındığında son derece ütopik olacaktır. Bu sebeple müzakere süreci aslında küresel rekabetten ayrı olarak düşünülmemelidir. "Yeni bir Soğuk Savaş" yorumu yapılan ABD- Çin rekabetinde iklim değişikliği müzakereleri her ne kadar özel bir iş birliği alanı olsa da; farklı bir rekabet alanı, bir "gri bölge"

olarak da görülebilir. Nitekim 2022'de yaşanan jeopolitik bir krizde –Pelosi'nin Tayvan ziyareti- ilk vazgeçilen konulardan biri iklim diplomasisi olmuş ve Çin, ABD ile iklim müzakerelerindeki anlaşmaları askıya aldığını açıklamıştır. Ağustos ayında dondurulan iklim müzakerelerinin tekrar başlaması ise ancak kasım ayında olmuştur (The Economist, 2022). Sadece bu durum bile iklim değişikliğinin salt bilimsel değil, politik bir yanı da olduğunu ortaya koymaktadır.

4. Çin-ABD Rekabetinde Gri Bölge

Esasen askeri uzmanlarca kullanılan bir terim olan "gri bölge" kavramı üzerinde uzlaşılmış net bir tanım yoktur. Genellikle gri bölge terimi savaş ve barış arasındaki faaliyetleri ifade etmektedir (Akın, 2022). Karışıklık, belirsizlik durumu, karşıdakini aldatma çabaları (Işık, 2020) gri bölgenin temel özellikleri olarak karşımıza çıkar. ABD-SSCB arasındaki Soğuk Savaş ortamı gri bölge için bir örnek olarak gösterilebilir. Günümüzde ABD-Çin ilişkileri için II. Soğuk Savaş (Walker, 2020; Bekkevold, 2022; Roberts, 2023) benzetmesi yapılsa da durum ABD-SSCB arasında yaşanan Soğuk Savaş'tan farklıdır (Stening, 2023). Zira günümüz dünyasında devletler arasındaki karşılıklı bağımlılık artık daha fazladır. Özellikle ticari ilişkiler ve sermaye piyasasının küreselleşmesi durumu da bu bağlılığı koparılamaz bir noktaya taşımıştır. Nitekim Ağustos 2023'te Çin'i ziyaretinde ABD Ticaret Bakanı Gina Raimondo'nun "güçlü bir Çin ekonomisinin iyi bir şey olduğu" (Siripurapu ve Berman, 2023) açıklaması karşılıklı bağlılığın ekonomik boyutunu da göstermektedir.

Çin ile ABD arasında bir soğuk savaş durumundan bahsedilebilmesi için tüm anlaşmaların ve ilişkilerin kesilmesi gerekir ki bu pek olası görünmemektedir. En kötümser perspektiften bakarak II. Soğuk Savaş ihtimalini kabul edersek; Rudd, böyle bir duruma karşı en akılcı olanın stratejik denge kurulana dek "küresel yönetişim kurumlarını işlevsel tutmak" olduğunu (TUIC, 2021) savunmaktadır. İklim değişikliği müzakereleri de bu işlevi görmesi açısından önemlidir.

Bu çalışmanın konusu olan iklim değişikliği müzakereleri ABD-Çin ilişkilerinde gri bölgede görülebilir. Nitekim Biden yönetiminin dışişleri bakanı Blinken'in Çin ile ilişkilerin "gerektiğinde rekabetçi, gerektiğinde işbirlikçi, gerektiğinde düşmanca" olacağı açıklaması (Sun, 2021) iklim diplomasisinin anlamını daha net ortaya koymaktadır. Zira ekonomik rekabetin yanında Tayvan konusunun sürekli sıcak tutulması ve Çin'in "tek Çin" ilkesinden ödün vermeyen kararlı tutumu ile iki ülke ilişkileri gittikçe gerilmiştir. Bu çerçevede Ocak 1979 yılında başlayan diplomatik ilişkilerin, özellikle Trump döneminde en düşük seviyede (Chen, 2022: 257) seyrettiği söylenebilir. Nitekim Çin dışişleri bakanı Vang Yi, 22 Ekim 2022'de Asia Society'nin New York'taki merkezinde yaptığı konuşmada iki ülke arasındaki rekabetin yanlış değerlendirilmesi ve ABD yönetiminin son birkaç yılda Çin'i çevreleme politikasını teşvik eden hamlelerinin dünyayı yeni bir Soğuk Savaş dönemine sürükleme riski olduğunu ve bunun dünya halklarının geleceği için belirsizlik doğurduğunu ifade etmiştir (FMPRC, 2022).

Özellikle 2015 yılında Obama-Cinping arasındaki iklim görüşmeleri ve imzalanan ikili anlaşmalar ile pozitif bir havada süren ilişkilerin; Trump döneminde ekonomik, Biden döneminde jeopolitik krizler yaşanması sonucu iklim diplomasisinde de kopma noktasına gelmesi kaçınılmaz olmuştur. Maalesef ki gri bölge stratejisinde Çin tarafından ilk etapta vazgeçilen veya koz olarak kullanılan konu iklim değişikliği müzakereleri olmuştur. Her ne kadar gerek Pekin gerekse Washington karşılıklı açıklamalarla gergin olan ilişkileri bir nebze iyileştirmiş; pozitif mesajlar verilmeye başlanmış olsa da iki ülke birbirini halen stratejik rakip olarak görmektedir. Bu sebeple iklim değişikliği müzakereleri de bir rekabet alanına dönüşmektedir.

5. Tayvan Sorunu ve İklim Diplomasisinin Geleceği

Susskind'e göre küresel müzakereler bilimsel araştırmalar kadar önemlidir. Nitekim müzakerecilerin kültürel, ideolojik ve politik

farklılıkları onların konuya yaklaşımlarını etkilemektedir (Susskind, 1994). Esasen iklim diplomasisi içinde bilimsel temeller konunun özünü oluşturması gerekirken ulusal egemenlik, ekonomi ve uluslararası çıkarlar ülkelerin politik duruşlarını belirlemektedir. 1972 yılında Stockholm'de düzenlenen BM İnsan Çevresi Konferansı'nı iklim değişikliği müzakerelerinin başlangıcı olarak kabul edersek, 2023 yılına kadarki süreçte başarılı anlaşmaların yanında, ABD ve Çin gibi küresel güçlerin zaman zaman engelleyici konumda oldukları görülebilir.

İklim değişikliği müzakerelerinde devletlerin politikalarındaki dalgalanmalar konunun iç veya dış politik etkenler ışığında ele alındığının bir işaretidir. Hükümetlerden bağımsız bir uluslararası iklim rejiminin henüz oluşturulamamış olması da bunu doğrulamaktadır. Zira böyle bir rejimin oluşması için çok taraflı bir iş birliğinin yanında ulusal çıkarlardan taviz verilmesi de gerekmektedir.

İklim değişikliği, salgınlar, gıda güvenliği gibi etik boyutu da olan küresel sorunlar, ancak "tüm insanlığın yararına olma" ilkesine dayalı çözümler ile aşılabilir. Bu ilke, devletlerin çoğu zaman uzun vadeli çıkarlarından belli ölçüde taviz vermesini gerektirmektedir. Devletlerin kısa vadeli çıkarlarından zaman zaman ödün vermeleri mümkün olsa da uzun vadeli çıkarlarından -kısmen de olsa- vazgeçmeleri pek mümkün değildir. İşte bu noktada iklim müzakerelerinden çekilen veya müzakereleri zorlaştıran devletlerin davranışları anlam kazanmaktadır. Müzakere sürecinde bazen devletler arasındaki farklı meselelerin sürece dâhil olduğu görülebilir. Son dönemde yaşanan Rusya-Ukrayna savaşı ve ABD-Çin arasındaki Tayvan sorunu ve devamında iklim müzakerelerine yansımaları, ulusal ve uluslararası çıkarların kimi zaman bilimsel gerçeklerin önüne geçtiğinin kanıtıdır.

Çin'in "Tek Çin" politikasının önemli bir parçası olan Tayvan, resmi statüsü net olmayan bir adalar bütünüdür. Bu kafa karıştırıcı durumu anlamak için Tayvan'ın tarihine bakmak yerinde olacaktır.

Bugün 166 adadan oluşan Tayvan 1600'lerde Hollanda kontrolündeyken 1683'ten 1895'e kadar Çin'e bağlıydı. Çin-Japon savaşından sonra 1895'te, sadece 148 gün bağımsız kalabilen Tayvan Demokratik Cumhuriyeti –Asya'da kurulan ilk cumhuriyet - kurulmuş; çoğu dünya devletinin tanımaması sonucunda Japonya kontrolüne geçmiştir (Öcal, 2009: 10). 50 yıllık Japon hâkimiyetinde pek çok Çinli ve Çin yandaşı Tayvan'ı terk etmiş; Tayvan toplumu Çin'den farklı bir tarih ve kültür oluşturmuştur (Lin, 2021: 16). Günümüzde yaşanan sorunların temelinde Japonya'nın Tayvan'ı işgal döneminde Tayvan'ın iç dinamiklerindeki köklü değişim vardır.

Tayvan, II. Dünya Savaşı'nın sonunda Japonya'nın yenilip barış anlaşması yapması sonrası ABD ve İngiltere'nin onayıyla tekrar Çin'e bağlanmıştır. Bu dönemde Tayvan halkına karşı Çin yönetiminin baskıcı ve şiddet içeren tutumu, yolsuzluklar ve ekonomideki çöküş ciddi ayaklanmaları da beraberinde getirmiştir (Ismayılzada, 2019: 54).

Çin'de KMT ile ÇKP (milliyetçiler- komünistler) arasında yaşanan iç savaş sonrası Tayvan'a kaçan ve sürgünde bulunan Çan Kay Şek'in Taipei'de kurduğu hükümet 1970'lere kadar Batı tarafından resmen tanınan ve hatta BMGK'de tüm Çin'i temsil eden bir konum kalmıştır. Fakat 1970'lerde Taipei hükümetinin Çin anakarasındaki milyonlarca kişiyi temsil etmesinin gerçek dışı olduğu anlaşılmış; 1971'de BM, Pekin'i resmen tanıdıktan sonra Tayvan hükümeti saf dışı kalmıştır. 1979'da Çin ile ABD arasında diplomatik ilişkilerin başlaması ile Tayvan'ı tanıyan ülke sayısı hızla azalmıştır. Fakat Tayvan'ın halen kendi anayasası, meclisi ve ordusu bulunmaktadır (Çalışkan, 2022). Günümüzde sadece 13 ülke Tayvan'ı, yani Çin Cumhuriyeti'ni, resmen tanımaktadır. "Tek Çin" ilkesi gereği Çin, Tayvan ile bağı olan devletlerle ilişki kurmamaktadır.

Mart 2023'e kadar Tayvan'ı tanıyan ülkelerin sayısı 14 iken Honduras yönetimi "Çin ile diplomatik ilişkiler kurma kararı alarak Tayvan ile ilişkileri kestiklerini" açıklamıştır. 2000'lerin başında Orta Amerika'daki

yedi ülkenin tamamı Tayvan'ı tanırken günümüzde bu sayı ikiye- Guatemala ve Belize- düşmüştür (Aslan, 2023). Bu durum Çin'in ekonomik gücünü kullanarak Latin Amerika'da nüfuz kazandığının, tersi bir okumayla da ABD'nin bölgede güç kaybettiğinin göstergesi olarak yorumlanabilir. Çin'in 2008'de ilkini yayınladığı, 2016 yılında güncellediği "beyaz kitapta" da Latin Amerika ülkeleri ile olan ilişkilerin "kazan-kazan" (Aguilera-Castillo ve Gil-Barragan, 2018) prensibine dayandığı vurgulanmaktadır. Ekonomik bağların yanında çeşitli ticari işbirlikleri de Çin'in güç projeksiyonu potansiyelini yaratması açısından altı çizilen hususlardır. Nitekim RAND Corporation'ın 2023 yılında yayınlanan Latin Amerika (Great-Power Competition and Conflict in Latin America) raporunda Çin'in bölgede büyük güç hedeflerini gerçekleştirmenin yanında Tayvan'ı tanıyan ülke sayısını da azaltmak için ticari ilişkileri kullandığı belirtilmektedir (Chindea vd., 2023). Çin'in; ABD'nin öncülük ettiği Amerikan Devletleri Örgütü'ne (The Organization of American States) bir alternatif olan Latin Amerika ve Karayip ülkeleri ile 2014'te başlattığı CELAC (Community of Latin American and Caribbean States) Forumu'nun da jeopolitik ve ticari bir yönü vardır. ABD ve Kanada hariç, kıtadaki tüm devletler -33 devlet- CELAC üyesidir. Çin'in 2018 toplantısında üye ülkeleri Kuşak-Yol Girişimi'ne resmen davet etmesini, hem Tayvan'ı tanıyan üye devlet sayısını azaltma hamlesi, hem de ABD'nin Çin'i kuşatma politikasına bir karşılık olarak görebiliriz.

Her ne kadar 1991 yılında Çin ile Tayvan arasındaki savaş durumu sona ermiş ve ekonomik ilişkiler zaman içinde ilerlemiş olsa da, Tayvan halkının ve yöneticilerinin bağımsızlık iddiası son bulmadığı için Çin nezdinde Tayvan "en nihayetinde anakaraya katılacak ayrılıkçı bir bölge" (Maizland, 2022) olarak görülmektedir.

Sorunlu politik ilişkilerine rağmen Çin ile Tayvan arasındaki ekonomik ilişkilerin artarak devam etmesi dikkat çekicidir. Bu ekonomik ilişki farklı perspektiflerden değerlendirilmektedir. Bir görüşe göre Çin, ekonomik olarak Tayvan'ı kendisine bağımlı hale getirmiştir ve Tayvan'ın ekonomik refahı Çin'e bağlıdır (Lee, 2021). Öte yandan ekonomik ilişkilerin yanında Tayvan'ın Çin için önemli bir pazar olması ve yatırımları, Çin'in Tayvan'a saldırmasının önündeki en önemli engeldir. Bu ince çizgide ABD'nin Çin ile olan rekabeti denklemi daha karmaşık hale getirmektedir. ABD uzun yıllardır Tayvan konusunda Çin'in ne yanında ne de tam karşısında konumlanmakta ve muğlak bir strateji izlemektedir. Fakat 2 Ağustos 2022'de ABD Temsilciler Meclisi Başkanı Nancy Pelosi'nin Asya Turu kapsamında Tayvan'ı ziyaret etmesi çok yönlü bir kriz yaratmıştır.

Asya Turu programında olmamasına rağmen Pelosi'nin Tayvan'ı ziyaret etmesinin muhtemel olduğu iddiaları üzerine Çin güçlü bir muhalefet ve lobi çalışması yürütmeye başlamıştır. ABD heyetinin Tayvan'a yaklaşması halinde uçağı düşürme tehdidine varan söylemlere rağmen Pelosi 2 Ağustos 2022'de söz konusu ziyareti gerçekleştirerek, 25 yıl sonra Tayvan'a giden ilk ABD Temsilciler Meclisi Başkanı olmuştur (Aytekin, 2022). Tayvan ziyaretinin iki ülke ilişkilerindeki gerginliği tırmandırma potansiyeli sebebiyle tüm dünya bu ziyareti yakından takip etmiştir. Pekin'in "tek Çin" politikasına alenen bir karşı çıkış olarak yorumlanan bu program dışı ziyaret sonrası Çin, Tayvan çevresinde gerçek mermilerin kullanıldığı ve adeta kuşatma hazırlığı olarak yorumlanan askeri bir tatbikat başlatmış ve 5 Ağustos'ta ABD'ye yönelik sekiz başlıktan oluşan karşı önlemleri açıklamıştır. Buna göre yasa dışı göç, uluslararası suçlar ve uyuşturucuyla mücadele ile askeri ve donanma iletişim mekanizması durdurulmuştur (Kwan, 2022). Ayrıca ABD-Çin ilişkilerinin en istisnai ve yumuşak yüzü olan iklim görüşmelerinin askıya alınması da bu karşı önlemlerden birisi olmuştur. Çin'in iklim görüşmeleri ile ilgili kararının kapsamı net olmasa da ABD'ye karşı önlem paketinin içinde yer alması konunun politize edilmesini beraberinde getirmiştir. Nitekim Çin Dışişleri Bakanlığı sözcüsü Wang Wenbin, Çin'in aldığı karşı önlemleri "meşru ve haklı tepkiler" olarak nitelendirirken iklim görüşmelerinin askıya alınması kararının tüm sorumluluğunun

ABD'de olduğunu ifade etmiştir. Aynı konuşmasında Wang'ın, Çin'in iklim değişikliği konusunda uluslararası ve çok taraflı iş birliğine devam edeceği mesajını vermesi (Lotus News, 2022) müzakere sürecinin iki ülke arasında küresel liderlik rekabetinin yeni ve farklı bir koluna dönüştüğünün göstergesidir.

Özellikle Obama döneminde iklim değişikliği ile mücadelede ABD'nin stratejik bir ortağı haline gelen, Trump döneminde iklim değişikliği müzakerelerinde liderlik rolü oynayan, Biden döneminde de müzakerelerdeki liderlik rolünü pekiştirmeye çalışan Çin'in iklim görüşmelerini askıya alması kararı tüm dünyada şaşkınlık ve endişe yaratmıştır. Zira Çin, son dönemde iklim değişikliği ile mücadele konusunda ciddi adımlar atmıştır. Temiz enerji yatırımlarında büyük atılım yaparak kömüre bağımlılığını azaltmayı hedefleyen Çin, 2030'a kadar karbon emisyonunda en üst seviyeye ulaşıp 2060'a kadar karbon nötr olma taahhüdünde bulunmuştur (Burck vd.,2023). Dünyanın günümüzde en fazla karbon emisyonundan sorumlu ülkesi olan Çin'in iklim değişikliği ile mücadeleden geri durmaması sırf bu sebeple bile ciddi bir önem taşımaktadır.

Çin'in ABD ile iklim değişikliği görüşmelerini askıya aldığını açıklamasının ardından ABD iklim elçisi John Kerry verdiği bir röportajda, Şi Cinping'i iklim diplomasisini sürdürmeye davet ederek Kasım 2022'de Mısır'da yapılacak COP 27 öncesi "iki ülkenin yeniden bir araya gelebileceğini umut ettiğini" ifade etmiştir. Kerry, iklim değişikliğinin diğer sorunların gölgesinde kalarak 'kesintiye uğramaması gereken bir alan' (İklim Haber, 2022) olduğunu belirtmiştir. Buna karşılık olarak Çin Dışişleri Bakanlığı yaptığı yazılı açıklamada, Washington ile iklim müzakerelerine tekrar başlamanın, Pelosi'nin ziyaretinin olumsuz izlerini silmek için ABD'nin neler yapacağına bağlı olduğu ifade edilmiştir. Bu açıklamanın Massachusetts Senatörü Ed Markey, Indiana Valisi Eric J. Holcomb, Tennessee Senatörü Marsha Blackburn ve son olarak Arizona Valisi Doug Ducey'in (Tesnim, 2022) ziyaretleri sonrasına denk gelmiş olması da konunun hassasiyetini ortaya koymasının yanında; Çin'in ABD'nin tutumuna karşı bir yaptırım uygulama yolu izlediğinin de kanıtıdır.

Öte yandan 18 Eylül 2022'de Joe Biden'ın CBS'e '60 Dakika' programında verdiği röportajda ABD'nin hala tek Çin politikasına bağlı olduğu, bağımsızlık için Tayvan'ı teşvik etmedikleri ama bağımsızlığın Tayvan halkının kararı olduğu ve Tayvan'ın olası bir Çin müdahalesine karşı ABD tarafından savunulacağı açıklaması yeni bir kriz yaratacak boyuttadır. Zira "Ukrayna'nın aksine ABD Tayvan'ı savunacak mı?" (Biden, 2022) sorusunun iki kere sorularak Biden tarafından olumlu cevaplanması dikkat çekicidir. Pekin'in beklediği "Pelosi'nin ziyaretinin olumsuz izlerini silecek" sözlerin bunlar olmadığı kesindir. Tayvan yönetimi Washington'a bu sözleri üzerine teşekkür ederken; Pekin, ABD'yi diplomatik yollardan protesto ettiğini açıklamıştır (Cheong, 2022).

Bu ortamda iklim değişikliği müzakereleri sürecinin bilimsellikten uzaklaşarak politik yönünün ağır bastığı görülmüştür. Pekin'in beklediği olumlu adımların ABD tarafından atılmadığı sürece tekrar iş birliğine yaklaşmayacağı açıklaması iklim aktivistleri ve kamuoyu nezdinde hayal kırıklığı yaratmıştır. Ağustos 2022'de Pelosi'nin Tayvan ziyareti kesintiye uğrayan ilişkiler sonrası ilerleyen aylarda Pekin ve Washington arasında gerilim azalmış, böylece iklim görüşmeleri de tekrar başlamıştır.

Biden 2021'de göreve geldikten sonra Şi Cinping ile ilk yüz yüze görüşmesi olması açısından kayda değer olan 14 Kasım 2022'deki görüşmede Beyaz Saray resmi toplantı metnine göre "iklim değişikliği, küresel makroekonomik istikrar, sağlık ve gıda güvenliği gibi önemli konularda iş birliğinin artırılması ve ortak çalışma" çağrısında bulunulduğu belirtilmiştir. Çin tarafı da bu görüşmeyi "derin, samimi ve yapıcı" olarak nitelemiştir. Başkan Şi'nin "ikili ilişkileri geliştirmek ve ilerletmek için doğru yolun bulunması gerektiğini" belirtmesi; Tayvan konusunda ABD'nin bağımsızlığı desteklemediği ve Tek Çin ilkesinin vurgulanması toplantı metnindeki dikkat

çekici noktalardan bazılarıdır (CBT, 2023). Temmuz 2023'te ise John Kerry'nin Pekin ziyaretinde karşılıklı iş birliği ve ilişkilerin geliştirilmesi açıklamaları Çin-ABD ilişkilerinin seyri açısından önemlidir. Sonrasında COP 27 ve yakın zamanda COP 28 toplantılarında da çok taraflılık ve iş birliği mesajları devam etmiştir. Kasım 2023'te de Şi Cinping ile Joe Biden'ın San Francisco'da; iklim temsilcileri Şi Zhenhua ile John Kerry'nin ise California'daki buluşmalarında iklim değişikliğine karşı ortak hareket konusunda bir dizi anlaşmaya imza atılmıştır. Söz konusu buluşmanın resmi metinlerinde Biden bu buluşmayı "şimdiye kadarki en üretken buluşma" sözleriyle öne çıkarmış; Çin-ABD ilişkisi ise Cinping tarafından "dünyadaki en önemli ilişki" olarak nitelendirilmiştir (CBT, 2023).

COP 28 ile Çin ve ABD'nin iklim müzakerelerinde tekrar ortak paydaya döndüklerini görebiliriz. Karbon emisyonlarını azaltma ve sıfırlama hedeflerini içeren ulusal katkı beyanlarına uygun yasal ve politik düzenlemeleri yapmaları –özellikle ABD iç politika dinamiklerini göz önüne aldığımızda Biden'ın başkanlık kararnamelerine mecbur kalabileceği düşünülebilir-, bu iki ülkenin "business as usual" olarak ifade edilebilecek eski üretim ve tüketim sistemlerine dönmemeleri, iklim değişikliği konusunda onlarca yıllık kazanımları daha da anlamlandıracaktır. Müzakerelerin geleceği açısından tarihsel sorumlu ABD ve güncel sorumlu Çin'in aynı masada ve sürekli altını çizdikleri gibi iş birliği içinde olmaları son derece önemlidir.

6. Sonuç

İklim değişikliği sorunu inkâr edilemez boyutlara ulaşmış, "yarının problemi" olmaktan günümüz gerçekliğine dönmüştür. Hemen hemen her gün konu ile ilgili bir haber karşımıza çıkmaktadır. Bireysel çabalar ile küresel sonuçlar alınamayacağına göre lider devletlerin vatandaşlarına ve tüm dünyaya karşı ağır ve acil bir sorumluluğu vardır. Bu sebeple iklim değişikliği müzakerelerinde ana aktör olan Çin ve ABD'nin iş birliğinin devamı tüm müzakere sürecinin en önemli noktasıdır. Fakat ne yazık ki Tayvan krizi sonrası Çin tarafından açıklanan karşı önlemler listesinde ABD ile iklim görüşmelerinin askıya alınması müzakere sürecinin ciddi şekilde sekteye uğraması riskini ortaya çıkarmıştır. Yine de 2023 yılında ikili ilişkilerin yeniden geliştirildiğini ve iş birliği mesajlarının sıkça verildiğini görmek oldukça önemlidir.

İklim değişikliği gibi bir konunun politize edilmesinin pek dikkate alınmayan bir yönü de iklim adaleti yani çalışmada nitelenen adıyla yeşil adalettir. Paris Anlaşması ile gündeme gelen 'kayıp ve zarar' mekanizmalarına uygun olarak fon sağlamadıkları ve konunun gündeme gelmesini engelledikleri için ABD ve AB sıkça eleştirilmektedir. Özellikle COP 27'ye hazırlık süreci olarak görülen ve haziran ayında düzenlenen Bonn İklim Değişikliği Konferansı'nda zengin ülkeler 'ihanetle' suçlanmıştır (McGrath, 2022). Zira 2021'de Glasgow'da düzenlenen COP 26'da gelişmekte olan ülkeler maddi desteğe paralel olarak karbon emisyonu azaltma taahhüdünde bulunmuşsa da özellikle ABD söz konusu desteği COP28'e dek sağlamamıştır. Kayıp ve zarar mekanizmasının tesisi tartışmaları sürecinde G77'yi de temsil eden Çin'in masada aktif olarak yer almış olması bu kararın politik yönünü de göstermektedir. COP28'de kabul edilen kayıp-zarar fonundaki 700 milyon USD ise iklim değişikliğinin yarattığı hasarın -ekonomik anlamda- karşılanması bağlamında henüz hedeften uzaktır (Lakhani, 2023). Zira ihtiyaç duyulan meblağ en az 400 milyar USD olup gelişmekte olan ülkelerin talebi ise 2030'a kadar gelişmiş ülkeler tarafından fona yıllık 100 milyar USD ayrılmasıdır (Richards ve Jowahir, 2023).

Müzakere sürecinde Çin'in ABD ile çeşitli problemler içeren çok boyutlu ilişkilerinden dolayı pasif kalması, denge unsuru olmama ihtimali; zengin ülkeler olarak ifade edilen ülkelerin gelişmekte olan ülkelerin taleplerini gündem dışında tutma çabalarına yol açacaktır. Yeşil adalet için Pekin ve Washington'ın iklim değişikliği müzakerelerinde iş birliği içinde olmasına ihtiyaç vardır. Küçük bir ada ülkesi olan Tuvalu'nun sular altında kalma tehlikesine dikkat çekmek için COP 26 sırasında deniz suları içinde açıklama yapan

Tuvalu Dışişleri Bakanı Simon Kofe'nin "Dünya barışını sağlama ve iklim değişikliği konusunda ciddiysek, iyi veya kötü insanlar diye bir şey yok… Gemide Çin'e ve ABD'ye ihtiyacımız var." (ABC News, 2021) sözleri Pekin ve Washington'ın iklim müzakerelerindeki iş birliğinin önemini anlatması bakımından iyi bir örnektir. Kofe'nin sözlerine paralel olarak, Çin ve ABD'nin uluslararası sistemi etkileme potansiyellerini ortak geleceğimiz için ve iş birliği içinde kullanacakları "yeşil" bir senaryo tüm gezegen ve insanlık için en iyisi olacaktır.

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