



The Global Water Crisis: Water Diplomacy As An Effort To Avoid Conflict Between Countries

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INFO ARTIKEL	ABSTRAK
Entered January 30, 2025 Revised March 22, 2025 Accepted April 30, 2025 Published May 28, 2025	The global water crisis is increasingly worrisome, especially in regions that rely on transboundary water resources such as the Middle East, Sub-Saharan Africa, South Asia, and Southeast Asia. Competition for access to clean water has the potential to trigger conflict, but it can also be an opportunity to build cooperation between countries through water diplomacy. This study aims to analyze the dynamics of water diplomacy in the midst of a global water crisis and identify the factors that influence its success and failure. The research method used is qualitative with a descriptive-analytical approach. Data were collected through literature studies from scientific journals, international organization reports, and policy documents, then analyzed using content analysis techniques and comparative analysis between regions. The results show that areas with strong cooperation mechanisms and international agreements, such as the Niger River basin, tend to be better able to manage potential conflicts. In contrast, tensions are rising in regions such as the Indus River (India–Pakistan) and the Nile River (Egypt–Ethiopia), where the unilateral approach is still dominant. Water diplomacy has proven effective if it is supported by a clear legal framework, political commitment, and the mediating role of international organizations. Implicitly, countries need to strengthen water diplomacy policies as part of their security and sustainable development strategies, as well as encourage inclusive regional cooperation for transboundary water resources management.
Keywords: Water Diplomacy, Water Crisis, Conflict, Regional Cooperation, Resource Management	

INTRODUCTION

The global water crisis has become a major concern in many fields, including among scientists, policymakers, and the media. Although water is a renewable resource, its uneven distribution and ineffective management lead to scarcity in various parts of the world. Various factors contribute to the increasing pressure on global water resources. The overall amount of water resources is sufficient to meet human needs, uneven spatial and temporal distribution often leads to scarcity in some regions. Excessive water extraction from rivers and groundwater has also led to environmental degradation and significant depletion of water resources (Abbott et al., 2019; Oelkers et al., 2011). Climate change exacerbates the water crisis by causing instability in rainfall patterns and



freshwater availability. In addition, rapid population growth and improved living standards increase the demand for water for domestic, industrial, and agricultural needs (Kumar, 2024; Vollmer & Harrison, 2021). Policies that do not reflect the strategic value of water often lead to overuse and inefficiency. Water prices that do not reflect its economic value, as well as the lack of innovation in conservation and recycling technologies, exacerbate this condition. Inadequate governance structures also slow down the implementation of sustainable solutions (Abdulrahman, 2019; Barbier, 2019).

The water crisis has a wide impact that affects various aspects of people's lives. In developing countries, access to clean water and adequate sanitation remains a major challenge. Water scarcity has a direct impact on public health, increasing the risk of waterborne diseases, and affecting the agricultural, industrial, and ecosystem sectors. This impact is often most felt by vulnerable groups of people (Oelkers et al., 2011; Racheeti, 2024). Water scarcity can also trigger social and political tensions, especially in regions that share transboundary water resources. In some cases, water disputes have led to conflicts between countries or a struggle for access to water resources, known as "water grabbing" (Barbier, 2019).

Competition for water resources can trigger conflicts between countries, especially in regions that experience water limitations and a significant increase in demand. One of the main factors that cause water conflicts is rapid population growth, which increases the pressure on limited water resources. Densely populated areas often face fierce competition to meet domestic, agricultural, and industrial needs, increasing the potential for tensions (Bozorg - Haddad et al., 2019; Gbandi, 2022). In addition, the use of water for agriculture and industry is also an important factor in this competition. Countries that are heavily dependent on agriculture and industry face challenges in maintaining access to water resources, as seen in Central Asia, where competition between countries for water is an ever-growing strategic issue (Ahn et al., 2023; Pradhan, 2021). In addition, inter-basin water transfer projects can trigger tensions between countries if not managed properly. One obvious example is Iran, where water transfer projects have generated protests and discontent among regions that feel disadvantaged by the redistribution of water resources (Bozorg - Haddad et al., 2019). Power asymmetry and geo-economic factors also exacerbate water conflicts, especially when countries with greater control over water resources use those advantages to strengthen their economic and political positions, often at the expense of other, weaker countries (Tukvadze & Guchua, 2022).

Water conflicts can have far-reaching impacts, including regional instability that threatens peace in a region with a history of political and ethnic tensions. Disputes over the right of access to water often exacerbate existing conflicts, creating situations that are increasingly difficult to resolve diplomatically (Ahn et al., 2023; Mosov et al., 2024). Although water-related conflicts are frequent, there are also regional cooperation efforts that show that countries can find peaceful solutions to manage water resources together. A number of international agreements have succeeded in reducing tensions and encouraging fairer and more sustainable water management (Bernauer & Böhmelt, 2020). Collaborative approaches and soft power are increasingly adopted strategies to reduce potential conflicts and build more effective cross-border water management mechanisms (Ahn et al., 2023).

Water diplomacy is a strategic approach that aims to manage international relations related to water resources, especially in preventing conflicts that can arise due to competition for limited resources. In a region with limited water and many competing

stakeholders, these diplomacy efforts are key to reducing tensions and finding mutually acceptable solutions (Ruiz, 2020; Yeganeh & Bakhshandeh, 2022; Zareie et al., 2020). In addition, water diplomacy also encourages international cooperation by establishing agreements and multilateral institutions tasked with regulating and supervising transboundary water use. A clear example of this approach is the steps taken by Iran in establishing relations with its neighboring countries to reach agreements on common water resources (Ruiz, 2020; Yeganeh & Bakhshandeh, 2022).

Furthermore, water diplomacy has a strategic role in maintaining global security and supporting sustainable development. With increasing challenges related to water availability due to climate change, population growth, and overexploitation, a water diplomacy approach can assist countries in achieving the Sustainable Development Goals (SDGs), especially in ensuring access to clean water and adequate sanitation for all (Krzymowski, 2021; Ruiz, 2020). To achieve these goals, various strategies and approaches in water diplomacy have been developed. One model that has been successfully implemented is the Iranian approach, which emphasizes the principles of "goodwill and cooperation" and "exchange of data and information" as a way to avoid conflict and build harmonious relations with other countries in cross-border water management (Yeganeh & Bakhshandeh, 2022). In addition to the political and negotiation aspects, a deep understanding of water resources or known as "Water-IQ" is also an important factor in the success of water diplomacy. Understanding the hydrological cycles and the impact of human activities on water ecosystems can help policymakers and negotiators find common ground in water-related conflicts. The higher this level of understanding, the greater the opportunity to achieve a sustainable and mutually beneficial solution for all parties involved (Bishop et al., 2024).

Furthermore, international water law is one of the important aspects of water diplomacy. These legal principles are often used in negotiations to guide countries toward cooperative solutions that benefit all parties. With clear regulations, international water law plays a role in creating a fairer and more sustainable mechanism for transboundary water resource management (Schmeier, 2021). Global collaboration in water diplomacy is becoming increasingly important as challenges in managing transnational water resources increase. Water diplomacy serves not only as a tool to resolve conflicts, but also as a strategy to ensure the sustainability of water resources and build more harmonious relations between countries (Keskinen et al., 2021; Krzymowski, 2021; Zareie et al., 2020).

One of the key urgency of global collaboration in water diplomacy is its contribution to security and sustainable development. By playing a role in achieving the SDGs, water diplomacy becomes an effective platform for international cooperation in the face of increasingly complex challenges, including the degradation of water resources and the increasing need for water due to population growth (Krzymowski, 2021). In addition, global collaboration is urgently needed in the management of transboundary water resources, such as rivers and aquifers that cross national borders. Disagreements over the management of these resources are often a source of conflict, so international agreements and cooperation are indispensable to avoid protracted tensions (Anghileri et al., 2024; Rubin et al., 2024).

Water diplomacy also plays a role in enhancing cooperation and building trust between countries, which is a key factor in creating stable relations in water resource management. By strengthening communication and transparency in the use of water resources, countries can find more effective solutions in addressing common challenges

(Rojas et al., 2020; Salmoral et al., 2019). Although global collaboration has great potential in water diplomacy, there are some challenges that hinder its implementation. One of the main obstacles is the limitation of resources and data, especially in regions such as Sub-Saharan Africa, where the lack of accurate information on water resources is often an obstacle to transboundary cooperation efforts (Anghileri et al., 2024). In addition, the asymmetry of power and geopolitical interests also complicate negotiations related to water resource management. For example, in South Asia, some economically and politically stronger countries often dominate water negotiations, creating inequality in access to and utilization of water resources (TDutta & AMP; Ganguly, 2024).

Another challenge is the need for integration between science and policy in the water diplomacy process. While technical knowledge of hydrology is essential, effective policy implementation also requires an understanding of political and social dynamics. Therefore, a multidisciplinary approach is needed to ensure that water diplomacy strategies are not only scientifically based, but can also be applied in complex political contexts (Klimeš et al., 2019). In addition, the lack of strong institutions in some regions is also an obstacle to cross-border water cooperation. Without institutions that can oversee and enforce rules related to water management, agreements and agreements are often difficult to implement effectively (Rubin et al., 2024).

Despite the various challenges, water diplomacy remains an important tool in achieving water security and sustainable development. By strengthening the integration between science and policy, as well as enhancing international cooperation, countries can overcome existing barriers and create long-term solutions in water resource management. Therefore, this study aims to analyze the role of water diplomacy in dealing with the global water crisis, especially in the context of sustainable transboundary water resource management. This research also aims to identify challenges and opportunities in the implementation of water diplomacy as a strategy to prevent conflicts, build international cooperation, and support the achievement of the Sustainable Development Goals (SDGs). In addition, this study seeks to explore how the integration between science and policy can strengthen the effectiveness of water diplomacy in responding to complex political, social, and environmental dynamics in different regions of the world.

METHODOLOGY

The research method used in this study is a qualitative method with a descriptive-analytical approach. This approach aims to understand in depth the phenomenon of the global water crisis, the role of water diplomacy, and the potential for conflicts between countries due to limited water resources. This research focuses on regions with significant water challenges, such as the Middle East, Sub-Saharan Africa, South Asia, and Southeast Asia, where water resources are a strategic issue that triggers tensions or encourages cooperation between countries.

Data collection is carried out through library research by collecting information from scientific journals, reports from international organizations such as the United Nations (UN), World Bank, UNESCO, Global Water Partnership (GWP), and International Water Management Institute (IWMI), as well as relevant academic books and articles. In addition, this study uses document analysis, by reviewing:

- Government and international organization policies related to water resource management,

- International agreements governing the sharing and management of transboundary water resources,

The data obtained was analyzed using the content analysis method to interpret documents and reports to find the main patterns, relationships, and factors that influence the dynamics of conflict and cooperation in water diplomacy. In addition, this study applies comparative analysis, by comparing water diplomacy policies or strategies in different regions to identify best practices in managing conflicts and building cross-border water cooperation.

The following is a comparison of some of the regions analyzed in this study:

Region	Water Issues Faced
Middle East (Egypt vs Ethiopia)	Grand Ethiopian Renaissance Dam (GERD)
Sub-Saharan Africa (Niger River basin)	Water scarcity and climate change exacerbate tensions between countries
South Asia (India vs Pakistan)	Indus River dispute
Southeast Asia (China vs Mekong countries)	China's control over the flow of the Mekong River

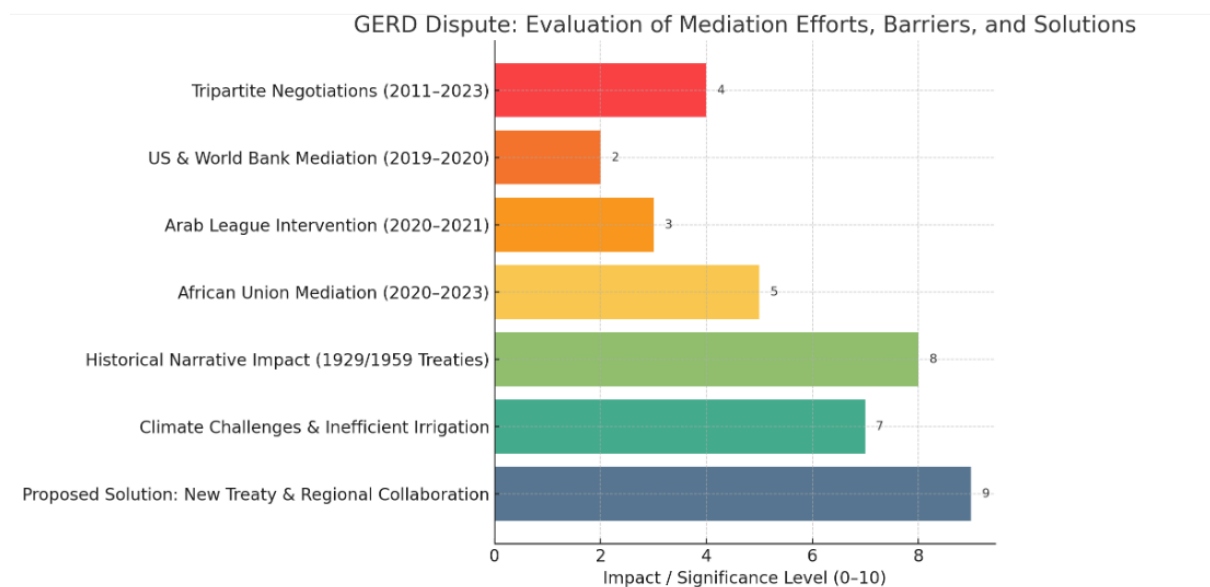
RESULTS AND DISCUSSION

Middle East (Egypt Vs Ethiopia)

Background of GERD Dispute

The construction of the Grand Ethiopian Renaissance Dam (GERD) on the Blue Nile River by Ethiopia aims to address the energy crisis and boost the national economy. Ethiopia insists that the project will not cause significant losses to the downstream countries, namely Egypt and Sudan. However, Egypt and Sudan consider the project a serious threat to their water, food and environmental security. With more than 90% of Egypt's water needs dependent on the Nile, the filling of GERD reservoirs has become a major source of tension between the countries.

The Role of Diplomacy:



1. Tripartite Negotiations (2011–2023) – Score 4

Negotiations between Ethiopia, Egypt, and Sudan have been ongoing since 2011 through a number of important forums, such as *the International Panel of Experts* (2011), *the Declaration of Principles* (2015), and *the National Independent Research Scientific Group* (2018). However, until now a binding legal agreement has not been reached. This is due to a sharp difference in interests: Ethiopia emphasizes the right to development for national energy needs, while Egypt and Sudan demand a guarantee of a fixed quota of water from the Nile. This negotiation was considered important, but the results were minimal and did not result in a real breakthrough, so the score was at 4.

2. United States and World Bank Mediation – Score 2

In 2019–2020, the United States and the World Bank were involved as mediators in an effort to reach an agreement. However, this process failed because Ethiopia rejected the results of the negotiations that were considered in favor of Egypt. The United States even used political pressure by withholding foreign aid to Ethiopia. This mediation not only failed to build trust, but also worsened the dynamics of relations between countries, so that the score was at 2.

3. Arab League Intervention – Score 3

The Arab League has publicly expressed its support for Egypt and Sudan, two countries downstream of the Nile. However, this intervention is considered non-neutral and actually increases political tension in the region. A position that is too partisan makes the diplomacy process more complicated and widens the gap between the differences between the parties so that the score is at 3.

4. African Union Mediation – Score 5

Since 2020, the African Union has taken over the position of main mediator. However, the limited institutional capacity, especially in terms of funding and political authority, has not been able to push for a binding agreement. Even so, the Air Force is still seen as the most feasible forum to lead further negotiations so the score is at 5.

5. The Influence of Historical Narratives (1929 and 1959 Agreements) – Score 8

Colonial treaties signed by Egypt and Sudan gave them dominant rights to the waters of the Nile River. Ethiopia is not involved in the treaty and rejects it as a legal basis. This narrative reinforces the hard-line positions of Egypt and Sudan and creates a zero-sum mentality, where one side's gains are considered as the other's losses. This narrative greatly affects the dynamics and impasse in negotiations, so the score is at 8.

6. The Challenge of Climate Change and Wasteful Irrigation Systems – Score 7

Conflicts related to GERD are also affected by water crises exacerbated by climate change, rapid population growth, inefficient irrigation systems, and water-intensive agricultural practices such as cotton cultivation in Egypt. While not a major factor in the political dispute, these challenges have a significant impact on water availability and the sustainability of the Nile Basin region, so the score is at 7.

7. Collaborative Solutions and the New Testament – Score 9

These solutions include changing the narrative to consider the Nile River as a shared resource, the establishment of new agreements involving all countries in the Nile Basin, as well as strengthening regional institutions such as the AU

and the NBI. This solution is considered the most promising because it is oriented towards justice, sustainability, and inclusive regional cooperation, so the score is at 9.

International Negotiations and Mediation A number of trilateral negotiations have been pursued since 2011, involving Ethiopia, Egypt, and Sudan. Some of the important initiatives include the establishment of the International Panel of Experts (IPE) in 2011, the Tripartite National Committee (TNC) in 2014, and the signing of the Declaration of Principles (DOP) in 2015. However, all of these efforts failed to result in a final agreement due to fundamental differences in interest and a zero-sum approach to negotiations.

In international mediation, the United States and the World Bank tried to mediate in 2019. However, Ethiopia withdrew because it considered the US to side with Egypt. In fact, the US had withheld foreign aid as pressure on Ethiopia. Afterwards, the UN Security Council referred the dispute to the African Union (AU) as a more neutral mediator. Although the AU has led several rounds of negotiations, including in 2023 in Cairo and Addis Ababa, the talks remain at an impasse. Egypt is demanding a legally binding agreement on the volume of water Ethiopia releases, while Ethiopia wants a flexible technical agreement so as not to limit its domestic interests.

Negotiation Barriers

One of the main obstacles in negotiations is the difference in historical positions. Egypt adheres to the 1929 and 1959 colonial treaties that recognize its historical rights to the waters of the Nile. Ethiopia, meanwhile, denies the legitimacy of the treaty because it was never involved in its formation. In addition, Egypt considers the Nile water to be a national security issue listed in its constitution, complicating further negotiations. Another factor that has muddied the situation is the involvement of the Arab League in support of Egypt and Sudan, turning this conflict into more of an international nature than just a regional dispute.

Recommendations

To reach a resolution, negotiations need to shift to an integrative approach oriented towards win-win solutions, rather than simply defending individual countries' positions. The African Union should be the main mediator because it is considered more neutral and understands the African context. In addition, Ethiopia, Egypt, and Sudan must show political will to find solutions that prioritize common interests, not rigid one-sided interests.

Conclusion

The GERD dispute is still at an impasse in international diplomacy, but the African Union remains the best mediation forum. Coercive approaches from outsiders, such as those taken by the US, tend to complicate negotiations. The success of resolving these conflicts is highly dependent on the political will of the parties involved, a commitment to the principles of justice, and the application of a more collaborative and solution-oriented approach to negotiations.

Sub-Saharan Africa (Niger River Basin)

Water Scarcity and Climate Change in the Niger River Basin

1. Water Scarcity as a Factor in Conflict

Increased demand (demand-induced scarcity)

The rapid population growth in the Niger River Basin (NRB) has driven an increase in the need for water for various purposes, such as domestic, agricultural, and

industrial consumption. The phenomenon of rapid urbanization is increasing the pressure on the availability of clean water and adequate sanitation systems. This creates a situation of inequality between high demand and limited water supply, which ultimately increases the risk of social tensions and competition between communities and countries.

Supply decline (supply-induced scarcity)

In addition to increasing demand, water supply is also declining due to various environmental factors. Deforestation, massive irrigation, and pollution due to industrial and household activities are the main causes of water quality degradation in this region. The excessive use of chemical fertilizers in the agricultural sector also contributes to the pollution of water sources. As a result, the availability of clean water is increasingly limited, triggering a water crisis that can spill over into social and political conflicts.

Uneven distribution (structural-induced scarcity)

Another crucial problem is the uneven distribution of water between countries in the NRB region. Upstream countries such as Mali and Guinea have greater control over the flow of water due to the existence of large dams built for their national purposes. This affects downstream countries such as Nigeria which are heavily dependent on water flows from upstream regions. This distribution inequality often causes diplomatic tensions and potential conflicts between countries.

2. Climate Change and Its Impacts

Extreme climate variability

The Niger River Basin is a region that is highly vulnerable to climate change. In recent decades, the region has experienced prolonged droughts (especially in the 1970s to 1990s) as well as severe floods that have impacted people's lives and the agricultural sector. This weather uncertainty exacerbates water scarcity and weakens people's resilience to environmental disasters.

Migration and conflict

The impact of climate change is also seen in the migration patterns of populations, especially farmers and ranchers, who move to areas that are considered more fertile or have more water. These moves often create conflicts with local communities in the destination region, both domestically and cross-country. Tensions over land and water access can lead to ethnic conflict and armed violence, adding to regional instability.

3. The Role of Diplomacy and Regional Mechanisms

a. Niger Basin Authority (NBA)

Score: 6 – Significant but still limited impact

Reasons for Scoring:

- The NBA has a fairly complete institutional structure and mandate, including the preparation of a *Sustainable Development Action Plan (SDAP)* and a *Shared Vision Process*.
- The NBA reflects the spirit of intergovernmental cooperation and provides space for technical diplomacy.
- However, its success is still limited due to major obstacles such as lack of funding from member states, weak political commitment, and inability to effectively enforce cross-border regulations.
- Policy implementation is often not in line with formal commitments. High dependence on external donors also reduces institutional independence.

b. African Ministers' Council on Water (AMCOW)

Score: 5 – Relevant, but weak results

Reasons for Scoring:

- AMCOW has a role as a policy and diplomacy framework at the African level for water and climate change issues.
- The organization helps drive policy integration and facilitates cross-border dialogue, including regulatory harmonization.
- However, in the context of the NRB, the role of AMCOW is not very direct or concrete in managing actual conflicts. The impact is more normative and there is not much evidence of direct contribution to conflict resolution on the ground.
- The limitations of visibility and real action make the effectiveness of AMCOW in the context of NRB difficult to overestimate.

South Asia (India Vs Pakistan)

Main Causes of the India–Pakistan Water Dispute

The water dispute between India and Pakistan is rooted in colonial heritage and post-independence geopolitical conditions in 1947. When the division of territory was carried out by the British, the river system and irrigation infrastructure were not well taken into account. The Indus River and its tributaries cross Indian territory into Pakistan, but most of the water control infrastructure such as dams and headworks is in India. As a result, Pakistan has become highly dependent on India as an upper riparian country, especially since both countries are agrarian countries that rely on water for agriculture and energy generation. This dependence is further exacerbated by the construction of water infrastructure projects by India, such as the Wullar Barrage, Baglihar Dam, and Kishanganga Hydroelectric Project. This development is seen by Pakistan as a threat to its right to water, and is considered to have the potential to disrupt the flow of water that should continue to flow to Pakistani territory in accordance with international agreements.

Conflict Resolution Mechanism and Diplomacy Efforts

To prevent the escalation of the conflict, in 1960 the two countries signed the Indus Water Treaty (IWT) which was mediated by the World Bank. In this treaty, India was granted rights to three eastern rivers (Ravi, Sutlej, and Beas), while Pakistan acquired rights to three western rivers (Indus, Jhelum, and Chenab). As part of the oversight mechanism, the Permanent Indus Commission (PIC) was established which functions as a bilateral technical forum for data exchange, field inspections, and conflict resolution discussions.

If the PIC is unable to resolve a dispute, then the agreement provides room for bilateral negotiations at the foreign secretary level, as well as escalation to further mechanisms such as the appointment of neutral experts (as in the Baglihar case), or submission to the International Court of Arbitration (ICA) (as in the Kishanganga case). In certain situations, support from the United Nations can also be involved as a form of preventive diplomacy.

Water Conflict Case Study

Several cases have been a major concern in this water conflict. The Wullar Barrage built by India on the Jhelum River was protested by Pakistan for having a water storage capacity that exceeded the limits allowed in the IWT, and so far there has been no final completion. The Baglihar Dam on the Chenab River has also drawn protests because its design is considered to allow India to control the flow of water to Pakistan.

This dispute was eventually resolved by neutral expert Raymond Lafitte, who recommended a design change. The Kishanganga Project is a power plant project that diverts water flow to another location, which was disputed by Pakistan until it was finally resolved by the ICA, which decided that the project could proceed as long as India maintained a minimum flow of 9 cumecs to Pakistan.

Problems in the Implementation of the Indus Water Treaty

Although it has helped avoid open conflicts, the implementation of IWT cannot be separated from criticism. One of its weaknesses is the lack of consideration of climate change and population growth, as well as the legal loopholes that allow India to carry out infrastructure development unilaterally. In addition, India has often been accused of politicizing water flows to show regional dominance, such as by releasing excess water during conflict or withholding flows during the growing season. Criticism of IWT has also come from both sides; Pakistan feels that the content of the agreement is unfair, while India considers the agreement to be too restrictive as an upstream country.

The Impact of Diplomacy Efforts

Despite many conflicts and tensions, the Indus Water Treaty proved successful in preventing major water-related wars for more than six decades. This agreement became a global model of water diplomacy and an example of constructive cross-border conflict resolution. Conflicts have not been completely eliminated, but they have been managed effectively through strong technical and institutional diplomacy.

Recommendations

In the future, revisions to IWT are urgently needed to be more responsive to new challenges such as climate change, population growth, and modern water needs. Pakistan needs to strengthen its infrastructure to reduce its dependence on India. On the other hand, scientific and engineering-based diplomacy needs to be improved. It is also important to develop trilateral cooperation between India, Pakistan and Afghanistan, given that the Indus river region also includes the region that crosses the three countries.

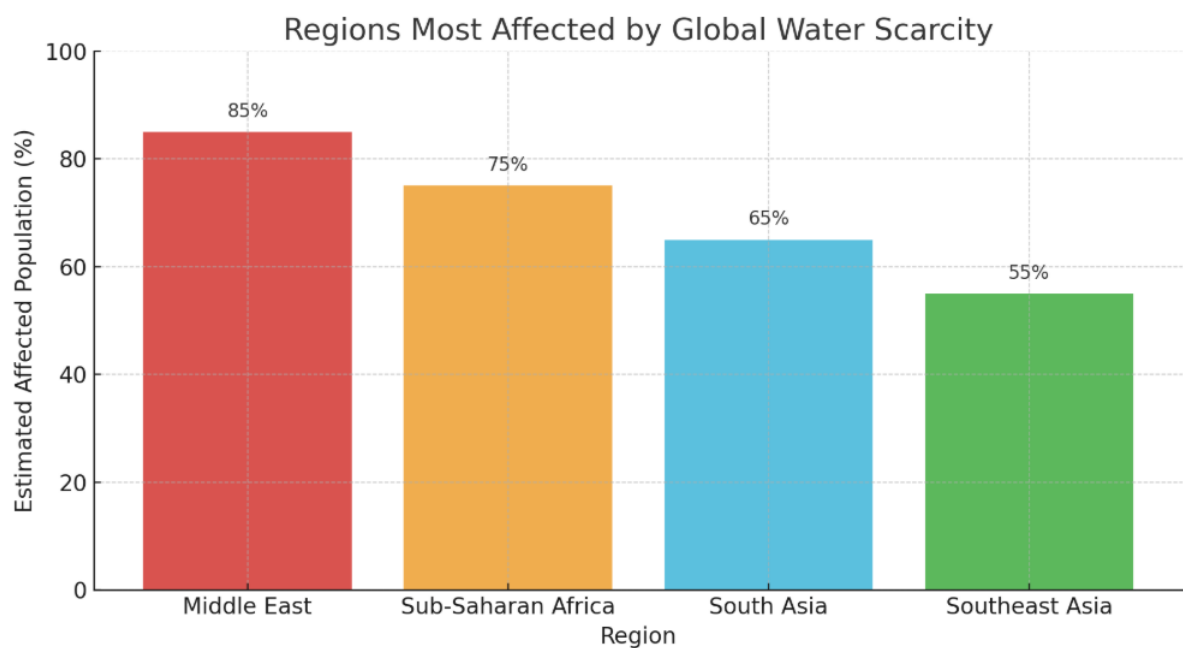
Southeast Asia (China Vs Mekong Countries)

Conflict Issues and Impacts: China's construction of dams along the Mekong River disrupts the natural flow of rivers that are an important source of water, food, and energy for countries in the region. This leads to inequality and poverty, as many communities that depend on fishery and agricultural products are directly affected. The construction of dams also causes a decrease in the number of fish that is important as a food source, and disrupts agricultural production, especially rice, which has an impact on food security.

ASEAN Diplomacy and the Role: Although ASEAN has the potential to address this issue, its role is perceived as ineffective. ASEAN faces major challenges in responding to this crisis due to the economic dependence of some of its member countries on China. Countries such as Laos and Cambodia, which receive a lot of investment from China, are less likely to push for this issue to be on the agenda with ASEAN, fearing that their economic ties with China will be disrupted. In addition, the ASEAN consensus principle that prioritizes mutual agreement is also a major obstacle in resolving this conflict, due to the difficulty in reaching agreements between members.

The Role of Lancang-Mekong Cooperation (LMC): China is trying to take the lead through the framework of the Lancang-Mekong Cooperation (LMC), which aims to improve economic relations and water resource management in the region. However, the LMC is also seen as a tool to increase China's influence in the region, which could worsen

the economic dependence of the Mekong countries on China. This is referred to as "debt trap diplomacy", where these countries are trapped in huge debts that give China greater political and economic influence.



Regions such as the Middle East, Sub-Saharan Africa, South Asia, and Southeast Asia are the most vulnerable regions to the clean water crisis. The graph shows the estimated percentage of the affected population in each region:

1. Middle East (85%)

- The dry natural climate, the heavy dependence on shared water sources (such as the Tigris and Jordan Rivers), and the high population growth make this region severely affected.
- Water diplomacy in the region is quite active, especially through multilateral cooperation, but it remains vulnerable to geopolitical conflicts.

2. Sub-Saharan Africa (75%)

- Limited water infrastructure, climate change, and weak water management institutions have led to chronic water crises.
- Several water diplomacy initiatives have emerged, such as the management of the Nile, but they are still constrained by political instability.

3. South Asia (65%)

- High population pressures and dependence on transnational rivers (such as the Indus and Ganges) make the region vulnerable to disputes and water shortages.
- Bilateral agreements such as the Indus Water Treaty between India and Pakistan are a clear example of water diplomacy.

4. Southeast Asia (55%)

- Water resources are relatively more available, but the exploitation and construction of major infrastructure (such as dams in Laos and China on the Mekong River) have sparked fears of loss of access for downstream countries.

- The Mekong River Commission is a form of regional water diplomacy, although it is still not fully effective.

The Middle East, Africa, and South Asia regions are regions that are particularly vulnerable to clean water crises. This vulnerability is caused by a combination of interrelated environmental, economic, and social factors. Limited water resources, rapid urbanization, and the impact of climate change further exacerbate this condition. Several studies that discuss the same explain that the water crisis in this region is caused by various main factors that worsen water security, including: Severe water scarcity is a fundamental problem in many regions of the Middle East, Sub-Saharan Africa, and Central Asia. In addition, economic constraints have further exacerbated this condition, causing around 40.7 million people to experience difficulties in accessing clean water (Oki & Quioco, 2020). Rapid urbanization in South Asia and Sub-Saharan Africa is also putting great pressure on already limited water infrastructure. Major cities in the region often face uneven water distribution crises, making it difficult for people to meet their basic needs (Kookana et al., 2020).

The impact of climate change has also exacerbated the situation, with rising global temperatures leading to reduced water availability and increased evapotranspiration rates in the Middle East and North Africa region (Ajjur & Al-Ghamdi, 2021; Mfarrej, 2025). In addition, water pollution is a serious threat, especially in the Middle East and North Africa, where pharmaceutical products and microplastics are often found in water bodies, increasing health and environmental risks (Ouda et al., 2021).

Another study states that the clean water crisis has a wide impact on social and economic stability in the affected areas. Political and economic instability often arises as a result of water insecurity exacerbated by climate change. Water scarcity can exacerbate social tensions, increase the risk of conflict, and hinder economic growth in the region (Daoudy et al., 2022; Mfarrej, 2025). In addition, a lack of investment in water, sanitation, and hygiene systems exacerbates public health conditions and increases poverty rates. Without adequate access to clean water, communities face greater risk of disease and unsuitable living conditions (Iyer, 2023).

CONCLUSIONS

Cross-border water conflicts in various regions of the world, including the Middle East (Egypt vs Ethiopia), Sub-Saharan Africa (Niger River Basin), South Asia (India vs Pakistan), and Southeast Asia (China vs Mekong countries), show that the scarcity of clean water is not only an environmental issue, but also a strategic issue that has a direct impact on regional political, economic, and security stability. In the Middle East, the GERD dispute between Egypt, Ethiopia, and Sudan reflects complex tensions due to differing geopolitical interests, historical narratives, and perceived threats to national water security. Although various forms of diplomacy have been carried out (tripartite negotiations, US mediation, Arab League intervention, and the African Union), there has been no concrete solution that is legally binding. A collaborative approach and the establishment of a new treaty framework are the most promising key recommendations.

In the Sub-Saharan African region, the water crisis in the Niger River Basin is exacerbated by climate change, environmental degradation, and the unequal distribution of water resources. Although regional organizations such as the Niger Basin Authority (NBA) and AMCOW have been established to facilitate cooperation, their effectiveness is still limited due to a lack of funding and weak political commitment from member states. In South Asia, the water conflict between India and Pakistan has been managed

through the Indus Water Treaty (IWT) since 1960, which is an example of the success of international technical and institutional diplomacy. However, the agreement faces new challenges from unilateral infrastructure development, climate change, and geopolitical dynamics. The revision of the IWT and the enhancement of trilateral cooperation (involving Afghanistan) are key to the sustainability of water peace in the region.

Meanwhile, in Southeast Asia, China's construction of dams in the upper Mekong River has resulted in ecological and social imbalances for downstream countries. ASEAN's weak role in responding to this issue shows the limitations of regional diplomacy due to economic dependence and the principle of non-intervention. Initiatives such as the Lancang-Mekong Cooperation (LMC) are seen as more of a Chinese geopolitical strategy than a just solution to the water issue. Overall, the resolution of transboundary water conflicts requires a multilevel approach that includes technical cooperation, inclusive diplomacy, and the strengthening of neutral and empowered regional institutions. A coercive or unilateral approach risks exacerbating conflicts. Sustainable settlement efforts must be based on the principles of justice, data transparency, and water resource management that is oriented towards sustainability and common interests..

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