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Settlement of International Groundwater Disputes

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Abstract

As a source of humanity's existence and development in its broadest meaning, groundwater is regarded as one of the most significant freshwater supplies, particularly during climate changes that have a detrimental impact on surface water, which is rapidly running out. However, dangers on Earth threaten the sustainability of this essential resource, partly because it is challenging to manage groundwater that crosses national borders, especially considering how difficult it is to regulate and control its movement. This study discusses the international conflict over shared waters and the consequence of underground water as a natural resource shared by many countries regarding the nature of the dispute and strategies for achieving a peaceful resolution. The study follows the inductive approach; It enables the identification of the regulations that apply to international water issues and methods for understanding, evaluating, and interpreting them in a way that supports international peace and collaboration. The fundamental conclusion of the research was that to address the previous reality of groundwater, authorities in those nations, particularly those whose geographic locations are defined by dry or semi-arid climatic characteristics, like the Arabian Gulf region, must endeavor to achieve a balance of groundwater resources; this is because groundwater is seen as an essential component of many development sectors, including agriculture, industry, and energy, necessitating efforts to reconcile the demands of these sectors with the groundwater reserve.

Keywords: *Transboundary Groundwater, Aquifers, Equitable Use*

INTRODUCTION

The distribution of water on Earth is known to vary scientifically and practically. The Earth's increasing temperature directly impacts the amount of water present in specific regions and its scarcity in others; this has resulted in a subsequent and urgent rise in demand for water due to the planet's rapidly expanding population and its essential requirements.

Groundwater is regarded as an essential source of water in some parts of the world as surface water is being depleted, as it is renewable and not subject to depletion since it is often believed that groundwater reserves may be accessed and exploited without supervision or accountability which is considered to be wrong since there is groundwater that is shared by more than one country, which means that it is not under the authority of one country alone, as these countries share it according to some legal rules that can be agreed upon. The uncontrolled use processes led to an increase and widening of the water issue between neighboring countries with shared groundwater reservoirs; the excessive use, especially when the underground water is temporal, negatively affected the rest of the countries that share those groundwater layers.

The Significance of the Study

Studies concerning the trans borders groundwater system continue to raise alarms, as in the research on settling those disputes that may arise between those countries by resorting to Non-Aggravated Peaceful Settlement. International arbitration can be employed when the settlement of those issues cannot be achieved by other means; this leads us to ask if the capability of the trans-borders groundwater legal system to resolve future disputes or conflicts that may emerge between countries that share aquifers or groundwater if one of the parties extensively uses groundwater or the execution of an activity that could have an impact on the shared aquifers or groundwater.

The Study Issue

This study discusses the international conflict over shared waters and the consequences resulting from underground water as a natural resource shared by many countries. It examines the nature of the dispute and

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strategies for achieving a peaceful resolution of conflicts that arise between nations that share groundwater networks or reservoirs that cross international borders; this is in addition to the reality that most legal studies in the field of shared groundwater have managed the issues of legal regulation of the rules of using, sharing, and acquiring historical rights without focusing on the aspect of international disputes that have been initiated at present or in the future between those regions or countries that share reservoirs or cross-border groundwater.

Aims Of the Study

This paper addresses the dispute arising from underground water that crosses the borders of many countries and offers solutions by emphasizing: The 1997 Framework Agreement on the Law regarding the Use of International Watercourses for Non-Navigational Purposes, which became active in 2014, in addition to the transboundary aquifer draft law included with UN General Assembly Resolution No. 124/63 on December 11, 2008.in addition to the transboundary groundwater draft law included with UN General Assembly Resolution No. 124/63 on December 11, 2008.

highlighting the judiciary's role in settling conflicts involving international watercourses, such as groundwater that flows over state orders.

evaluating traditional and innovative regional mechanisms through international practices for the peaceful settlement of water disputes.

Encouraging and motivating countries that share water under their borders to work together to protect the shared aquifers and to cooperate among them about those aquifers.

METHODOLOGY

The study follows the inductive approach. It enables the identification of the regulations that apply to international water issues and methods for understanding, evaluating, and interpreting them in a way that supports international peace and collaboration, as well as the historical and descriptive research methods to investigate historical facts that the research derives from the past to handle Conflict over groundwater. Then, the study adopts objective analytical research methods; it addresses the objective and scientific examination of the legal issues brought up by the existence of underground water shared by many nations. When achieving equitable and reasonable utilization between countries sharing the aquifers, these factors must be considered.

RESULT AND FINDINGS

First Topic: Groundwater Characteristics, and Its Relationship to Surface Water, and the Impact of International Borders on Transboundary Groundwater

Groundwater Concept and Definition

Groundwater plays a crucial role in the water cycle and is directly related to ecosystems and surface water. It is found everywhere on earth and represents 99% of all fresh water on the planet. Groundwater, which is all the water under the earth's surface and rises to the surface through springs or wells, is the world's population's primary drinking water source (Vapnek et al., 2009).

In addition to moving continuously, vertically and horizontally, groundwater varies from water traveling above the earth's surface in that it travels from high to low pressure. Furthermore, groundwater moves at a variable rate depending on the location, whereas movement above the ground moves considerably more quickly. One of the most significant sources of groundwater is precipitation, specifically snow, and rain, which melt as they fall and reach the earth (Ali, 1995). Since groundwater naturally crosses political boundaries without human intervention and may extend across international borders, its significance as a vital source and its connection to surface water becomes evident, which causes its applications to cross borders and interact with interests (Haider, 2008).

Because groundwater was formerly part of rainwater or river water that resulted from icebergs melting and leaking into the ground, producing aquifers, it is known as the water that exists below the surface of the earth and occupies all or a part of the gaps in the rock formations.

In order to clear up any ambiguity around the phrase "groundwater," we refer to the second article of the draft related to the Transboundary Aquifers Law released by General Assembly Resolution No. 124/63: What is meant by the terms "transboundary aquifer or transboundary aquifer network" is an aquifer or a groundwater network whose parts are located in different countries (UN., 2009)

Thus, an aquifer that is entirely located inside a country's borders may be regarded as international and, as a result, falls under the authority of the Non-Navigational Uses of International Watercourses Convention (1997). As long as it meets the additional requirements the agreement sets, it can be connected to a portion of the surface waters crossed by international borders.

Groundwater Features

Even though the flow of groundwater is slow compared to surface water, it is constantly moving. The distance it moves may not exceed a few units of one-thousandth of a centimeter in the soil through fine-grained rocks, but it may reach several thousand meters in fractured geological formations (Mansour, 1996).

The existence of groundwater, which requires evidence, is rare in regions with little to no surface water; it is generally connected to the presence of lakes and rivers. Legislators and jurists frequently overlooked the correlation between groundwater and the hydrological cycle. It was as though groundwater was unrelated to and independent from the rest of the hydrological cycle when it came to discussion. Due to their mobility and connection to surface water, groundwater has two characteristics. Any actions one country takes regarding its groundwater—such as pumping—may impact groundwater or surface water in another country, and vice versa.

The Link between Surface Water and Groundwater

Among the most significant water sources are transboundary surface water and groundwater, and they are linked to each other according to an uninterrupted movement, that is, undisturbed, despite their following different paths and methods. In addition, many international agreements have addressed the hydrological relationship between surface water and groundwater, which then created a legal relationship as follows:

The Hydrological Connection Between Groundwater and Surface Water

The interrelation between surface water and groundwater is more variable and less predictable than the relationship between surface water types, i.e., upstream, and downstream water. Even though groundwater pollution from groundwater leaking into surface water or the depletion of surface water flow resulting from groundwater exploitation is less clear, it is no less important than the interactions of water from another surface (UNECE, 2014).

Some international treaties, especially between European countries, specify the possibility of groundwater affecting surface water; for example, the first article of the agreement concluded between Switzerland, Austria, and Hungary on December 30, 1982, about the regulation of the Rhine River, and also the first article of the French-Swiss agreement on April 26, 1962, to protect Lake Geneva from pollution (Assem, 2013); this clearly shows that the mutual relationship between surface water and groundwater must be considered because they comprise a single hydrological unit within the basin. Therefore, modifying the watercourse would impact groundwater supplies that may be affected by this modification. Because the conditions under which groundwater occurs vary significantly from one location to another, the reciprocal link between surface water and groundwater must be considered.

The Nature of The Legal Relationship Between Surface Water and Groundwater

There is a legal relationship between groundwater and surface water confirmed by what was stated in the Greek-Yugoslav Declaration on September 1, 1957, regarding the Doiran Lake; the connection between the two types of water, as the commitment of both parties aims for hydrological studies to monitor groundwater levels and compare them to surface water.

Some UN meetings acknowledged that to achieve optimal utilization, efforts must consider groundwater resources and their interactions with surface water. In the same state of affairs, the regional meeting of

international river organizations, which was held in Dakar in 1981, recognized that awareness at the official levels of the interaction of the underground environment with the surface has only expanded. One of the conclusions drawn from this conference is that cooperating nations that still need to incorporate groundwater into their shared water resources must acknowledge groundwater's role in the hydrological cycle and its essential relationship to the amount and quality of shared surface water (Muhammad, 2012).

The association between groundwater and surface water presents extremely complex legal problems. Surface water can be traced as it crosses borders, unlike groundwater, which is in the ground and difficult to trace. In addition, the state can impose its sovereignty over surface waters, but it cannot impose its domination over a subterranean reserve because boundaries are not defined. Since the amount, depth, and quality of the water in this underground resource are unknown, it could cover many nations.

It is, therefore, challenging to determine the path of groundwater due to the numerous steps that must be taken by the state or participating countries to determine the amount, composition, and suitability of the water present in the ground and the research necessary to determine its quality, quantity, and suitability for use.

Legal Issues Regarding the Exploitation of International Groundwater

Every nation has the right to use groundwater as long as it remains within its borders and is considered a natural resource. However, where groundwater is present and crosses national borders, excessive groundwater consumption by one nation at the cost of another nation may negatively affect the other nation's groundwater level (Issam, 2001).

Modifying the aquifer's water sources may also harm the water in it. For instance, altering the river's recharge flow artificially may impact the aquifer, and altering the natural terrain—for example, changing the river's course or volume—may result in the depletion of the groundwater aquifer. The Great Libyan River was a massive project in 1980 to transport groundwater to agricultural areas and densely populated cities in northern Libya for 35 billion dollars.

It should be noted that when countries demarcated international borders, they did not consider groundwater. Therefore, the international border line that was demarcated may lead to the division of groundwater content; this is because countries did not take into account the existence of disputes over groundwater, perhaps because these countries were not aware of the presence of this essential natural resource they share (Barberis,1991).

Redrawing the Borders of Countries that Take Advantage Shared Groundwater

Since groundwater makes up 31% of all freshwaters on Earth, it is a valuable resource. Groundwater in Lake Geneva and Geneva provides drinking water to nearly 700,000 people, mostly residents and neighbors of the French region (Groundwater shared by the municipality of Geneva, Switzerland). Because of the growing land development and population expansion, it is impossible to undervalue the importance of groundwater since groundwater aquifers are regarded as an ideal supply of water in many ways. Groundwater may flow over boundaries between two or more countries due to the rising water demand. As such, it is governed by the authority of the state in which the water portion is located (Matsumoto, 2002); this was mentioned in the third article of the Transboundary Aquifer Law of 2008 at the 68 sessions of the UN General Assembly (UNGA), where it stated: "Every aquifer state maintains its sovereignty under international law over the portion of its aquifer or the transboundary aquifers that lies within its territory" (UN, 1999).

Redrawing the borders of those countries using groundwater may affect the groundwater basins shared with other countries, causing disputes between them. Also, some countries that share groundwater aquifers need the approval of neighboring countries to redraw their borders, which may affect the groundwater aquifers. An example of this is the agreement concluded between France and Britain on January 10, 1924, relating to the border between French Equatorial Africa and Anglo-Egyptian Sudan, which stipulated granting France the right to obtain water from wells located in the Sudanese region.

Second Topic: The International Interest in Groundwater and the Legal Rules Regulating its Usage

Even though groundwater is one of the most important sources of fresh water, countries' interest in it differs because there was so limited surface water, and countries started to learn about it. It is the same as surface water, the drought in some areas of the world, and the increase in population. Groundwater resources have significantly impacted any state's economic, social, and frequently political activities, and this is still the case, particularly if these critical resources have limited supplies. All these factors urged the international community to pay attention to groundwater as a natural and vital resource (Golovina et al., 2021).

International Agreements Regulating Groundwater

In the absence of an international agreement regulating their conservation and usage, shared water resources continue to be the most crucial issue (Salman, 2007). The following are the international agreements and regulations that address groundwater:

The International Law Association (ILA) in Helsinki, Finland, issued the Helsinki Rules on the Usage of the Waters of International Rivers in August 1966 (AOAD, 2000). These guidelines regulate the use of rivers and the groundwaters they connect to that exceed national boundaries (Nabil, 1993). The ILA has created comprehensive guidelines to manage, employ, and safeguard international watercourses (Yoram, 2003).

Seoul Rules (1986). It is one of the few international documents that address international cross-border groundwater. Article 1 of those rules defines international aquifers as (those groundwaters that intersect the borders between two or more countries are international waters, and the aquifer with its waters is an international basin or Part of it). Whether or not the aquifer and its waters are included in the surface water from a hydraulic system that flows to a common point, these countries are basin countries in the sense of the Helsinki rules. Regarding hydraulic interconnection, the Seoul Rules addressed the relationship between surface water and groundwater; this was mentioned in the first paragraph of the second article of those rules, which examined the idea that aquifers located in or contributing to the surface waters of an international basin are deemed a part of that basin (Robert & Albert, 1991).

The Bellagio Draft Treaty 1989: Around the world, from North Africa to North Europe and from Asia to the North, there is a continually rising tension on groundwater supplies due to rapid population increase, industrialization, and agricultural development. Groundwater has also become increasingly and crucially important in South America. Furthermore, this utilisation is growing due to the majority of them lacking institutional and legal frameworks and the fragility of the few institutions that do exist and handle international aquifers. To address this requirement, an international groundwater agreement draft is required (Albert & Robert, 1989). There are twenty articles in the Bellagio project. The introduction highlights the need to maintain and preserve transboundary groundwater for extended periods while using it reasonably and rationally (Stefano & Kerstin, 2005).

The Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention) Helsinki, 17 March 1992: Is a unique legal and intergovernmental platform that promotes the sustainable use of transboundary waters. This agreement improves the steps taken to handle surface water and groundwater and peacefully safeguard them while enhancing cooperation in transboundary water. By embracing the river basin method, which organizes water resource management at the basin level, the agreement also seeks to promote integrated management plans for water resources (Charles, 1996). It is considered a living document, as it establishes a secretariat under Article 19 of the same agreement, in addition to Article 17, which stipulates holding regular meetings of the parties. As stated in the first paragraph, Article 22 of that agreement, "If a dispute arises between two or more parties regarding the interpretation or application of the agreement, they must search for a solution through negotiation or any other means acceptable to settle disputes." Concerning the dispute that cannot be resolved according to the first paragraph, the second paragraph provides a formula for participation in or compulsory arbitration (Traversi, 2010).

Convention on the Law of the Non-Navigational Uses of International Watercourses: The UN Watercourses Convention is an international treaty that the UN adopted on May 21, 1997. This agreement

is based on two basic principles: fair and reasonable use and "Obligation not to cause significant harm." Article 5 of the agreement stipulates that "all states must use the water source in a sustainable, just, and reasonable manner, especially concerning states that share the water source."

The law of transboundary aquifers 2008: United Nations General Assembly Resolution No. (124063), approved on December 11, 2008, relating to the draft law on transboundary aquifers (UN, 2008). which defined transboundary groundwater as geological formations containing water in the form of an aquifer or aquifer networks, parts of which are located in different countries, as stated in Article Two of that draft attached to General Assembly Resolution No. (118/68) of 2013. The international group was concerned with the need for cooperation and communication to implement a strategy that would increase interest in learning about the characteristics of transboundary aquifers and prevent anything that could harm them, like pollution or unjust withdrawal from them. It also attempted to ensure that these international efforts would avoid future concerns between the countries that share these aquifers.

Table (1): The International Agreements Regulating Groundwater

International Agreements Regulating Groundwater	**The Date**	**Basic Principles**
1-The International Law Association (ILA) in Helsinki, Finland	1966	Regulate the usage of rivers and the groundwaters they connect to that exceed national boundaries.
2-Seoul Rules	1986	Examined surface-groundwater interactions. The first paragraph of the second article of those rules evaluated the idea that aquifers in or contributing to the surface waters of an international basin constitute part of that basin.
3-The Bellagio Draft Treaty	1989	The introduction highlights the need to maintain and preserve transboundary groundwater for extended periods while using it reasonably and rationally.
4- The Convention on the Protection and Use of Transboundary Watercourses and International Lakes, (Water Convention) Helsinki.	1992	Enhances transboundary water cooperation and peacefully protects surface and groundwater. Any dispute between parties must be resolved by negotiation or other acceptable procedures.
5- Convention on the Law of the Non-Navigational Uses of International Watercourses.	1997	Obligation not to cause significant harm, and "all states must use the water source sustainably and reasonably, especially concerning states that share the water source."
6- Transboundary Aquifers Law	2008	Concerned about the need for cooperation and communication to increase transboundary aquifer interest and prevent pollution or illegal withdrawal. International actions were also meant to avoid disputes.

Legal Principles Regulating the Use of Transboundary Groundwater

The law on transboundary aquifers depends on some basic principles; the following are among these principles that regulate the use of transboundary groundwater:

The first Principle: The Principle of Equitable and Reasonable Use Between Countries Sharing Transboundary Groundwater

The basic rule governing the use of shared natural resources is that use must be fair, reasonable, and under public international law (Barberis,1991). Fair and equitable use is the term used to describe this concept, which is currently widely accepted. There are two main things to remember when using international groundwater

aquifers relatively and acceptably. Another recommendation is that countries divide the benefits that come from or are derived from this water in the limbic aquifers Traversi, C. (2010).

Due to the rising demand for groundwater in recent decades, several aquifers from countries that share them have undergone excessive depletion, which has had negative repercussions (Al-Hussein, 2013). As a result, nations that share aquifers must consider and acknowledge the need to manage and organize their groundwater uses by their unique demands; this involves using the groundwater aquifer reasonably to maintain that resource (Barberis,1991); this was confirmed by the Convention on the Law of the Non-Navigational Uses of International Watercourses in Article five, which covered the guidelines for fair and sensible use. The elements listed in Article Six are essential to achieving an equitable and reasonable use of the use of an international watercourse. According to the Convention on the Law of the Non-navigational Uses of International Watercourses (1997), To use an international watercourse fairly and reasonably, as defined by Article 5, it is necessary to consider all relevant features and factors, including the following:

Natural features such as geographic, hydrographic, hydrological, ecological, and others.

The social and economic needs of the watercourse countries.

The population that depends on the watercourse.

The impact of a watercourse's use on the other country.

Existing and potential uses of the watercourse.

Conserving, defending, and enhancing the watercourse's water supplies while minimizing the expenses associated with doing so.

The presence of comparable alternatives for a specific intended or current purpose.

The Second Principle: The Principle of Not Seriously Endangering Transboundary Groundwater

The duty under standard international law is to avoid causing physical harm to groundwater that flows across borders; this is regarded as a general restriction because any harm one state may cause to another may impact the amount or quality of water or the geological structure of the water. There could also be negative impacts on the groundwater aquifer levels, such as using more than the natural rates or altering its sources of supply (Barberis, 1991).

Article Seven, the first paragraph of the same agreement, referred to the obligation not to cause significant harm, as stated in the first paragraph; "Watercourse countries shall take all reasonable precautions to prevent causing serious harm to other countries while using an international watercourse on their territory." In the second paragraph, this article indicated that when significant harm occurs to another country, the country who caused this harm shall take all appropriate measures in the absence of agreement on this use regarding the provisions of Articles 6.5 and consultation with the affected part to eliminate or reduce this damage and to discuss, as appropriate, the issue of compensation (Stefano & Kerstin, 2005).

The Third Principle: Commitment to Collaboration, Information Sharing, Consultation, and Negotiation When Using Transboundary Groundwater

International collaboration is crucial as it aims to lessen potential tensions between countries that share water sources. Furthermore, cooperation amongst these countries aims to maximize benefits by utilizing shared water resources, whether surface groundwater or cross-border water sources. It should be noted that Article Seven of the 2008 draft law on transboundary aquifers addressed the idea of nations taking part in transboundary aquifers agreeing to cooperate. Additionally, the requirement to exchange data and information about transboundary aquifers was incorporated in Article Eight of the proposed law on aquifers (UNGA, 2009).

This draft law's item on transboundary aquifers makes abundantly evident how crucial regular data and information exchange is as a first step towards aquifer countries cooperating. The draft article requires aquifer states to consider all pertinent factors and circumstances when implementing the equitable and reasonable

utilization obligation outlined in Draft Article Four. To that end, aquifer states need data and information regarding the state of the aquifer (UNGA, 2009).

Third Topic: Reasons for the International Conflict Over Shared Groundwater and Means for Resolving the Conflict Peacefully

Countries sharing cross-border aquifers may contribute to disputes arising from disagreements over legal matters or other issues that may conflict with these nations' interests. Since these disputes involve international parties, there is no other option for resolution except through available international mechanisms. However, according to global statistics, there are 273 cross-border groundwater sharing, suggesting disagreements or conflicts over shared groundwater wells between cross-border nations may occur in the future (Al-Qutbi, 2017).

Conflicts Over Shared Groundwater Resources and International Water Disputes

The world's freshwater supplies are under tremendous strain due to their ever-increasing demand. As a result, there is now increased competition between nations over freshwater resources, such as lakes, rivers, and groundwater wells. Especially with the increase in industries that rely primarily on water, as well as meeting the needs of countries for hydroelectric energy, in addition to food production, for which water is an essential element in this production, as well as agricultural activity, in light of the increase in the population and the high demand for fresh water.

As a result, the multiple uses of international watercourses, including transboundary groundwater wells, often compete, as one use may dominate another, which leads to disputes between those countries that share these transboundary groundwater wells. Therefore, disputes related to shared international watercourses can be divided into the following:

International Disputes Over the Amount of Water

Water shortage is one of the most important factors that affect the amounts of water shared between countries, which may create a kind of tension and conflict between countries that share borders over water resources. World Bank reports on the global water crisis that there are one billion people in developing countries suffering from a lack of clean drinking water. The current century will witness a necessary exacerbation problem of water, indicating that Just 35 percent of people on Earth will have access to enough water by 2025.

International Disputes Over Water Quality

International water pollution, including shared groundwater wells between multiple nations, is a significant environmental challenge the world community takes seriously. The responsibility to safeguard shared freshwater is one of the most significant duties imposed on nations sharing a watercourse because they share the same water supply, and it is noteworthy that numerous regulations have been passed to protect it (Haifa, 2013). Water pollutants also have many forms, such as pollutants resulting from industrial activities, such as toxic chemical waste and excess fertilizers that contain compounds such as phosphorus and nitrogen, which lead to pollution in the water and make it non-potable. In addition to the leakage of salt water into the groundwater layers, drilling groundwater wells near coastal areas contaminates those aquifers with salty water, making the water unsuitable for human consumption (David, 2005).

Protecting Aquifers During Armed Conflict

Water shortages have been shown to harm international peace and security. These effects can include direct conflicts between nations over water, using water weapons as intimidation, and indirect consequences. The protection of transboundary aquifers, networks, layers, facilities, and other related works shall enjoy the protection provided by the principles of international law applicable in international armed or unarmed conflicts. It may not be used in a way that violates these principles and rules, according to draft Article 18 of the Transboundary Aquifers Law of 2008 (Danilo, 2016).

Peaceful Settlement of Transboundary Groundwater Disputes

Conflicts over the uses of shared groundwater or cross-border aquifers frequently arise between the sharing nations. In order to determine which diplomatic channels are best suited for settling international conflicts involving transboundary groundwater, this section of the study examines several diplomatic channels. Next, talks about the mechanisms that can be used to settle disputes between nations that share water resources:

Diplomatic Channels

Negotiation: According to the United Nations Charter, one of the most crucial tools for resolving international conflicts is negotiation. Negotiations have therefore been included as a method of resolving international issues diplomatically, as stated in Article 33 of its first paragraph, which states: "The parties to any dispute, the continuance of which is likely to endanger the maintenance of international peace and security, shall, first of all, seek a solution by negotiation, inquiry, mediation, conciliation, arbitration, judicial settlement, resort to regional agencies or arrangements, or other peaceful means of their own choice" (UN, 1945).

Good Offices: Although there are few examples and supporting data regarding the actual application in disputes involving groundwater layers or networks, the value of good offices becomes apparent as a means of resolving disputes when the two disputing countries have reached the point of cutting diplomatic ties and a third party intervenes between them with the consent of the disputing parties. Nonetheless, the value of good offices in settling these conflicts cannot be understated, mainly when a significant development could result in a crisis between the conflicting nations (Abu Heif, 1990).

Mediation Efforts: One of the earliest political dispute-resolution processes is mediation. It was linked to labor negotiations, and then its scope expanded to include multiple and diverse fields. *Mediation* is an amicable activity undertaken by a country or an international organization to resolve a dispute between two countries (Naji, 2006). However, some crucial points should be considered regarding mediation and our researcher's topic, which is the resolution of cross-border groundwater disputes between nations that share underground water reservoirs. These include the mediator's efforts to resolve the conflict and to bring the parties' points of view closer together. Furthermore, because of the conflict's unique technical structure, which necessitates that the mediator be informed of every facet, he is unaware of the truth and nature of the dispute.

Investigation: An objective committee makes efforts to resolve the current disagreement between the parties involved by gathering information, looking into it, and then submitting reports with recommendations for resolving the international dispute and demonstrating the significance of fact-finding panels in international watercourse issues, such as those involving groundwater and the United Nations Convention on the Law of the Use of Watercourses in Other According to Article 33 of the second paragraph of that agreement, for navigational purposes in 1997, if the dispute has not been resolved after six months from the request for negotiation, the parties may, at the request of one of the parties, resort to investigation committees, given that investigation committees are one of the means (Badr al-Din, 1991).

Reconciling: The United Nations Watercourses Convention of 1997 included a provision for conciliation in Article 33, paragraph 2, regarding the peaceful resolution of international watercourse disputes (UN, 1997). Conversely, conciliation goes beyond investigation because it offers the disputing parties a peaceful resolution that can satisfy their needs. Conciliation is an attempt to settle the dispute that has arisen between them by presenting solutions that are presented to the parties, and they can accept or reject them; as such, it is not binding (Heif, 2015).

Regional Body's Role in Resolving International Water Conflicts: The United Nations Charter has encouraged its members to use regional organizations to resolve conflicts. Because these organizations, such as the former Organization of African Unity, the current African Union, and the League of Arab States, have in-depth knowledge of all parties involved in the conflict and the circumstances surrounding it, they play a crucial role in resolving disputes that may arise between member states (Salah, 2003). It is also worth noting that the League of Arab States plays a vital role in water protection and Arab water security, and the Ministerial Water Council is developing a strategy to protect Arab waters. The League has also sought to establish a center for technical and legal water studies, and this reflects the critical role played by the University. The Arab countries are among the essential regional international organizations in water for the Arab countries (Hala, 2014).

World Bank's Role in Settling International Water Disputes: The World Bank initially encountered challenges and disagreements about shared waterways, but the Bank remained interested in funding initiatives to exploit and develop international river waters; one of the most significant difficulties that the bank faces is the absence of clear rules regulating non-navigational uses. The World Bank has also developed policies and procedures for exchanging information and consultations between countries that share a particular watercourse and plan to carry out projects on the same watercourse. As a result, these other international financing institutions had no choice but to deal with specific watercourse-related projects by World Bank standards (Salman, 2015).

Table (2): Diplomatic Channels to settle groundwater disputes

Diplomatic Channels	The Description
1- Negotiation	The parties to any dispute, the continuance of which is likely to endanger the maintenance of international peace and security, shall, first, seek a solution by negotiation.
2- Good Offices	When the two disputing countries have reached the point of cutting diplomatic ties, a third party intervenes between them with the consent of the disputing parties.
3- Mediation Efforts	A country or an international organization undertakes an amicable activity to resolve a dispute between two countries.
4- Investigation	The parties may, at the request of one of the parties, resort to investigation committees, given that investigation committees are one of the means.
5- Reconciling	Conciliation is an attempt to settle a dispute that has arisen by presenting solutions that are presented to the parties, who can accept or reject them; as such, it is not binding.
6- Regional Bodies' Role	The United Nations Charter has encouraged its members to use regional organizations as a means of resolving conflicts. they play a crucial role in resolving disputes that may arise between member states.
7- World Bank's Role in Settling International Water Disputes	The World Bank also has standards for exchanging information and consulting countries that share a watercourse and plan to build projects on it. Thus, these other international financial organizations had to handle watercourse projects following World Bank standards.

Settlement Procedures Used to Resolve International Water Disputes

International Justice Court: According to Article 33 of the 1997 United Nations Convention on the Law of the Uses of International Watercourses for Non-Navigational Purposes, if there is a conflict, the parties involved must attempt to resolve it amicably. If, however, diplomatic channels are unsuccessful in resolving the disagreement between two or more parties over the interpretation or application of the agreement, or if no agreement between them can be resolved in this way, the tenth paragraph of that article suggests turning to the International Court of Justice (UN, 1997).

International Arbitration of International Water Disputes: Most international agreements stipulate international arbitration, including many international agreements that deal with the arbitration in detail through the formation of the body, its powers, and procedures. Because of the different locations of international watercourses between the upstream countries, it should be noted that choosing an arbitration mechanism to settle disputes related to international rivers, including transboundary groundwater reservoirs, was not an easy matter; this is evident in the differences that occurred between the countries involved with the United Nations Convention on International Watercourses. Additionally, the interests of the downstream and upstream countries evolved during the discussion of Article 33 of that agreement, with the downstream countries viewing arbitration as a mandatory measure and the upstream countries preferring to use it freely.

CONCLUSION

Due to the limited availability of groundwater resources and their complex relationship to multiple intricate natural factors, such as the hydraulic cycle, it is an uncommon resource whose availability varies with time and

place; this has led to the creation of an uneven reality wherein certain areas have access to this groundwater resource, making them safe, while other areas are left with a shortage.

The international community is paying close attention to groundwater layers or networks because they are a resource that is becoming increasingly important and because of the potential problems they may cause; this is because these water systems do not respect state boundaries. When the layers were being inventoried and surveyed, this interest surfaced. There is transboundary groundwater throughout the world, which is why the census revealed that roughly 270 groundwater basins are shared by two or more nations. These nations must come to bilateral or multilateral agreements to continue sharing these cross-border groundwater basins.

To address the groundwater reality mentioned above, officials in those nations—particularly those whose geographic locations are typified by climatic characteristics that are predominantly dry or semi-arid, like the Arabian Gulf region—must endeavor to attain a balance of peripheral water resources.

Water availability is the only way to accomplish social and economic progress. As a result, when organizations and authorities in charge of the water sector attempt to make decisions about water, particularly groundwater reservoirs shared by two or more nations, they need to be aware that the effects of those decisions are critical. Since water is a source of human existence, its effects extend beyond economic activity to include human safety and survival.

The countries involved in transboundary aquifers must cooperate to exchange transparent data and information about the state of the aquifers they share; this is done to preserve the aquifers and guard them against pollution that could alter their composition. i.e., making groundwater unfit for human consumption.

More than half of the world's population depends on groundwater as a standard water resource, and as a result, there has been conflict over this resource. Each country wants to obtain the most significant amount of this water, which increases the likelihood of future conflicts or disputes over this water.

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