Journal of Pure Social Sciences
Pak Sosyal Bilimler Dergisi
e-ISSN: 2757-914X
International e-Journal (http://paksos.com)

Year/Yıl:2024, 5(9), 109-124
Research Paper (Received: 20.12.2024/Accepted: 29.12.2024)
Araştırma Makalesi (Geliş: 20.12.2024/Kabul: 29.12.2024)
Index: ISI (International Scientific Indexing), ASI (Advenced Sciences Index), ICI, ESJIndex etc.

THE ROLE OF SUSTAINABLE WATER MANAGEMENT AND EFFECTIVE GOVERNANCE IN MITIGATING WATER CONFLICT IN THE MIDDLE EAST

***

ORTA DOĞU'DA SU ÇATIŞMALARININ AZALTILMASINDA SÜRDÜRÜLEBILIR SU YÖNETIMI VE ETKIN YÖNETIŞIMIN ROLÜ

Citation: Tiryaki, Ü. and Keser, A. (2024). The role of sustainable water management and effective governance in mitigating water conflict in the middle east. *Journal of Pure Social Sciences*, 5(9), 109-124.

DOI: https://doi.org/10.5281/zenodo.14569010

Ünal TİRYAKİ[*]
Ahmet KESER[**]

Abstract

Water scarcity and conflict represent critical challenges in the Middle East and the Nile Basin, regions where water resources are both vital and limited. This study explores the role of sustainable water management and effective governance in mitigating water conflicts, with a focus on the complex interplay between environmental, economic, and sociopolitical dimensions. Drawing on a combination of primary and secondary data and employing descriptive analysis, the research examines historical legacies, governance structures, and management practices that shape water politics in transboundary contexts. This research provides actionable recommendations for fostering cooperation and mitigating conflict, including the establishment of binding legal frameworks, promotion of regional dialogue, and integration of advanced technologies into water management practices. By adopting these strategies, stakeholders can transform water from a source of conflict into a catalyst for regional stability and shared prosperity. The findings offer valuable insights for addressing water challenges not only in the Nile Basin and the Middle East but also in other regions facing similar transboundary water issues.

Keywords: *Water Scarcity, Transboundary Water Management, Governance and Sustainability, Nile Basin Conflict, Grand Ethiopian Renaissance Dam (GERD)*

Öz

Su kıtlığı ve çatışma, su kaynaklarının hem hayati hem de sınırlı olduğu Orta Doğu ve Nil Havzası'nda kritik zorlukları temsil etmektedir. Bu çalışma, çevresel, ekonomik ve sosyopolitik boyutlar arasındaki karmaşık etkileşime odaklanarak, su çatışmalarının hafifletilmesinde sürdürülebilir su yönetimi ve etkin yönetişimin rolünü araştırmaktadır. Birincil ve ikincil verilerin birleşimi kullanılarak ve tanımlayıcı analiz uygulanarak yürütülen araştırma, sınır ötesi bağlamlarda su politikalarını şekillendiren tarihsel mirasları, yönetişim yapıları ve yönetim uygulamalarını incelemektedir. Bu araştırma, bağlayıcı hukuki çerçevelerin oluşturulması, bölgesel diyaloğun teşvik edilmesi ve gelişmiş teknolojilerin su yönetimi uygulamalarına entegrasyonu dahil olmak üzere işbirliğini teşvik etmek ve çatışmaları hafifletmek için uygulanabilir öneriler sunmaktadır. Paydaşlar, bu stratejileri benimseyerek suyu bir çatışma kaynağı olmaktan çıkarıp bölgesel istikrar ve ortak refah için bir katalizör haline getirebilir. Bulgular, yalnızca Nil Havzası ve Orta Doğu'da değil, benzer sınır ötesi su sorunlarıyla karşı karşıya olan diğer bölgelerde de su sorunlarını ele almak için değerli bilgiler sunmaktadır.

Anahtar Kelimeler: *Su Kıtlığı, Sınır Aşırı Su Yönetimi, Yönetişim ve Sürdürülebilirlik, Nil Havzası Çatışması, Büyük Etiyopya Rönesans Barajı (GERD)*

[*] Hasan Kalyoncu University, Department of Political Science and International Relations, Şahinbey, Gaziantep, Tükiye, https://orcid.org/0000-0002-2612-8005, unal.tiryaki@std.hku.edu.tr
[**] Corresponding Author: Hasan Kalyoncu University, Department of Political Science and International Relations, Şahinbey, Gaziantep, Türkiye, ORCID: 0000-0002-1064-7807, ahmet.keser@hku.edu.tr, a123keser@gmail.com

Journal of Pure Social Sciences
Pak Sosyal Bilimler Dergisi
e-ISSN: 2757-914X
International e-Journal (http://paksos.com)
Year/Yıl:2024, 5(9), 109-124
Research Paper (Received: 20.12.2024/Accepted: 29.12.2024)
Araştırma Makalesi (Geliş: 20.12.2024/Kabul: 29.12.2024)
Index: ISI (International Scientific Indexing), ASI (Advenced Sciences Index), ICI, ESJIndex etc.

EXTENDED ABSTRACT

Background:
Water conflicts are widely considered one of the most vital problems in areas where water is a limited commodity and a subject of disputes. The MENA region as well as the Nile Basin has experienced keen competition over water leading to conflicts of strategic importance. Water scarcity has long been an acute problem in the Middle East region due to combination of high, desert-like temperatures and low precipitation, limited water availability, and population and climate change (Allouche, 2011). In the same manner, the Nile River- the longest river internationally, runs through eleven countries in northeastern Africa and water from it is mandatory as well as debated by millions of inhabitants of Nile Basin. The social, economic, and environmental contexts have also upped the ante and added layers of complexity to these conflicts which calls for a more holistic and systemic framework to their solutions (DeQuero-Navarro et al., 2020).

Research Purpose:
identify sustainable water management strategies, which are crucial for addressing the core issue of water scarcity in the Middle East. By exploring and pinpointing effective and innovative practices, this objective promotes long-term water security in the region. Secondly, the study examines the role of governance, emphasizing how effective political and institutional frameworks can mitigate water conflicts and enhance cooperation among Middle Eastern countries. This objective highlights the importance of governance in managing water resources, contributing to regional stability and conflict prevention. Lastly, the study seeks to propose practical policy recommendations for governments and international organizations. This ensures that the research findings are translated into actionable steps, providing a clear pathway for implementation and making the research highly relevant and applicable to real-world scenarios.

Methodology:
This section outlines the methodological framework adopted for the study, including the scope, limitations, research design, sampling strategy, data collection, data analysis, and ethical considerations. By employing a descriptive analysis approach, the study integrates both primary and secondary data to provide a nuanced understanding of sustainable water management and governance in mitigating conflicts in the Middle East, particularly in the Nile Basin. The methodology reflects adaptations made to overcome challenges during the data collection process and ensures that the findings are robust, comprehensive, and aligned with the research objectives.

Findings:
The findings of this study reflect a synthesis of primary and secondary data, offering insights into the multifaceted dynamics of water management and conflict in the Middle East and Nile Basin. The analysis examines historical, political, and socioeconomic dimensions, emphasizing the role of sustainable practices and governance mechanisms in conflict mitigation.

Conclusion:
The issue of water scarcity and conflict in the Middle East and the Nile Basin underscores the urgency of sustainable water management and effective governance. This study has examined the interplay between historical legacies, governance structures, and sustainable practices, offering insights into how these factors contribute to water conflicts and the pathways for mitigating them.

1.INTRODUCTION

Water conflicts are widely considered one of the most vital problems in areas where water is a limited commodity and a subject of disputes. The MENA region as well as the Nile Basin has experienced keen competition over water leading to conflicts of strategic importance. Water scarcity has long been an acute problem in the Middle East region due to combination of high, desert-like temperatures and low precipitation, limited water availability, and population and climate change (Allouche, 2011). In the same manner, the Nile River- the longest river

Year/Yıl:2024, 5(9), 109-124
Research Paper (Received: 20.12.2024/Accepted: 29.12.2024)
Araştırma Makalesi (Geliş: 20.12.2024/Kabul: 29.12.2024)
Index: ISI (International Scientific Indexing), ASI (Advenced Sciences Index), ICI, ESJIndex etc.

internationally, runs through eleven countries in northeastern Africa and water from it is mandatory as well as debated by millions of inhabitants of Nile Basin. The social, economic, and environmental contexts have also upped the ante and added layers of complexity to these conflicts which calls for a more holistic and systemic framework to their solutions (DeQuero-Navarro et al., 2020).

With sustainable development aiming to achieve both environmental conservation, economic profitability, and social and cultural acceptability, applying the principles of sustainability gives a good perspective on tackling these water conflicts. Thus, organizing these three dimensions, the stakeholders may look for solutions meeting the present conflicts but also pertinent for the water resources sustainability and accessibility in the future. The Nile water conflict and water conflicts generally in the Middle East is a clear resolution of the interconnection and challenges that surround the sharing of water resources. Analyzing the nature of these conflicts in terms of sustainability leads to questioning the so-called win-win strategies that concern stakeholders in economy, social systems, and environment (Kasim et al., 2014).

This study focuses on the Middle East taking Nile Basin as a case study, examines the dual role of sustainable water management practices and effective governance in mitigating water conflicts in the Middle East. It seeks to identify strategies that balance developmental needs with equitable resource distribution. Ultimately, this research aims to contribute to the formulation of inclusive policies and frameworks that foster regional cooperation and stability while ensuring sustainable water use.

2.LITERATURE REVIEW

This section outlines the conceptual framework guiding the research, emphasizing the interconnections between sustainable water management, effective governance, and conflict resolution. The framework is built upon the foundational concepts of environmental, economic, and sociocultural sustainability, which collectively address the challenges of water scarcity and conflict in transboundary contexts. By linking these dimensions with governance practices and conflict mitigation strategies, the framework provides a comprehensive lens for analyzing the dynamics of water management and conflict in the Middle East, particularly in the Nile Basin.

The conceptual framework includes the management of the water related issue linked to the Environmental sustainability, Economic sustainability and Sociocultural sustainability. Environmental sustainability focuses on the environmental factors and Economic condition comes under the economical sustainability. Sociocultural sustainability deals with the maintenance of cultural practices and people's participation in the decision-making processes. This approach guarantees coordinated strategies which can effectively prevent conflicts and enhance stability in the long run (Afshar et al., 2021). For instance, in the water sector, environmental conservation, water sharing, and community participation in the Jordan River Basin can lead to minimized conflict and effective water management.

2.1.Water Conflict Definition, Causes and Impact

Water conflicts represent a critical area of concern, particularly in regions where water resources are scarce and heavily contested. This section explores the definition, underlying causes, and multifaceted impacts of water conflicts, setting the stage for understanding the challenges addressed in this study

Conflict over water means disagreement between the parties involved, and these may include the two or more nations, states, or other organized groups on the use of water. These conflicts are realized when call for water outstrips supply or when applying it is questionable numbered for political, economic, or ecological terms. It can be diplomatic where two parties have expressed political disagreements with the use of water issues, legal where they are taking legal actions against each other over water, or even when they have resorted to armed struggle over water issues

Year/Yıl:2024, 5(9), 109-124
Research Paper (Received: 20.12.2024/Accepted: 29.12.2024)
Araştırma Makalesi (Geliş: 20.12.2024/Kabul: 29.12.2024)
Index: ISI (International Scientific Indexing), ASI (Advenced Sciences Index), ICI, ESJIndex etc.

(Chowdhary et al., 2019). Such conflicts arise when the demand for water exceeds its availability or when governance structures fail to manage water resources equitably. These conflicts may take the form of political disagreements, legal disputes, or even armed confrontations as example, The Cauvery River dispute which is the long-standing conflict between the Indian states of Tamil Nadu and Karnataka over the sharing of the water resources of the Cauvery River (Twain, M. 2018).

While water is essential for life, conflicts over this vital resource arise from various causes. Key drivers of water conflict include scarcity, population growth, agricultural and industrial use, environmental degradation, and political and economic power (Liu et al., 2021). Scarcity often leads to water rationing, particularly in regions affected by geographical or climatic limitations, compelling users to manage with limited supplies. Rapid population growth further strains water resources, especially in densely populated areas and sectors critical to society. The expansion of agriculture and industry, driven by economic development, dramatically increases water demand worldwide.

Environmental degradation also contributes significantly to water conflicts. Pollution and over-extraction compromise water quality, making it difficult to access clean, usable water (Wolf, 2023). Additionally, political and economic power imbalances often exacerbate conflicts. Historical agreements or conventions may enable one party to dominate the management and supply of water resources, leading to inequitable distribution and heightened tensions.

Generally, the consequences of water conflict are very deep-reaching and extensive in their effects. In socially, they lead to migration, increase poverty levels and most importantly can cause social inequality. Economic conflict might be a threat to the regions or countries that are involved in producing water needed for agricultural production, power production among other sectors. In the environment, they can lead to the degradation of the water resources, which further pollutes the environment and damages the various species of wildlife. In geopolitical terms, water resources conflicts can cause unrest in the affected regions and lead to conflict and hostility; the conflicts may then expand into power struggles of larger proportions (Zittis et al., 2022).

In the Middle East for instance, water sharing in the JCWA the Jordan river and Tigris Euphrates River systems has been a cause of conflict between countries such as Israel, Palestine, Jordan Turkey, Syria, and Iraq. These are issues of scarcity coupled with political matters proving that water conflict is not straightforward but rather complex and hence calling for a more elaborate and cooperative approach to the issue (Mannan & Al-Ghamdi, 2020).

Innovations in sustainable water resources focus on several key areas to address water scarcity and promote efficient usage. Water conservation efforts aim to change population behaviors and incorporate advanced technologies to reduce overall water consumption. Rainwater harvesting systems are being implemented to capture and use rainwater, thereby decreasing reliance on other water sources for various needs. Wastewater treatment and reuse involve treating and filtering wastewater to make it suitable for non-potable applications such as landscaping and manufacturing. In agriculture, improved irrigation methods are being developed to minimize water wastage, ensuring more efficient use of water resources in the field. Additionally, desalination technologies are advancing to extract water efficiently from seawater or brackish water, enhancing the availability of fresh water (Faisal Abass Padder & Bashir, 2023). These innovations collectively contribute to a more sustainable approach to managing water resources.

Water management is a critical issue that demands top priority and adequate attention due to its significant impact on sustainability and human well-being (Rashed & Shah, 2020). Effective strategies to address water management challenges include substantial investment in water infrastructure. This involves increasing capital expenditure to enhance water reservoirs and distribution networks, as well as improving water quality to ensure a reliable supply of clean water for various uses. Such investments are crucial for mitigating water scarcity and supporting the growing demands of urban and rural populations, below are some of the strategies implemented:

Year/Yıl:2024, 5(9), 109-124
Research Paper (Received: 20.12.2024/Accepted: 29.12.2024)
Araştırma Makalesi (Geliş: 20.12.2024/Kabul: 29.12.2024)
Index: ISI (International Scientific Indexing), ASI (Advenced Sciences Index), ICI, ESJIndex etc.

-Groundwater management is another essential strategy, focusing on the protection and sustainable management of aquifers. This includes measures to monitor and control water usage to prevent over-extraction and depletion of groundwater resources. By implementing effective groundwater management practices, regions can maintain the long-term viability of their water supplies and reduce the risk of water shortages.

-Fair water pricing and governance are also critical components of effective water management. Developing and enforcing appropriate water tariffs and policies can help manage water demand and promote efficient use of resources. By ensuring that water pricing reflects its true value, policymakers can encourage conservation and discourage wasteful practices. Additionally, strong governance structures are necessary to oversee the implementation of these policies and ensure compliance.

-Public awareness and education play a vital role in water conservation efforts. Conducting awareness programs, campaigns, games, and educational sessions can inform the public about the importance of using water sparingly and adopting sustainable practices. Educated and informed communities are more likely to participate in conservation efforts and support policies aimed at protecting water resources.

-International cooperation is indispensable in managing shared water resources and addressing transboundary water issues. Collaborative efforts with neighboring countries sharing the same water basins, as well as partnerships with international organizations, are essential for the effective management and conservation of common water bodies. Through cooperative agreements and joint initiatives, nations can work together to resolve conflicts, optimize water usage, and ensure the equitable distribution of water resources.

Sustainable water management, as a governmental strategy, includes policy adoption to encourage people into practicing and investing in, project construction and the enhancement of stakeholder capacity, and control and assessment. Stakeholder engagement involves government, communities, and industries on the belief that all parties can be held accountable in addressing water scarcity challenges (Yeganeh & Bakhshandeh, 2022).

2.2.Importance of Governance in Managing Water Resources

Governance has a central role in directing water resources by defining objectives, goals, and requirements for distribution and usage of water resources in a fair, sustainable manner and in protecting them. Governance also involves conflict resolution, priority settings, and management of the relationships among all participants involved in the project. Moreover, governance enhances public accountability and enforceable participation in water management that involves decision making. Governance also helps in employing the water resources that are scarce in the best ways at local, national, and global levels, reduces the impacts of water deficiency and pollutions, and in general, provides sustainable water supply to the current and next generations (Pahl-Wostl et al., 2020).

Furthermore, governance improves the public's accountability regarding the water resource and also guarantees involvement in the decision-making processes of water management. Not only does the presented participatory approach enhance the accountability and openness of the process, but it also contrasts traditional, top-down approaches by including every stakeholder, including those with limited decision-making power, in the process. Today, through the issues of decentralization of governance, the populations feel that they are called upon to manage water and thereby adopt practices that are friendly to the sustainability of water sources (Zittis et al., 2022).

Governance is also important in the utilization of limited water resources for maximum benefits based on the needs at local, national, and global. This has to do with the adoption of measures that discourage the use of excessive water, discourage pollution and support the habitats of water bodies. In this connection, it can be understood that governance can – through legal instruments and penal measures – guarantee the efficient use of water in a way that the existing

Year/Yıl:2024, 5(9), 109-124
Research Paper (Received: 20.12.2024/Accepted: 29.12.2024)
Araştırma Makalesi (Geliş: 20.12.2024/Kabul: 29.12.2024)
Index: ISI (International Scientific Indexing), ASI (Advenced Sciences Index), ICI, ESJIndex etc.

supply will be sufficient to serve all people in the present while saving for all those who are yet to come (Yeganeh & Bakhshandeh, 2022).

In the broader context, governance contributes to the development of strategies of supply by importing ideas of scarcity and pollution, encouraging collective action, and allocation of water. It is crucial that measures such as the aforementioned be taken, in order to maintain water resources for future generations In this way we have a more integrated approach to water and its management. The relationship between sustainable water management, effective governance, and conflict resolution

Water governance, management, and conflict are inextricably linked in a world challenged by a scarcity of resources. Sustainable water management practices involve the targeted efficient use of water and the conservation and protection of water scarce resources for efficiency and fairness. It is the task of the governance to create the appropriate conditions, rules, and legislation to utilize these resources appropriately, and involve all stakeholders, as well as distribute them adequately. This, in turn, aids in reducing competition over water, hence minimizing cases of over-pressure within the community. In the case of conflict, strong governance structures ensure that, rather than implementing force, the two parties engage in talks, which seeks to find the most efficient, peaceful and rightful solution to the problem prevailing. Therefore, integral governance supports water sustainability, as well as being key for negotiating tensions, establishing order and to guarantee a stable provision of water supplies in the future (Di Vaio et al., 2021).

Water governance, management, and conflict are closely linked, mainly due to global water shortages and competition over resource access. Water resource conservation and sustainable use call for proper management which involves efficient use of the limited water available. Good governance policies create a set of structures to regulate the access and utilization of water. This can effectively prevent conflict in communities, especially that arising from competition over water use and access. Policies in governance can prevent amplifying the pressures that cause water conflicts since it establishes the rules to follow (Soylu, 2021).

Basically, in cases where Conflict arises, proper governance structures are instrumental in ensuring that the conflict is resolved in the most peaceful and effective manner as possible. Strong governance does not involve the use of force but settles issues by ensuring protracted negotiations between two or more parties in conflict. This strategy seeks to arrive at the best outcome in the shortest possible time with as little conflict as possible. For instance, resolution and equitable decision-making processes like mediation, arbitration and group participation are effective in seeking to solve the actual issues to the conflicts (Katariina Simonen, 2021). Also, accountability is important for water utility. Through proper utilization of water resources and proper use of water governance, future generations are assured a continuous supply of the same. This entails controlling the use that is being made of the resource now and also ensuring that water ecosystems are not polluted and eroded in any way. Another benefit of governance frameworks is that they make it possible to adapt to conditions in the environment that are constantly evolving, such as climate change by incorporating considerations of resilience and sustainability into the design of the water management frameworks (Zeitoun et al., 2019)

2.3.Historical Background of Nile Water Conflict

The Nile River, the longest river globally, runs through northeastern Africa supporting the civilizations within these regions for several centuries. It has for some time been a riparian water that has created some political issue in the different nations where the river is located especially Egypt, Sudan, and Ethiopia. The historical factor at the backdrop of the Nile water conflict can be traced back to colonial times and the bargaining centrality of the river to the involved hither land countries (Angelakis et al., 2021). It is noteworthy that the conflict over the water of the Nile is relatively recent; It began only in the 20th century. They agreed the Sudanese question hence in 1929 they signed an Anglo-Egyptian treaty representing Sudan that at that time was a colony of

Year/Yıl:2024, 5(9), 109-124
Research Paper (Received: 20.12.2024/Accepted: 29.12.2024)
Araştırma Makalesi (Geliş: 20.12.2024/Kabul: 29.12.2024)
Index: ISI (International Scientific Indexing), ASI (Advenced Sciences Index), ICI, ESJIndex etc.

Great Britain in East Africa. This agreement gave Egypt the prior management of majority of water in Nile and authorized it to have a preemptory right to control any project in the upstream affecting its water systems. The main purpose of the treaty is to secure Egypt's national interests because it receives 95% of its water resources from the Nile.

In the context of the Nile waters management, there were other agreements in 1959 between Egypt and independent Sudan by which the latter allocated the remaining water to Egypt 55. The consumption stands at 5 billion cubic meters per year and Sudan at 18. 5 billion cubic meters. This agreement excluded Ethiopia while it is recognized that the Blue Nile that has the source in Ethiopia provides more than eighty-five percent of the total water flow of the Nile River (Wehling, 2020).
The increasing number of people in Ethiopia and the desire to advance in the field of economics resulted in the start of the hydroelectric project of the Grand Ethiopian Renaissance Dam (GERD) in 2011. The GERD is aimed at producing electrical energy to support the country's electricity demand and develop the economy. But with construction of the dam coming up, Egypt and Sudan became concerned with reduction of water flow to downstream tracts which are essential for agriculture, drinking water and even the economy (Angelakis et al., 2021).

The GERD announcement deepened the Nile Water Conflict by bringing to limelight what had been a long-standing issue for many decades. Some diplomatic overtures have been made aimed at finding a common ground on how best the issue of operation of the dam and distribution of the Nile water is to be resolved. Several talks have been conducted involving the African Union and other international facilitators with the aim of finding a solution to the conflict, but none has led to the conclusion of a settlement that would be enforceable (Pemunta et al., 2021).

From the analysis of the Nile water conflict, issues of contention in the management of transboundary water resources are highlighted the challenge of managing the water resources in a balanced and sustainable manner to meet the needs of riparian countries (Wehling, 2020). This setup for negotiations proves hostile due to the colonial agreements that favored the downstream countries immensely while with the modern-day developmental sentiments of the upstream countries. To that effect the Nile water conflict resolution needs to be informed by a win-win situation that acknowledges the necessities of all the featured countries and a sustainable utilization of the river.

Key Issues and Disputes

Some of the key problems and contentious issues in the Nile water conflict relate to the equitable use and control of the water resource. These are contractual, geopolitical and developmental factors, largely influenced by historical accords and contemporary challenges of the Nile riparian states (Salameh et al., 2021). A major concern emerging from the present-day legal frameworks is the validity of contracts that were signed during the colonial era. Several treaties, the most significant of which are the 1929 and 1959 agreements, divide most of the water in the Nile for the benefit of the two downstream states, Egypt and Sudan, and the current treaty agreements are regarded as unfair by upstream countries mainly Ethiopia. They failed to address the water requirements and the developmental expectations of countries such as Ethiopia that has an important external input being the Blue Nile yet the country was not included in the treaties. One of the more contentious issues is the argument that the agreements must be adjusted in accustom with modern realities (Tekuya, 2018).

The Grand Ethiopian Renaissance Dam (GERD) Also known as the 'Blue Nile Dam', is an attraction that Ethiopians and international tourists alike cannot afford to miss. The most contemporary event causing unrest in the Nile water conflict is the construction of GERD by Ethiopia. The government of Ethiopia sees the dam as crucial for its development seeking to harness huge amounts of hydroelectric power to fuel its industry and alleviate poverty levels. But the countries of Egypt and Sudan are concerned that the amounts of water that would pass down will be cut and this would have more impact on problems that affect the agriculture sector, availability of drinking water as well as other flows that are pegged on economy. The currently

Year/Yıl:2024, 5(9), 109-124
Research Paper (Received: 20.12.2024/Accepted: 29.12.2024)
Araştırma Makalesi (Geliş: 20.12.2024/Kabul: 29.12.2024)
Index: ISI (International Scientific Indexing), ASI (Advenced Sciences Index), ICI, ESJIndex etc.

highly disputed issue of filing and operating the GERD has triggered active negotiations, but no legally binding contract has been signed (Alfin, 2022).

The primary source of conflict is the way in which the Nile's waters are to be shared amongst its NEXT riparian states. According to Egypt, over 90% of its water needs are obtained from the Nile River, and its representatives have insisted that any future or current reduction of its share would pose a catastrophe to the country. Another important aspect is the fact that Sudan also relies on how much water is available in the river Nile to irrigate and for human consumption. While Egypt and other downstream countries demand adequate water supply under and from the Nile Basin, Ethiopia and other upstream countries also have a right to harness the river for their development. That issue has remained a bone of contention right from the root of the conflict regarding water rights and usage (Muñoz et al., 2020).

2.4.Environmental and Economic Impacts

Some of the consequences of the conflict over the water from the Nile River include social and environmental impacts. The cuts in water flow that might ensue due to GERD can hamper agricultural production in the two countries, which would have devastating implications for food security. Criticism also focuses on possible negative effects of the large-scale water projects implemented along the Nile on the sedimentation regime and, therefore, the health of wetlands, and other water ecosystems. Striking a balance between the developmental targets and objectives and environmental conservation therefore remains one of the greatest endeavors (Doorn, 2021). Foreign policies also have an impact in the Nile water conflict. The fact that the Nile is viewed as a strategic asset and water crisis act as a potential trigger for conflict render the problem highly security sensitive. The actions and interactions of various parties of the international system bear witness to the import of the conflict. There is a need to maintain stability within the region as this may require diplomacy and peaceful settlement of disputes, this may however be dragged down by nationalism (Alfin, 2022).

2.5.Impacts of Water Conflict on Egypt and Ethiopia

The issues of water resources of the Nile result in various impacts that concern not only the economic and environmental situation but also the political alliances of both the Egyptian and Ethiopian countries. The main controversy is largely focused on the construction and usage of the GERD and the subsequent effects on the water share of the downstream (Elsayed et al., 2020).

2.6.Sustainability Water Management Practices by Two Countries

Effective water management is essential for addressing the water scarcity challenges faced by many countries, particularly in regions with limited water resources. This section explores the sustainable water management practices employed by Egypt and Ethiopia, two countries that heavily depend on their water resources for agriculture, industry, and daily life. Both nations have developed innovative strategies to manage their water supplies efficiently and sustainably, considering their unique geographical and climatic conditions. By examining these practices, we can gain insights into the diverse approaches to water management and their potential for ensuring long-term water security and economic stability.

Effective water management in Egypt primarily revolves around improving irrigation techniques and promoting water recycling and reuse. Given the country's dependence on the Nile River, efficient irrigation practices are crucial. Modern irrigation methods, such as drip and sprinkler irrigation, are employed to minimize water wastage compared to traditional flood irrigation. Additionally, Egypt focuses on rehabilitating and lining irrigation canals to reduce water losses from seepage and evaporation (Jiménez et al., 2020).

Water recycling and reuse are integral components of Egypt's water management strategy. Modernized and extended sanitary sewer systems facilitate the reclamation of wastewater, which is

Year/Yıl:2024, 5(9), 109-124
Research Paper (Received: 20.12.2024/Accepted: 29.12.2024)
Araştırma Makalesi (Geliş: 20.12.2024/Kabul: 29.12.2024)
Index: ISI (International Scientific Indexing), ASI (Advenced Sciences Index), ICI, ESJIndex etc.

then used for agricultural and industrial purposes, as well as landscape watering. Treated effluent from agriculture is also reused for irrigation, enhancing overall water use efficiency. Furthermore, the development of desalination projects, particularly along the coastline, is a key strategy to provide an additional freshwater source and alleviate pressure on the Nile (Liu et al., 2021).

To foster water conservation and efficient water management, the Egyptian government conducts awareness and education campaigns. These initiatives, along with training programs for farmers on sustainable agricultural techniques, aim to promote the efficient use of water resources. Egypt has also established a legal framework for water governance, emphasizing water consumption restrictions and the equitable distribution of the country's limited water supply (Araya et al., 2021).

On the other hand, Ethiopia faces significant water management challenges, particularly due to the adverse effects of climate change. The country has prioritized hydropower development as a key component of its water management strategy. Large hydroelectric power plants, including the Grand Ethiopian Renaissance Dam (GERD) with a capacity of 6,000 MW, are central to this approach. These projects are expected to meet Ethiopia's energy demands and stimulate economic growth. Additionally, Ethiopia is constructing smaller hydroelectric systems to supply electricity to rural areas, thereby enhancing living standards (Araya et al., 2021).

Integrated Water Resources Management (IWRM) is another critical practice in Ethiopia. IWRM involves watershed development programs aimed at protecting and rehabilitating land, reducing soil erosion, and enhancing groundwater recharge. Community stewardship initiatives empower local populations to maintain water resources, ensuring equitable water usage for all. Agricultural water management is improved through better irrigation systems, small-scale and community water projects, and the use of rainwater to support irrigation and address household water shortages (Megistu, 2020).

Ethiopia also emphasizes drought resilience and adaptation. The country has developed early warning systems to monitor and predict drought occurrences, enabling better preparedness. Programs that promote drought-resistant crop varieties help reduce the demand for irrigation water and enhance food security. These efforts are supported by Ethiopia's National Water Policy, which focuses on sustainable use, fair allocation, and effective management of water resources. Moreover, Ethiopia actively participates in inter-governmental discussions and negotiations, particularly concerning the management of shared water resources such as those of the Nile Basin.

In summary, both Egypt and Ethiopia employ diverse and robust strategies for sustainable water management. Egypt's approach includes modern irrigation techniques, water recycling, desalination, and public education, while Ethiopia focuses on hydropower development, IWRM, and drought resilience. These strategies not only address immediate water management needs but also aim to ensure long-term water security and sustainability for their respective populations.

Effective Governance in Mitigating Water Conflict

Water disputes have always been an area of concern with different countries sharing water resources. The next major geographic feature to discuss is the Nile River which is among the longest rivers globally extending through multiple northeastern African countries. It is thus important to understand and analyze the Nile River water issue in an effort to search for ways of avoiding possible conflicts among these riparian states. In this regard, governance can be defined as a combination of collaboration efforts, legal boards/requirements, use of innovation and appropriate management processes (Li et al., 2020).

Nile River basin is considered to be exploited from eleven countries such as African countries like Egypt, Sudan, Ethiopia and Uganda among others. Egypt had a greater control over the Nile waters owing to the colonial treaties in the twentieth century particularly the 1929 and 1959 Nile Waters Treaties entailing the distribution of most of the water to Egypt and Sudan. These agreements locked out other Nile basin countries, hence embodying what has been considered as current long-standing complaints.

Year/Yıl:2024, 5(9), 109-124
Research Paper (Received: 20.12.2024/Accepted: 29.12.2024)
Araştırma Makalesi (Geliş: 20.12.2024/Kabul: 29.12.2024)
Index: ISI (International Scientific Indexing), ASI (Advenced Sciences Index), ICI, ESJIndex etc.

Most of the conflicts of the GED has been as a result of construction of the Grand Ethiopian Renaissance Dam (GERD) by Ethiopia especially with the Egypt and Sudan downstream nations. In a way, Egypt is afraid the dam will hamper its water resources of which is a vital natural resource while on the other hand Ethiopia sees the dam as vital resource in its developmental and energy spill over.

3.DATASET AND RESULTS

The data collection and analysis for this research are carefully designed to align with the research objectives and ethical considerations. This involved a combination of primary and secondary methods to capture both empirical insights and contextual depth. The integration of these methods allowed for a comprehensive exploration of the research themes.

As for the primary data, semi-structured interviews were conducted with a select group of experts in water management and governance. Given participants' time constraints and preferences, the interview framework was revised and tailored to focus on specific themes aligned with each respondent's expertise. This approach ensured meaningful engagement while respecting participants' concerns and availability.

On the other hand, to supplement primary data, the study relied on a wide range of secondary sources, including historical treaties, policy documents, reports from international organizations, and peer-reviewed academic literature. These sources provided critical context and addressed gaps in primary data, particularly where respondents were unable or unwilling to participate.

The analysis process employed a descriptive approach to synthesize findings from primary and secondary data. This method ensured that the research objectives were addressed comprehensively and that the findings were aligned with theoretical and practical insights.

Interview data were coded and categorized into key themes, such as governance challenges, socio-economic impacts, and sustainable practices. This thematic approach allowed for a structured exploration of recurring patterns and insights. While the secondary data were systematically reviewed to extract relevant information on historical trends, governance models, and policy implications. The analysis focused on understanding the influence of these factors on water conflicts and cooperation in the region. At the end, descriptive analysis was used to highlight patterns, draw comparisons, and generate actionable recommendations for sustainable water management and governance.

This integrated approach to data collection and analysis ensures that the research findings are robust, well-supported, and provide valuable insights for policymakers, stakeholders, and the academic community on sustainable water management and conflict mitigation in the Middle East.

The findings of this study reflect a synthesis of primary and secondary data, offering insights into the multifaceted dynamics of water management and conflict in the Middle East and Nile Basin. The analysis examines historical, political, and socioeconomic dimensions, emphasizing the role of sustainable practices and governance mechanisms in conflict mitigation.

The findings chapter of this research presents a detailed analysis of data collected through interviews and secondary sources, focusing on water governance and sustainable management practices in the Nile Basin. The analysis is structured to provide a comprehensive understanding of the challenges and opportunities associated with water resource management in this transboundary context. It combines insights from primary data gathered through interviews with experts and stakeholders and secondary data from historical records, policy documents, and previous research.

The study relied on a purposive sampling method to identify and engage key informants, including professionals and experts with in-depth knowledge of water management and governance structures in the Nile Basin region. Table 1 outlines the demographic profile of the respondents, categorized by their affiliations and roles in the sector.

Year/Yıl:2024, 5(9), 109-124
Research Paper (Received: 20.12.2024/Accepted: 29.12.2024)
Araştırma Makalesi (Geliş: 20.12.2024/Kabul: 29.12.2024)
Index: ISI (International Scientific Indexing), ASI (Advenced Sciences Index), ICI, ESJIndex etc.

Table 1. List of Respondents

Respondent ID	Country	Occupation
R1	Ethiopia	Professor of Water and Environmental Engineering, Addis Ababa University
R2	Ethiopia	Water Policy Expert, Ethiopian Water Research Institute
R3	Ethiopia	Expert in Water Resources Management, Mekele University
R4	Ethiopia	Water Resources Adviser, Ministry of Water and Energy
R5	Ethiopia	Water Researcher, Institute for Sustainable Development
R6	Ethiopia	Professor of Aquatic Economics
R7	Ethiopia	Environmental Policy Researcher, University of Gemma
R8	Ethiopia	Professor of Regional Relations, University of Haramia
R9	Ethiopia	Specialist in International Cooperation
R10	Ethiopia	Water Researcher, Addis Ababa University
R11	Egypt	Professor of Water Resources, Cairo University
R12	Egypt	Former Minister of Irrigation
R13	Egypt	Professor of Aquatic Geology, University of Alexandria
R14	Egypt	Researcher, Water Research Institute, Ministry of Water Resources and Irrigation
R15	Egypt	Professor of Water Resources Engineering, University of Menoufia
R16	Egypt	Professor of Water Economics, Suez Canal University
R17	Egypt	Professor of Aquatic Environment, Cairo University
R18	Egypt	Expert on Regional Affairs, Al-Ahram Centre for Studies
R19	Egypt	Professor of Agricultural Economics, Cairo University
R20	Egypt	Expert in Water Resources, Nile Research Institute
R21	Egypt	Researcher, National Center for Water Research
R22	Egypt	Water Governance Expert, Water Research Center

Each participant was interviewed individually, with interviews lasting approximately 15 to 20 minutes. Due to concerns over security and political sensitivities, some respondents were unwilling to answer all questions or participate in extended interviews. Consequently, the research questions were adjusted to accommodate shorter interviews while still capturing essential data. Additionally, secondary data was extensively used to supplement the findings, particularly where primary data was unavailable or limited.

The data was manually analyzed using a descriptive approach. Microsoft Excel was employed to categorize, compare, and identify patterns in the responses and secondary data. The process involved thematic coding, trend analysis, and cross-referencing findings with existing literature. This method ensured that the study's objectives were met, providing a robust foundation for synthesizing conclusions and proposing actionable recommendations.

4.CONCLUSION

The issue of water scarcity and conflict in the Middle East and the Nile Basin underscores the urgency of sustainable water management and effective governance. This study has examined the interplay between historical legacies, governance structures, and sustainable practices, offering insights into how these factors contribute to water conflicts and the pathways for mitigating them.

Water, as a critical resource, is deeply intertwined with environmental, economic, and sociopolitical dimensions. The findings reveal that while water scarcity stems from natural factors like arid climates and limited freshwater resources, the root causes of conflicts are often governance related. Historical agreements such as the 1929 and 1959 Nile Waters treaties have perpetuated inequities,

Year/Yıl:2024, 5(9), 109-124
Research Paper (Received: 20.12.2024/Accepted: 29.12.2024)
Araştırma Makalesi (Geliş: 20.12.2024/Kabul: 29.12.2024)
Index: ISI (International Scientific Indexing), ASI (Advenced Sciences Index), ICI, ESJIndex etc.

privileging downstream states like Egypt while marginalizing upstream countries like Ethiopia. These agreements have become symbols of both mistrust and the need for reform, highlighting the importance of inclusive governance frameworks that reflect contemporary realities.

The study emphasizes the interdependence of sustainable water management and governance. Effective governance provides the foundation for equitable resource allocation, conflict resolution, and the implementation of sustainable practices. Conversely, sustainable management ensures that water resources are preserved and utilized efficiently, reinforcing the stability and legitimacy of governance structures. This relationship is evident in the divergent strategies of Egypt and Ethiopia, where historical entitlements and developmental aspirations continue to shape water management practices and diplomatic relations.

International organizations and cooperative frameworks like the Nile Basin Initiative (NBI) have played a pivotal role in fostering dialogue and technical collaboration. However, the lack of binding agreements and enforceable mechanisms remains a significant barrier to achieving long-term cooperation. The integration of advanced technologies, such as remote sensing and Geographic Information Systems (GIS), offers a pathway for improving transparency, data sharing, and informed policymaking. These tools can address misconceptions and build trust among stakeholders, a crucial step toward resolving tensions and fostering collaboration.

Community engagement emerges as a critical factor in sustainable water management. Local populations, as the primary users and stewards of water resources, must be actively involved in decision-making processes. Capacity-building initiatives and participatory governance frameworks can empower communities to adopt sustainable practices, aligning local actions with regional and global objectives. Such efforts not only enhance the effectiveness of management strategies but also ensure that policies are context-specific and culturally sensitive.

The balance between economic development and environmental conservation remains a central challenge. Projects like the Grand Ethiopian Renaissance Dam (GERD) exemplify the potential for hydropower and economic growth but also highlight the risks of ecosystem disruption and inter-state tensions. Adaptive management strategies that integrate environmental, economic, and social considerations are essential for achieving sustainable outcomes. These strategies must be supported by robust governance mechanisms that prioritize transparency, equity, and accountability.

In conclusion, the study demonstrates that addressing water scarcity and conflict in transboundary contexts requires a holistic approach that integrates sustainable management, effective governance, and regional cooperation. Key recommendations include strengthening legal and institutional frameworks, leveraging technology for transparency and data sharing, promoting regional dialogue, and empowering communities. By adopting these strategies, stakeholders can transform water from a source of conflict into a catalyst for cooperation, fostering stability and shared prosperity in the Nile Basin and the Middle East.

The lessons from this research extend beyond the Nile Basin, offering valuable insights for other regions facing similar challenges. As climate change, population growth, and geopolitical complexities continue to exacerbate water scarcity worldwide, the principles of sustainability, equity, and collaboration provide a roadmap for achieving resilient and inclusive water management systems. Through collective action and innovative governance, the vision of a stable, equitable, and sustainable future for water resources can become a reality.

Year/Yıl:2024, 5(9), 109-124
Research Paper (Received: 20.12.2024/Accepted: 29.12.2024)
Araştırma Makalesi (Geliş: 20.12.2024/Kabul: 29.12.2024)
Index: ISI (International Scientific Indexing), ASI (Advenced Sciences Index), ICI, ESJIndex etc.

REFERENCES

Afshar, A., Soleimanian, E., Akbari Variani, H., Vahabzadeh, M. & Molajou, A. (2021). The conceptual framework to determine interrelations and interactions for holistic Water, Energy, and Food Nexus. Environment, Development and Sustainability. https://doi.org/10.1007/s10668-021-01858-3

Aguilera, R. V., Aragón-Correa, J. A., Marano, V. & Tashman, P. A. (2021). The Corporate Governance of Environmental Sustainability: A Review and Proposal for More Integrated Research. Journal of Management, 47(6), 1468–1497. https://doi.org/10.1177/0149206321991212

Alfin (2022). http://www.diva-portal.org/smash/record.jsf?pid=diva2%3A1665054. DIVA. https://www.diva-portal.org/smash/record.jsf?pid=diva2%3A1665054&dswid=8079

Allouche, J. (2011). The sustainability and resilience of global water and food systems: Political analysis of the interplay between security, resource scarcity, political systems and global trade. Food Policy, 36, S3–S8. https://doi.org/10.1016/j.foodpol.2010.11.013

Angelakis, A. N., Valipour, M., Ahmed, A. T., Tzanakakis, V., Paranychianakis, N. V., Krasilnikoff, J., Drusiani, R., Mays, L., El Gohary, F., Koutsoyiannis, D., Khan, S., & Giacco, L. J. D. (2021). Water Conflicts: From Ancient to Modern Times and in the Future. Sustainability, 13(8), 4237. https://doi.org/10.3390/su13084237

Araya, A., Prasad, P. V. V., Ciampitti, I. A. & Jha, P. K. (2021). Using crop simulation model to evaluate influence of water management practices and multiple cropping systems on crop yields: A case study for Ethiopian highlands. Field Crops Research, 260, 108004. https://doi.org/10.1016/j.fcr.2020.108004

Awadh, S. M., Al-Mimar, H. & Yaseen, Z. M. (2020). Groundwater availability and water demand sustainability over the upper mega aquifers of Arabian Peninsula and west region of Iraq. Environment, Development and Sustainability, 23(1), 1–21. https://doi.org/10.1007/s10668-019-00578-z

Badea, C. (2020). Water Conflıcts: The Case Of The Nıle Rıver And The Grand Ethıopıan Renaıssance Dam. Studia Universitatis Babes-Bolyai - Studia Europaea, 65(2), 179–193. https://www.ceeol.com/search/article-detail?id=927498

Bozorg-Haddad, O., Zolghadr-Asli, B., Sarzaeim, P., Aboutalebi, M., Chu, X. & Loáiciga, H. A. (2019). Evaluation of water shortage crisis in the Middle East and possible remedies. Journal of Water Supply: Research and Technology-Aqua, 69(1), 85–98. https://doi.org/10.2166/aqua.2019.049

Chen, J., John, R., Yuan, J. & A Mack, E. (2022). Sustainability challenges for the social-environmental systems across the Asian Drylands Belt. Environmental Research Letters, 17(2).

Chen, Y., Zhu, M., Lu, J., Zhou, Q. & Ma, W. (2020). Evaluation of ecological city and analysis of obstacle factors under the background of high-quality development: Taking cities in the Yellow River Basin as examples. Ecological Indicators, 118, 106771. https://doi.org/10.1016/j.ecolind.2020.106771

Chowdhary, P., Bharagava, R. N., Mishra, S. & Khan, N. (2019). Role of Industries in Water Scarcity and Its Adverse Effects on Environment and Human Health. Environmental Concerns and Sustainable Development, 1, 235–256. https://doi.org/10.1007/978-981-13-5889-0_12

DeQuero-Navarro, B., Aoun Barakat, K., J. Shultz, C. & A. Araque-Padilla, R. (2020). From Conflict to Cooperation: A Macromarketing View of Sustainable and Inclusive Development in Lebanon and the Middle East. SpringerLink, 66.

Di Vaio, A., Trujillo, L., D'Amore, G. & Palladino, R. (2021). Water governance models for meeting sustainable development Goals:A structured literature review. Utilities Policy, 72, 101255. https://doi.org/10.1016/j.jup.2021.101255

Doorn, N. (2021). Artificial intelligence in the water domain: Opportunities for responsible use. Science of the Total Environment, 755, 142561. https://doi.org/10.1016/j.scitotenv.2020.142561

El-Fadel, M., El-Sayegh, Y., El-Fadl, K. & Khorbotly, D. (2003). The Nile River Basin: A Case Study in Surface Water Conflict Resolution. Journal of Natural Resources and Life Sciences Education, 32(1), 107–117. https://doi.org/10.2134/jnrlse.2003.0107

Elsayed, H., Djordjević, S., Savić, D. A., Tsoukalas, I. & Makropoulos, C. (2020). The Nile Water-Food-Energy Nexus under Uncertainty: Impacts of the Grand Ethiopian Renaissance Dam. Journal of Water Resources Planning and Management, 146(11), 04020085. https://doi.org/10.1061/(asce)wr.1943-5452.0001285

Faisal Abass Padder & Bashir, A. (2023). Scarcıty Of Water In The Twenty-Fırst Century: Problems And Potentıal Remedıes. Medalıon Journal Medical Research Nursing Health and Midwife Participation, 4(1), 1–5. https://doi.org/10.59733/medalion.v4i1.66

Jiménez, A., Saikia, P., Giné, R., Avello, P., Leten, J., Liss Lymer, B., Schneider, K. & Ward, R. (2020). Unpacking Water Governance: A Framework for Practitioners. Water, 12(3), 827. https://doi.org/10.3390/w12030827

Kasim, A., Gursoy, D., Okumus, F. & Wong, A. (2014). The importance of water management in hotels: a framework for sustainability through innovation. Journal of Sustainable Tourism, 22(7), 1090–1107. https://doi.org/10.1080/09669582.2013.873444

Katariina Simonen. (2021). Oman Water Diplomacy Part I: The Beginnings of the Middle East Desalination Research Centre (MEDRC). Springer EBooks, 133–160. https://doi.org/10.1007/978-3-030-85218-4_6

Li, J., Shi, X., Wu, H. & Liu, L. (2020). Trade-off between economic development and environmental governance in China: An analysis based on the effect of river chief system. China Economic Review, 60, 101403. https://doi.org/10.1016/j.chieco.2019.101403

Liu, Y., Wang, P., Gojenko, B., Yu, J., Wei, L., Luo, D. & Xiao, T. (2021). A review of water pollution arising from agriculture and mining activities in Central Asia: Facts, causes and effects. Environmental Pollution, 291, 118209. https://doi.org/10.1016/j.envpol.2021.118209

Luo, P., Sun, Y., Wang, S., Wang, S., Lyu, J., Zhou, M., Nakagami, K., Takara, K. & Nover, D. (2020). Historical assessment and future sustainability challenges of Egyptian water resources management. Journal of Cleaner Production, 263, 121154. https://doi.org/10.1016/j.jclepro.2020.121154

Mannan, M. & Al-Ghamdi, S. G. (2020). Environmental impact of water-use in buildings: Latest developments from a life-cycle assessment perspective. Journal of Environmental Management, 261, 110198. https://doi.org/10.1016/j.jenvman.2020.110198

Maru, M. (2019). Mehari Taddele Maru. Researchgate. https://scholar.google.com.pk/citations?user=ZBrgcT0AAAAJ&hl=en&oi=sra

Megistu, F. (2020). Towards sustaining watershed management practices in Ethiopia: A synthesis of local perception, community participation, adoption and livelihoods. Environmental Science & Policy, 112, 414–430. https://doi.org/10.1016/j.envsci.2020.06.019

Mianabadi, A., Davary, K., Mianabadi, H. & Karimi, P. (2020). International Environmental Conflict Management in Transboundary River Basins. Water Resources Management, 34(11), 3445–3464. https://doi.org/10.1007/s11269-020-02576-7

Mishra, B., Kumar, P., Saraswat, C., Chakraborty, S. & Gautam, A. (2021). Water Security in a Changing Environment: Concept, Challenges and Solutions. Water, 13(4), 490. https://doi.org/10.3390/w13040490

Muñoz, A. A., Klock-Barría, K., Alvarez-Garreton, C., Aguilera-Betti, I., González-Reyes, Á., Lastra, J. A., Chávez, R. O., Barría, P., Christie, D., Rojas-Badilla, M. & LeQuesne, C.

(2020). Water Crisis in Petorca Basin, Chile: The Combined Effects of a Mega-Drought and Water Management. Water, 12(3), 648. https://doi.org/10.3390/w12030648

Nabiafjadi, S., Sharifzadeh, M. & Ahmadvand, M. (2021). Social network analysis for identifying actors engaged in water governance: An endorheic basin case in the Middle East. Journal of Environmental Management, 288, 112376. https://doi.org/10.1016/j.jenvman.2021.112376

Nasrat, A. (2020). Global Climate Change Impacts on Tigris-Euphrates Rivers Basins. DIVA. https://www.diva-portal.org/smash/record.jsf?pid=diva2%3A1379427&dswid=1420

Ostad-Ali-Askari, K. & Shayannejad, M. (2021). Quantity and quality modelling of groundwater to manage water resources in Isfahan-Borkhar Aquifer. Environment, Development and Sustainability, 23(11), 15943–15959. https://doi.org/10.1007/s10668-021-01323-1

Pahl-Wostl, C., Knieper, C., Lukat, E., Meergans, F., Schoderer, M., Schütze, N., Schweigatz, D., Dombrowsky, I., Lenschow, A., Stein, U., Thiel, A., Tröltzsch, J. & Vidaurre, R. (2020). Enhancing the capacity of water governance to deal with complex management challenges: A framework of analysis. Environmental Science & Policy, 107, 23–35. https://doi.org/10.1016/j.envsci.2020.02.011

Pemunta, N. V., Ngo, N. V., Fani Djomo, C. R., Mutola, S., Seember, J. A., Mbong, G. A. & Forkim, E. A. (2021). The Grand Ethiopian Renaissance Dam, Egyptian National Security, and human and food security in the Nile River Basin. Cogent Social Sciences, 7(1), 1875598. https://doi.org/10.1080/23311886.2021.1875598

Rashed, A. H. & Shah, A. (2020). The role of private sector in the implementation of sustainable development goals. Environment, Development and Sustainability, 23(5), 2931–2948. https://doi.org/10.1007/s10668-020-00718-w

Salameh, M. T. B., Alraggad, M. & Harahsheh, S. T. (2021). The water crisis and the conflict in the Middle East. Sustainable Water Resources Management, 7(5). https://doi.org/10.1007/s40899-021-00549-1

Soylu, N. (2021). Southeastern Anatolıa Project (Gap) In Turkey And Food Securıty In The Mıddle East. International Journal of Water Management and Diplomacy, 1(2), 23–34. https://dergipark.org.tr/en/pub/ijwmd/issue/60012/830258

Stefanakis, A. I. (2020). Constructed Wetlands for Sustainable Wastewater Treatment in Hot and Arid Climates: Opportunities, Challenges and Case Studies in the Middle East. Water, 12(6), 1665. https://doi.org/10.3390/w12061665

Tekuya, M. (2018). The Egyptian Hydro-Hegemony in the Nile Basin: The Quest for Changing the Status Quo. Papers.ssrn.com. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3680312

Turhan, Y. (2020). The hydro-political dilemma in Africa water geopolitics: The case of the Nile river basin. African Security Review, 30(1), 1–20. https://doi.org/10.1080/10246029.2020.1844775

Wehling, P. (2020). Nile Water Rights. In Springer eBooks. Springer Nature. https://doi.org/10.1007/978-3-662-60796-1

Wolf, A. T. (2023). Middle East Water Conflicts and Directions for Conflict Resolution. In Google Books. Intl Food Policy Res Inst. https://books.google.com.pk/books?hl=en&lr=&id=fH-tsDpRL8QC&oi=fnd&pg=PR3&dq=economic++sustainability++linked+it+with+water+conflict+in+middle+east&ots=bYO7C442lc&sig=cONq8EvSfFEmmkPr4qZF510s4nw&redir_esc=y#v=onepage&q&f=false

Yeganeh, Y. & Bakhshandeh, E. (2022). Iran's Model Of Water Dıplomacy To Promote Cooperatıon And Prevent Conflıct Over Transboundary Rıvers In Southwest Asıa. World Affairs, 004382002210812. https://doi.org/10.1177/00438200221081210

Zarei, M. (2020). The water-energy-food nexus: A holistic approach for resource security in iran, iraq, and turkey. Water-Energy Nexus. https://doi.org/10.1016/j.wen.2020.05.004

Year/Yıl:2024, 5(9), 109-124
Research Paper (Received: 20.12.2024/Accepted: 29.12.2024)
Araştırma Makalesi (Geliş: 20.12.2024/Kabul: 29.12.2024)
Index: ISI (International Scientific Indexing), ASI (Advenced Sciences Index), ICI, ESJIndex etc.

Zeitoun, M., Mirumachi, N., Warner, J., Kirkegaard, M. & Cascão, A. (2019). Analysis for water conflict transformation. Water International, 1–20. https://doi.org/10.1080/02508060.2019.1607479

Zhang, D., Sial, M. S., Ahmad, N., Filipe, A. J., Thu, P. A., Zia-Ud-Din, M. & Caleiro, A. B. (2020). Water Scarcity and Sustainability in an Emerging Economy: A Management Perspective for Future. Sustainability, 13(1), 144. https://doi.org/10.3390/su13010144

Zittis, G., Almazroui, M., Alpert, P., Ciais, P., Cramer, W., Dahdal, Y., Fnais, M., Francis, D., Hadjinicolaou, P., Howari, F., Jrrar, A., Kaskaoutis, D. G., Kulmala, M., Lazoglou, G., Mihalopoulos, N., Lin, X., Rudich, Y., Sciare, J., Stenchikov, G. & Xoplaki, E. (2022). Climate change and weather extremes in the Eastern Mediterranean and Middle East. Reviews of Geophysics, 60(3). https://doi.org/10.1029/2021rg000762

Twain, M. (2018). Transboundary Water Conflicts and Cooperation. Springer International Publishing. https://doi.org/10.1007/978-3-319-78625-4_3