Geopolitics Quarterly, Volume: 18, No 4, Winter 2023 Scopus
PP 71-93

Water Diplomacy Role in Easing Iran-Iraq Hydropolitical Tensions

Morad kavianirad *- Department of Political Geography, Faculty of Geographical Sciences, Kharazmi University, Tehran, Iran.
Hasan Sadrania- Assistant Professor, Research Institute of Strategic Studies, Tehran, Iran.
Sedigheh Nasri Fakhredavood- Assistant Professor, Faculty member of Hakim Sabzevari University, Sabzevar, Iran.
Hussein Hamid- Assistant Professor, Department of Spatial Planning and Applied science, Duhok University, Iraq.

Received: 17/02/2021 Accepted: 07/01/2022

DOI:20.1001.1.17354331.1401.18.68.4.6

Abstract

Environmental sustainability and human settlement are tightly intertwined with water. Therefore, water has had a history-maker function throughout the history of ties between human communities and politico-spatial units. Over the past decades, water consumption has increased in parallel with a reduction in the levels of these strategic resources, thereby orientating the hydro politics-based foreign policy of nations, particularly in low-precipitation regions. In this vein, Iraq's geographical position is such that several seasonal and permanent rivers running in western Iran flow into its western neighbor, providing for water supply security in some eastern regions of that country. Over the past one and a half-decade, drought-stricken Iran has moved to harvest water flowing out across its western borders, which has consequently reduced water inflow into Iraq and stirred up hydropolitical tensions between the two nations. This research aims to identify effective driving forces in transforming hydropolitical tensions to water cooperation between Iran and Iraq. The functional data required for this research has been gathered by the library-survey method (interview and expert forum) to be analyzed with a combined quantitative-qualitative approach and applying structural analysis. The research found that water diplomacy has a strategic role in reducing hydropolitical tensions.

Keywords: Water Crisis, Hydropolitics, Water Diplomacy, Iran, Iraq, Tigris River Basin.

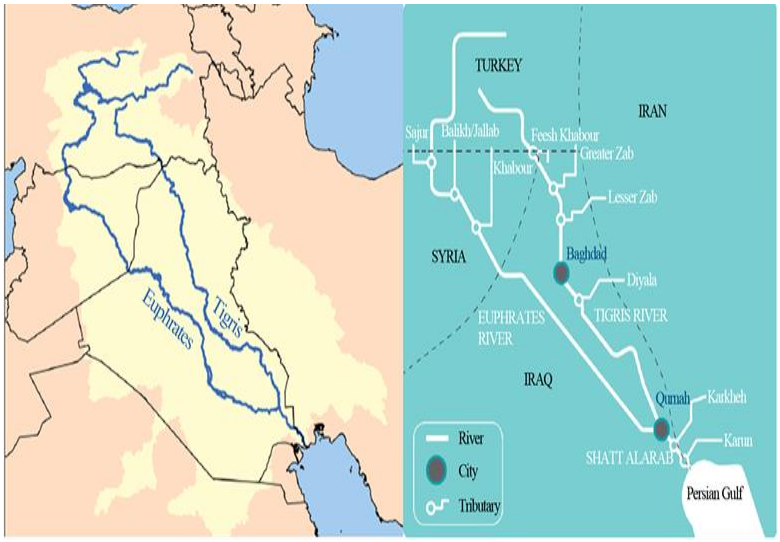
* E-mail : kaviani@khu.ac.ir

1. Introduction

Human activities have increased consumption of limited water resources while, in light of increased global demand for fresh water, contamination of water resources along with climate changes has further restricted fresh water resources. That has degenerated into widespread security consequences in foodstuff and water supply, not to mention social instability and conflict between politico-spatial units. Therefore, in many areas, water-based tensions and skirmishes have been growing between countries. The water basins located in arid and semi-arid areas experience low precipitation due to climate changes and therefore limited access to necessary water resources often creates tensions between them. The Tigris river basin is a case in point (Unruch,2019). Under such circumstances and against such a temporal backdrop, water diplomacy is largely involved in hydropolitical ties. Water diplomacy detects water challenges, identifies points of intervention, and suggests sustainable and just solutions, let alone be sensitive to various viewpoints and uncertainty as well as changing and competitive demands (Janjua and et al,2020). Therefore, water diplomacy sets a framework for reducing conflicts in favor of water-based cooperation.

The geographical position of Iraq in Southwest Asia is such that it mostly comprises desert land. Despite extremely low rainfall, water consumption is increasing due to population growth while at the same time evaporation is on the rise on account of climate variability. It deserves a mention that the bulk of the Euphrates and half of the Tigris water in Iraq originate from neighboring countries. A number of seasonal and permanent rivers in western Iran, which flow into the Tigris basin, are instrumental in water supply security in some western areas of Iraq. Statistics show that Iran's water projects in western basins have reduced the flow of water into Iraq, whose reflection is seen decreased water inflow into Iraq, even water cut during drought periods, and labor protests in Iraq's water sector. That is while global studies indicate cooperation between co-basin states (Julien, 2012:54). Therefore, this research seeks to examine the significance of the water diplomacy driver in transforming hydropolitical tensions into water cooperation and hydropolitical ties between Iran and Iraq.

Fig (1): Euphrates and Tigris water basin



(**Source:** Al-Ansari,2016:6)

2.Methodology

This research has a practical nature. The data has been gathered by a library & survey method (interview and expert forum) and analyzed by a combined quantitative-qualitative approach and structural analysis with MICMAC software. In data gathering, in addition to literature analysis and book documents, semi-structured interviews have been used in the section of expert views while efforts have been made to fully identify variables. Afterward, following views of Iranian and Iraqi professors and researchers, the variables were organized and their comprehensiveness and overlap, as well as their impacts, were discussed in expert forums.

Table (1): Population Specifications in Open-Ended and Semi-Structured Interviews

No.		Iranian		Iraqi	
		Specialty	Scientific Rank/Occupational Grade	Specialty	Scientific Rank/Occupational Grade
1	Number of Faculty Members (11)	Geopolitics (3)	Assistant Professor (1) Associate Professor (2)	Water Resources Management (1)	Assistant Professor (4)
		Water Policymaking (1)	Assistant Professor (1)	Hydrologist (1)	

		Geographical Data Systems (1)	Assistant Professor (1)	Spatial Planning (1)	
		International Relations (2)	Assistant Professor (1)	Soil Protection (1)	
2	Executive Organ Employee (6)	Ministry of Foreign Affairs (2)	Director (1) Border Water Expert (3)	Director (1) Expert (1)	Iraqi Kurdistan Underground Water Resources Department (1) Ministry of Agriculture and Warehousing
		Ministry of Energy (2)			

Table (2): Population Specifications in Delphi Method Questionnaires

No.		Iranian		Iraqi	
		Specialty	Scientific Rank/Occupational Grade	Specialty	Scientific Rank/Occupational Grade
1	Number of Faculty Members (26)	Geopolitics (3)	Assistant Professor (3) Associate Professor (2)	Water Resources Management (3)	Assistant Professor (10) at Baghdad, Erbil and Duhok Universities
		Water Sources Engineering (4) Water Policymaking (3)	Assistant Professor (6) Associate Professor (1)	Hydrologist (2)	
		Geographical Data Systems (1)	Assistant Professor (1)	Spatial Planning (3)	
		International Relations (3)	Assistant Professor (3)	Urban and Regional Planning (2)	
2	Executive Organ Employee (11)	Ministry of Foreign Affairs (2)	Director (1) Border Water Expert (3)	Director (3) Expert (3) Senior Expert (1)	International Association of Iraqi Geologists (1) Underground Waters Department (2) Ministry of Agriculture and Warehousing (2) Water Strategies and Policy Expert (2)
		Ministry of Energy (2)			

3.Theoretical Fundamentals

3-1. Water Crisis

Without fresh water, the viability and sustainability of human settlements are impossible. Although nearly 70% of the Earth's surface is water-covered, fresh water has a meager 2.5% share with the rest going to oceans and lakes (saline water). Natural glaciers, in the form of ice and snow, account for 1.75-2%, underground water, and moist soil make up 0.5-0.75%

while less than 0.01% belongs to lakes, lagoons, rivers, and surface water (www.UNU-INWEH,2017:3). Therefore, fresh water is a limited, irreplaceable, and widely-consumed commodity that is manifested in the human viability, biosphere, security, development, and sustainability of communities as well as politico-spatial units. That explains why water shortage and scarcity would bring about environmental insecurity as well as instability in communities and nations. Fresh water shortage and scarcity have been mainly caused by climate variability, drought, contamination, and overexploitation of water resources. The world population only tripled in the 20th century but using renewable water resources grew 6-fold (www.unwater.org), a challenge transpiring all continents. The 2021 world population is estimated at 7.9 billion (www.worldometers.info), more than 2.3 billion of whom live in regions with water scarcity (www.worldwater.io). Based on UN forecasts, the world population would reach 9.8 billion in 2050 and 11.2 billion in 2100 (www.un.org). Estimates show that developing nations, mainly in Africa and then in Asia, would see the highest rate of demographic growth – two regions set to face clean water scarcity (Boretti and Rosa,2019). The world is set to see its population grow 40-50% over 50 years, which would be ensued by growing industrialization and urbanization and therefore growing demand for water, which would, in turn, leave serious impacts on the environment, water, and food security (www.worldwatercouncil.org). In 2020, nearly 2.1 billion persons in the world did not have access to clean water. In other words, millions of families have no clean water for drinking, cooking, and washing. Statistically speaking, 3.4 million persons die in the world annually from water scarcity and contamination, millions of women and children spend 3-6 hours a day for water gathering from remote and contaminated resources while half of the hospital beds across the globe is a field with patients who have fallen ill due to the lack of access of clean water (www.wholives.org). Meantime, the water crisis is directly linked with accessible clean fresh water shortage. Research shows that climate variability, demographic growth, agriculture expansion, and inefficient management of water resources are to blame for the appearance and expansion of the global water crisis. By 2035, nearly 40% of the world population would be living in areas with serious water stress, where the ecosystems' capacity to supply fresh water would be increasingly threatened. By 2030, there would be a 40% gap between water demand and water supply while this limited source is

expected to support the forecast population of 9.7 billion by 2050. By that time, more than 40% of the world population, i.e. 3.9 billion persons, would be living in river basins under extremely high pressure (www. UNU-INWEH,2017:3). UN reports indicate that climate changes and population growth would be intensifying the water crisis by 2021. Climate variability, in the form of global warming, has changed precipitation levels on the regional and global scale, whose consequence, again the form of warming, is reflected in changes in the precipitation patterns and farming seasons, which has in turn largely affected food security, health, and welfare of humans (https://news.un.org)[1]. By 2050, on average 74-86% of the entire Asian continent would be grappling with serious water shortage, which would affect nearly 40% of Asia's population (www.eco-business.com). Southwest Asia with an annual average precipitation of 166mm is the aridest region in the world (Karami,2019:118). This region accounts for almost five percent of the total land area in the world and hosts 4.4% of its population, but the region's 484 km3 of renewable water only represents 1.1% of the world's total renewable water resources. Overall, water resources per capita in the region are one-sixth of the global average of about 720 m3 per capita per year. Nine out of 15 countries in the region are characterized by absolute water scarcity. This is especially true in the Arabian Peninsula, the most disadvantaged sub-region in the Middle East, which has only one percent of the renewable water resources in the Middle East while comprising 47% of its geography. Kuwait has no internal renewable water resources (www. NSD-S Hub,2019:5). Studies show that most cities in this region would be grappling with serious water stress by 2030 (Maitah,2018:1).

3-2. Hydropolitics

In terms of ontology and nature, geopolitics comprises geography (place, territory, domain, resources) and politics (power, sovereignty, and policymaking). These two components form the very existence of geopolitics which is characterized by geographical phenomena, places, and spaces marked with political features (Hafeznia and Kavianirad,2014:63). The intertwinement of social, political, security and environmental events and variations with water scarcity and the shortage has given them a

1. https://news.un.org/en/story/2021/10/1102162

geopolitical shape. Since the very nature and function of the foregoing variabilities and consequences is characterized geopolitically, hydropolitics is inevitably defined based on solidifying this concept based on the notion of geopolitics. Therefore, "hydropolitics is a branch of geopolitics that studies the intertwinement of power relations with the interactions of communities and politico-spatial units about fresh water resources from the local to global scales". In this definition, power refers to the ability to create favorable conditions to prepare the ground for the survival and welfare of the actor (community or politico-spatial unit). Naturally, in light of the geographical and geopolitical position of politico-spatial units and environmental perception of political leaders and executives, the concept and examples of favorable conditions would be relative. However, there is consensus on the fact that acquiring maximum capital with minimum cost constitutes the logical and strategic aspect of the creation of favorable conditions. Depending on their impression of welfare, security, and development, leaders (executive, representative, or ruler) select one aspect of power relations in the form of coexistence, antagonism, conflict, and war. Findings show that absent water, favorable conditions would basically make no sense for humans, and even with water scarcity, such conditions would not survive. Therefore, all leaders make efforts to provide sustainable water resources permanently. In the light of increased consumption of water and growing demand for it, post-WWII history indicates numerous examples ranging from cooperation to confrontation on access to fresh water resources. An analysis of hydropolitical relations between extraterritorial actors indicates that contrary to the predictions of the last decades of the 20th century that the 21sth century would be the century of the water war, the dominant approach is hydropolitical relations. A review of water-based interactions in the past couple of decades shows that the dominant approach on hydropolitical relations has been cooperation between co-basin states, wherein approaches enshrined in international law on the water have been widely cited. The dominance of the hydropolitical approach indicates that national leaders in many areas have, in their efforts to find solutions to water challenges, have distanced themselves away from the costly antagonistic traditional geopolitics to embrace cooperation, diplomacy, and legal approaches. Fundamental water-based challenges are highly symbolic in the regions where leaders and executives are still following traditional geopolitics in form of antagonism, environmental

determinism, eliminatory approach, software approach and emphasis on weaponry and combat readiness, hydrohegemony and realistic policies in power acquisition, whose consequences are reflected in the water and food security threats, environmental threats in co-basin states or downriver nations (Kavianirad,2019:40). On this basis, the issue of water resources and joint water basins as well as transboundary rivers as a common geographical phenomenon involving several nations or politico-spatial units and affecting their power relations is studied in the domain of geopolitics under the title of hydropolitics. Water is a geographical factor that is instrumental in the appearance and undermining of politico-spatial units, and any water scarcity or any changes in accessibility to water may lead to conflict. Therefore, hydropolitical relations have a more marked security aspect, increasing the possibility of conflict. Water scarcity, as an objective-geographical fact, is analyzed from the standpoint of geopolitics (Kavianirad,2019:41).

3-3. Foreign Policy and Water Diplomacy

Geopolitical events linked with WWI and WWII led to an increase in the number of nations and the development of interactions between them within the framework of foreign policy. Foreign policy would make sense when it comes to determining and identifying decisions, strategies, and interactions of governments (Ozkececi-Taner,2017:58)[1]. Furthermore, in the wake of globalization, the modern world is rapidly moving towards increased interaction between various nations. The foreign policy serves as a guide for governments to realize their objectives and serve their national interests with a view to achieving the status they deserve in international relations (Bojang,2017:15)[2]. In defining foreign policy as a behavior of states, Hermann maintains that this policy refers to a targeted action that would influence personal and collective decision-making. George Modelski defines foreign policy as the system of activities evolved by communities for changing the behavior of other states and for adjusting their own activities to the international environment. He reiterates that only those aspects of policy

1. Ozkececi Taner, Binnur (2017). Disintegration of the "strategic depth" doctrine and Turkey's troubles in the Middle East; Contemporary Islam, 201-214.

2. Bojang, B. S. (2017). Critical Issues Affecting Africa's Development: E-Government, Democracy and Democratic Principles, and Governance as an Alternative for Socio-Economic Development in Africa, International Journal of Youth Economy, Vol. 1, No. 1.

that aim at the change in the existing behavior of states, as the primary objectives of foreign policy. However, foreign policy has an evolving nature, thereby appearing in different forms under different circumstances (AS,2018:2)[1]. In each state's foreign policy, the country chosen for this purpose is important. It seems that in a general classification, that country may be one of the following seven categories: enemy, hegemonist, a dependent ally of the enemy, neutral, ally, dependent, and puppet (Cottam, 1986:50)[2]. In most cases, foreign policy decision-makers classify a country under one of the seven categories and then interacting with them would follow dominant norms. A sector of foreign policy and political activism by states outside their borders is their regional policy and behaviors. At the regional level, hydropolitics is a foreign policy sector of states. As it was mentioned earlier, finding solutions to water-related conflicts within the framework of water diplomacy would require basin states to reduce tensions and cooperate with each other (Hefny,2011:18)[3]. Interactions associated with transboundary waters have a political nature and function that is determined by the politico-social fabric and nature of basin states. Therefore, power asymmetry between basin states influences interactions. For instance, the geographical position of shores is a major source of power. Geography classifies various countries under different groups and upstream states have an advantage of manipulating currents. They can block rivers or change their directions for their own interests and show off their power (Vij et al,2020:249)[4]. In this regard, water diplomacy involves using diplomatic tools to settle ongoing or emerging disputes and conflicts about joint water resources with a view to settling or reducing them to clear the way for

1.AS, A. (2018). Democratic Consolidation and Good Governance in Africa: Assessing the Incidences of Poverty and Corruption in four African States, Bangladesh e-journal of Sociology, Vol. 15, No. 1.

2. Cottam, Martha L. (1986). Foreign Policy Decision Making: The Influence of Cognition, Boulder: Westview Press.

3. Magdy A. Hefny (2011). Water Diplomacy: A Tool for Enhancing Water Peace and Sustainability in the Arab Region. Presented in preparation for the Second Arab Water Forum Theme 3: "Sustainable and Fair Solutions for the Trans-Boundary Rivers and Groundwater Aquifers. At: http://www.unesco.org.

4. Vij, Sumit, Warner, Jeroen and Barua, Anamika (2020). Power in water diplomacy. WATER INTERNATIONAL 2020, VOL. 45, NO. 4, 249–253 https://doi.org/10.1080/02508060. 2020 .1778833.

regional cooperation, stability, and peace (Schmeier,2018).[1] Water diplomacy is an emerging concept for discussing the political nature of transnational cooperation and linking water with wider regional cooperation, geopolitics, and foreign policy (Klimes and et al,2019:1362).[2] Water diplomacy is a new field of diplomacy that combines the methods of science diplomacy (focusing on close ties between the worlds of science and diplomacy) with traditional diplomatic instruments. It is defined by its emphasis on water-related topics: access to drinking water, water sanitation, water scarcity, flooding, etc. All these categories are included in the broader category of international water management. Water management is a multifarious responsibility that extends to agriculture, national security, public health, and other areas. A diplomacy that promotes efficient water management requires the involvement of different actors who need to understand and take into account the 'water dimension' of a specific diplomatic situation. As needed, it can employ the tools of pre-emptive diplomacy, designed to head off critical international problems, and crisis management. That is why the cooperation of government officials with the scientific community (including experts in the hard sciences, technical disciplines, the social sciences, and the humanities) is crucial to successful water diplomacy (Tomalov and et al,2020:30).[3]

4.Result and Discussion

Through library studies and content analysis of interviews, 49 variables were extracted. In the next step, based on these variables semi-structured questionnaires were drawn up and sent to a group of Iranian and Iraqi experts, executives, and policymakers. Following experts' views, some issues were merged due to overlap while some new issues were incorporated as possible future drivers. After questionnaires were sent three times a total of 56 issues were agreed upon based on the experts' views.

1.Schmeier, Susanne (2018). What is water diplomacy and why should youcare?.at: https://globalwaterforum.org?

2. Klimes, M., Michel, D., Yaari, E and Restiani, P. (2019). Water diplomacy: The intersect of science, policy and practice. Journal of Hydrology. Volume 575.

3. Tomalová, Eliška, Černovská, Eliška, Aukes, Ewert, Montana, Jasper, Dall, Elke (2020). Water Diplomacy and its Future in the National, Regional, European and Global Environments. https://www.s4d4c.eu/wp-content/uploads.

Table (3): Variables Extracted from Library Studies and Specialized Forums with Population

No.	Variables
.١	Drought and Climate Changes
.٢	Significance of Water Resources for Iraq Food Security
.٣	Significance of Water Resources for Iran Food Security
.٤	Population Growth
.٥	Inter-Basin Water Transfer in Iran
.٦	Inter-Basin Water Transfer in Iraq
.٧	Diplomacy and Water Resources Management
.٨	Infrastructure Weakness of Draining and Water Supply Canals in Iraq
.٩	Lack of Reliable Information on Water Resources in Iran and Iraq
.١٠	Tigris and Euphrates Water Basin Overexploitation
.١١	Water Scarcity Crisis in Iran
.١٢	Role of Neighboring States in Iran-Iraq Water Tension
.١٣	Kurds' Growing Role in Iran-Iraq Water Relations
.١٤	Iraqi Local Elite and People's Opposition to Water Resources Transfer
.١٥	Iranian Local Elite and People's Opposition to Water Resources Transfer
.١٦	Iran's Participation in Iraqi Development Projects
.١٧	Iraq's Further Access to Persian Gulf Marine Routes
.١٨	Iran's Hydrohegemonism Attempt
.١٩	Iran-Iraq Joint Action to Obtain Environmental Water Right from Turkey
.٢٠	Iraq-Syria Geopolitical Opportunities for Iran Regional Objectives
.٢١	Internal Unrest in Iraq
.٢٢	Iran's Opposition to Iraqi Kurdistan Independence in 2017
.٢٣	Impact of Iran International Sanctions on Further Attention to Agriculture Development
.٢٤	Significance of Water Resources for Job Creation in Iraq
.٢٥	Significance of Water Resources for Job Creation in Iran
.٢٦	Significance of Water Resources for Protecting National Security of Iran Western Areas
.٢٧	Significance of Water Resources for Internal Stability in Iraq
.٢٨	Iraqi Kurdistan's Water Needs
.٢٩	Significance of Water Resources for Energy Security in Iran
.٣٠	Significance of Water Resources for Energy Security in Iraq
.٣١	US Presence in Iraq
.٣٢	Impact of Syria Security and Stability
.٣٣	Persian Gulf Water Desalination
.٣٤	Training Iraqi Water Ministry Employees
.٣٥	Turkey Water Policy in the Euphrates
.٣٦	Turkey Water Policy in the Tigris
.٣٧	Iran Water Policy in Shatt al-Arab's Karoun Basin
.٣٨	Iraqi Shia Population
.٣٩	Iraqi Sunni Population
.٤٠	Border Rivers Containment by Iran
.٤١	Agriculture Development in Iraq
.٤٢	Agriculture Development in Iran Border Areas

۴۳.	Women's Role
۴۴.	Role of Regional Organizations
۴۵.	Activity of Civil Organizations
۴۶.	Official Organs
۴۷.	Governing Documents
۴۸.	Iran-Iraq Cultural Commonalities
۴۹.	Terrorist Groups
۵۰.	Ethnic Disputes
۵۱.	Industrial Development in Iran and Iraq
۵۲.	Urbanization Development in Iraq
۵۳.	Information Sharing
۵۴.	Iran Product Exports
۵۵.	Green Technologies
۵۶.	Iraq Dependence on Iran Power Imports

In order to gather experts' views, the Fuzzy Delphi method and seven-choice spectrum of linguistic variables have been used. Geometric mean has been used to calculate the value of each variable. In the next stage, the obtained numbers are defuzzified. The threshold is considered at 7 in this analysis. The following table contains experts' views obtained from the Fuzzy Delphi method, showing the most important issues dominating Iran-Iraq hydropolitical relations.

Table (4): Major Issues in Iran-Iraq Hydropolitical Relations

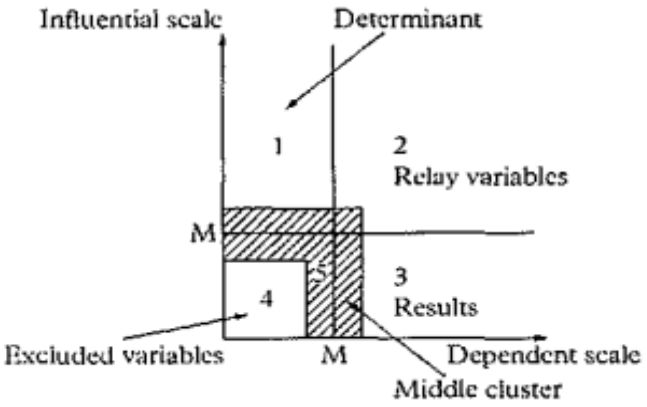
Number	Full Title	Codes
1	Drought and Climate Changes	**A01**
2	Significance of Water Resources for Food Security	**A02**
3	Population Growth	**A03**
4	Diplomacy and Water Resources Management	**A04**
5	Infrastructure Weakness of Draining and Water Supply Canals in Iraq	**A05**
6	Tigris and Euphrates Water Basin Overexploitation	**A06**
7	Role of Neighboring States in Iran-Iraq Water Tension	**A07**
8	Iran's Participation in Iraqi Development Projects	**A08**
9	Iran-Iraq Joint Action to Obtain Environmental Water Right from Turkey	**A09**
10	Internal Unrest in Iraq	**A10**
11	Significance of Water Resources for Job Creation	**A11**
12	Presence of Transregional Actors in Iraq	**A12**
13	Turkey Water Policy in Euphrates and Tigris	**A13**

14	Iran Water Policy in Shatt al-Arab's Karoun Basin	**A14**
15	Border Rivers Containment by Iran	**A15**
16	Agriculture Development	**A16**
17	Urbanization Development in Iraq	**A17**
18	Green Technologies	**A18**

Structural Analysis Method

After variables were identified, in a bid to upgrade the level and precision of forecasts about their cross impacts and identify key influential variables, the structural analysis method has been used. In order to study the relationship between variables, the cross-impact matrix is used. Filling the matrix is a qualitative process. The following question applies to both variables: Is there any direct impact relationship between variable 1 and variable 2? If negative, a zero is inserted into each cell. 1 is inserted for weak influence, 2 for moderate influence, and 3 for strong influence (Gordon and Glenn, 2008). In general, the matrices and output graphs of software are of two categories. One is the matrix of the direct relation between variables and associated graphs and the other one is the matrix of indirect relationships between variables and associated graphs. Studying the direct matrix uncovers variables with maximum impact, but it is not enough to uncover hidden variables which often impact the system under study. In fact, in addition to the direct relation between variables, there are indirect relations through reaction chains or feedbacks. In order to calculate the indirect impacts of each variable, the software multiplies the relation between variables automatically to the power of 2, 3, 4, 5, …. That would help calculate the indirect impact of variables. Such analyses would facilitate a precise study of the system. The MICMAC output is presented in the form of five groups of variables (Fig. 2). These variables differ from each other due to their role in the dynamism of the system under study (Zali and Mansouri,2015:115)

Fig (2): Influence/Dependence Graph

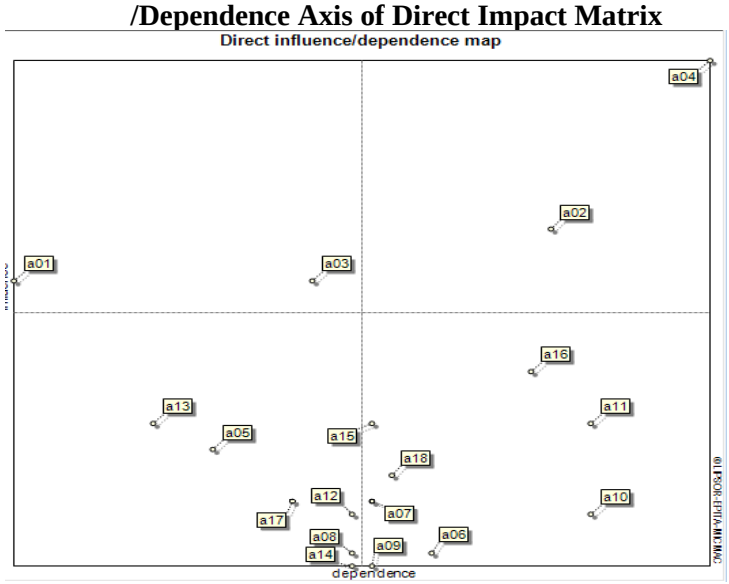


(**Source:** Gordon and Glenn,2008)

Table (5): Cross-Impact Matrix Data Primary Analysis

Matrix Size	Repetitions	Zeros	Ones	Twos	Threes	Total	Completion
18	2	129	82	57	53	195	69.12%

Fig (3): Dispersion of Variables and Their Status in Influence /Dependence Axis of Direct Impact Matrix



Influential Variable: Any system variability depends on influential variables and it is highly important to control these variables. Drought and climate change constitute an influential variable. As an environmental variable, it is dependent on the system and is not controlled by the system. This variable lies outside the system and functions as a stable one.

Dichotomous Variables: These variables are simultaneously influential and dependent. The diplomacy and water resources management and also the significance of water resources for food security are two variables of this category. These variables are naturally unstable. By manipulating these variables, one may achieve the desired variability and evolution of the system. Therefore, these variables indicate possible objectives in the system rather than display any predetermined result.

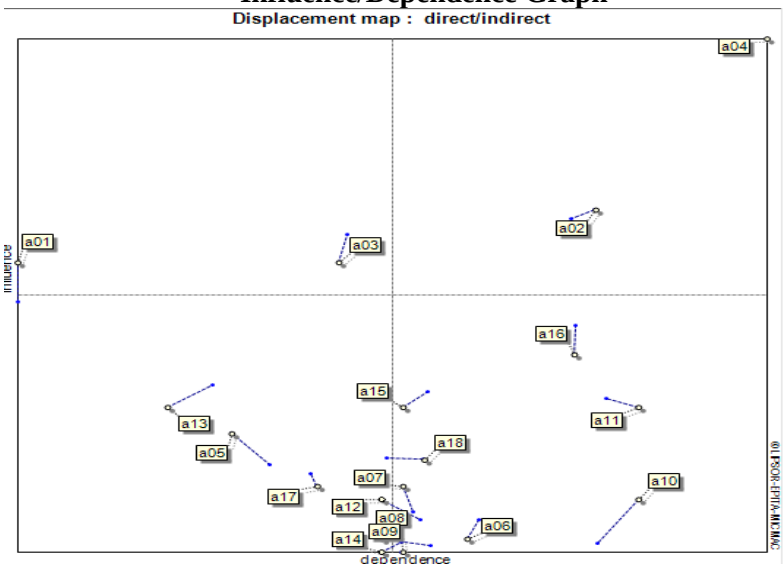
Dependent Variables: These variables represent the system output and are extremely sensitive to the evolution of influential and dichotomous variables. They include agriculture development, the significance of water resources for job creation, Iraq's internal unrest, Tigris and Euphrates water basin overexploitation, presence of transnational actors in Iraq, green technologies, the role of neighboring states in creating water tension in Iran-Iraq relations, containment of border rivers by Iran and the two countries attempt to obtain environmental water right from Turkey.

Independent Variables: These variables include Iran's participation in development projects in Iraq, Iran's water policy in the Shatt al-Arab's Karoun basin, development of urbanization in Iraq, and the infrastructure weakness of draining canals and water supply in Iraq. Independent variables have a meager or no mutual impact on other variables in the system. Their relation with the system is very weak as they neither halt any main variable nor evolve and advance any variable in the system.

Secondary Leverage Variable: Although it functions somewhat independently, this variable is influential rather than dependent. Therefore, it is used as a reference for measurement. Turkey's water policies in the Tigris and Euphrates have such functionality in the system.

Regulatory Variable: The population growth variable is the only variable that can function as the weak objectives secondary leverage or risk variable.

Fig (4): Displacement of Variables in Direct and Indirect Influence/Dependence Graph



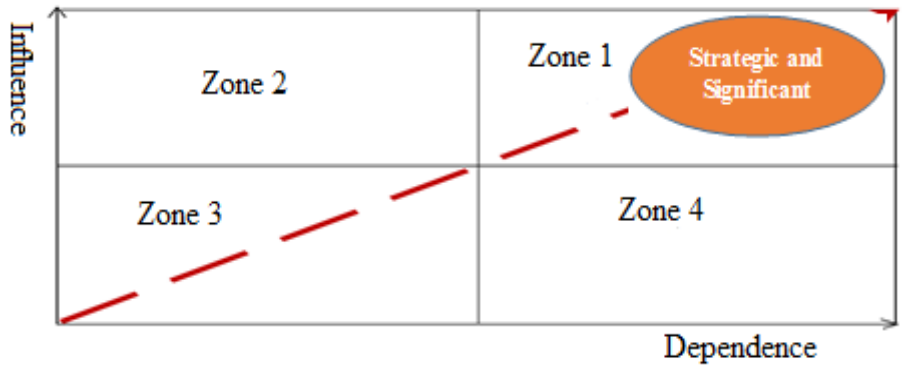
As shown in Fig (4), no significant displacement has occurred in the role of variables between direct and indirect impacts. Therefore, the same analysis presented regarding the role of variables in the direct impact graph in Fig (3) applies here too. Table 6 provides further proof. The variables, ranging from 1 to 5, show the quantitative displacement.

Table (6): Rank of Variables in Various Direct/Indirect Influence/Dependence Conditions

Rank	Short Title	Direct Influence	Short Title	Direct Influence	Short Title	Indirect Influence	Short Title	Indirect Influence
1	Diplomacy	1352	Diplomacy	1014	Diplomacy	1194	Diplomacy	1001
2	Food Security	958	Unrest	845	Food Security	886	Job Creation	792
3	Drought	873	Job Creation	845	Population	839	Unrest	780
4	Population	873	Food Security	788	Drought	743	Agriculture Development	753
5	Agriculture Development	676	Agriculture Development	760	Agriculture Development	703	Food security	747

According to the research results, strategic drivers are those which would be manipulated and controllable while being influential on the dynamism and variation of the system. Therefore, highly influential but uncontrollable drivers are not considered to be strategic.

Fig (5): Strategic Variables



If we assume the graph of the variables as a coordinates' network, the drivers inserted in Zone 2, as shown in Fig. 5, are rarely changed by planners. The drivers in Zone 3 are of extremely low influence and dependence, thereby not being considered as strategic. The drivers in Zone 4, due to their strong dependence on other drivers, have no strategic feature and are rather considered as the outcome of other drivers. But the drivers in Zone 1 are strategic because they can be controlled by the management system in addition to having acceptable influence in the system. As we move from the end of Zone 3 towards the end of Zone 1, the drivers become more significant and strategic. In this regard, the research findings show that water diplomacy is the most strategic driver in reducing hydropolitical tensions between Iran and Iraq.

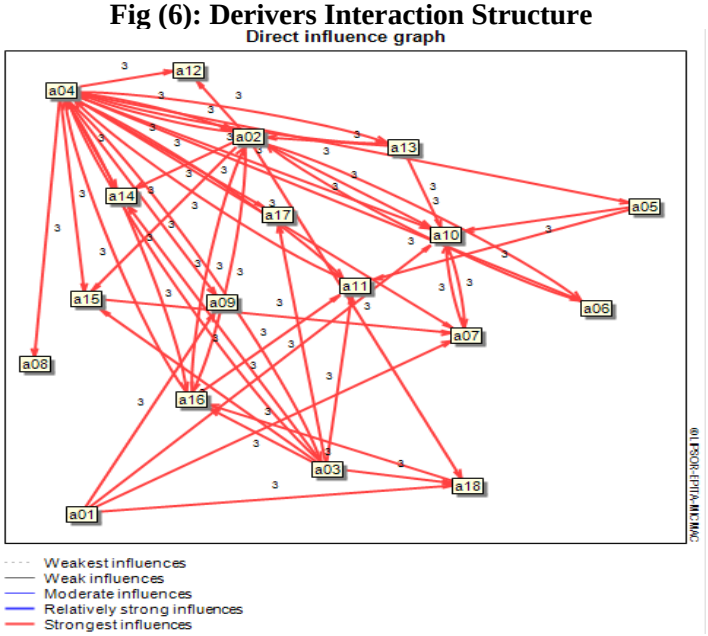
5.Analysis

Action and reaction within the framework of cooperation indicate coherence of policies in favor of common interests. Realizing joint objectives requires voluntary and optional arrangements to pursue common interests as no objective would be achieved without cooperation between actors. The UN has declared 2018-2028 as the International Decade for Action "Water for Sustainable Development". Studies show that water lies at the focus of sustainable development for socio-economic development, human survival,

ecosystems health, containment of epidemics, improvement in health and welfare, and the productivity of vital population. International water conventions, pacts, treaties, drafts, and bilateral or trilateral agreements help ease differences and disputes between states. Such cooperation in international law on border waters has been taken into consideration within the framework of limited territorial sovereignty based on the principle of "reasonable and equitable share in Article 4 of the Helsinki Rules (1996), Article 2 of Europe Water Convention (1993), Article 4 of UN Convention (1997) and Article 12 of the Berlin Rules (2004).

According to data for 1820-2007, 250 independent international conventions including 688 agreements, have been signed about 113 joint water basins. This data shows that cooperation in joint water basins has been accepted as normal by basin states, especially because cooperation would provide the ground for attracting foreign investment and receiving facilities from international entities for development projects.

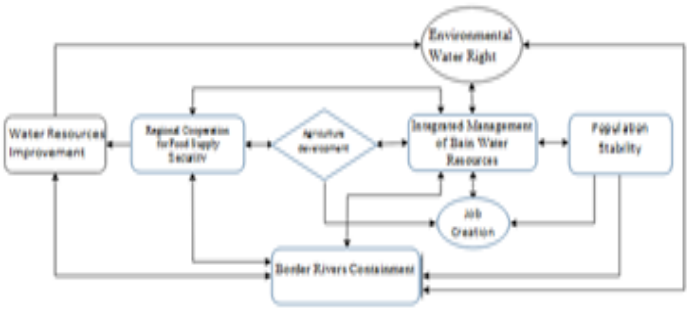
Fig (6): Derivers Interaction Structure



Given the ruling structure in the drivers' relation system, water diplomacy influences the development of agriculture and food supply security, job

creation, population stability, and improvement of water resources by creating the capacity for combining integrated water resources management approaches and regional cooperation between Tigris basin states. Water diplomacy has the capacity to encourage the three main co-basins states of Iran, Turkey, and Iraq to show cooperation in reducing water-related disputes and instead influence the expansion of their relations in the energy, transit, trade, investment, and social development sectors. Among these basin states, Turkey enjoys a particular position as more than 90% of the Euphrates water and nearly half of the Tigris water originates from Turkey while both being vital watercourses in Iraq. Iran is considered as an upriver state; however, it is deemed as downriver in the southwestern section and is affected by the consequences of dried-up lagoons and haze. In addition to providing countries with sustainable access to water, water diplomacy would consider the environmental problems of all basin states. Granting environmental water rights to lagoons would feed underground water resources, reduce haze levels, provide a better and healthier environment for residents and discourage immigration. Since the main bone of contention between countries pertains to geopolitical rivalry and power relations, negotiations focused on mutual geopolitical dependence would facilitate cooperation. Some of these sectors include energy, transit, trade, and joint investment and creating mutual dependence on non-strategic food items. The development of joint industries around border areas with joint investment would be instrumental in job creation and efficient water use.

Fig (7): Conceptual Model of Impact of Diplomacy on Regional Cooperation



6.Conclusion

Iran and Iraq are struggling with numerous and intertwined challenges. Both are low-precipitation countries located in the arid and semi-arid areas of Southwest Asia. Both depend on the Tigris water basin resources to supply their water needs. However, data shows that upriver and downriver states have opted for optimism, thereby disturbing the ecological balance to the detriment of the environment in this basin. The consequences may be seen in the two countries' objection to the upriver state over reduction in its water right, increased environmental risks, drop in water tables, and land sinking. This research sought to identify the most strategic driver instrumental in reducing water tensions in this basin by exploring influential variables in hydropolitical ties between the two states. To that end, in addition to library studies, a number of experts and persons involved in the water resources sector were interviewed. The findings from the analysis of interviews were presented to the population in the form of a questionnaire. The questionnaires were assessed and analyzed through a three-phase process. Then, by applying the Delphi method, a total of 18 important drives were identified and the mutual impacts of the drivers were evaluated by the structural analysis method which is a suitable method for identifying strategic drivers in the future of hydropolitical relations between Iran and Iraq in this water basin. As this report sought to analyze the topic within a future-oriented approach framework, it was necessary to use a method that would be appropriate. Findings show that water diplomacy is the most strategic driver. Water diplomacy requires using diplomatic tools to settle existing or emerging disputes and conflicts over joint water resources with a view to regional cooperation, stability, and peace. Among the proposed mechanisms through this approach is the integrated management of the water basin resources and regional cooperation for food supply security. According to the research findings and the conceptual model born out of them, water diplomacy influences the development of agriculture, job creation, population stability, environmental water right, and improvement in water resources. These resources are among important issues worrying rulers and influencing water tensions between the two countries. Therefore, in order to ease hydropolitical tensions, the best approach would be to adopt water diplomacy within the framework of cooperation.

7.Suggestion

Given the diverse aspects of water diplomacy, it is suggested that separate research examine the impact of water diplomacy on hydropolitical relations between the two countries and the more advantageous and more realistic aspect of research be identified.

8.**Gratitude**

The authors feel compelled to offer their sincere gratitude to the Center for International Scientific Studies and Collaboration (CISSC) of the Ministry of Science, Research and Technology and the Office of Deputy Chancellor of Khawrazmi University for Research Affairs for their assistive contribution.

References

1. Al-Ansari, N (2016). Hydro-Politics of the Tigris and Euphrates Basins. Engineering, Vol.8 No.3.
2. AS, A. (2018). Democratic Consolidation and Good Governance in Africa: Assessing the Incidences of Poverty and Corruption in four African States, Bangladesh e-journal of Sociology, Vol. 15, No. 1
3. Bojang, B. S. (2017). Critical Issues Affecting Africa's Development: E-Government, Democracy and Boretti, Alberto and Rosa, Lorenzo (2019), Reassessing the projections of the World Water Development Report, Article2, No: 15.
4. Cottam, M.L. (1986). Foreign Policy Decision Making: The Influence of Cognition, Boulder: Westview Press
5. Democratic Principles, and Governance as an Alternative for Socio-Economic Development in Africa.
6. Shahmir Janjua, Ishtiaq Hassan, Mahdi Zarghami, Shafiqul Islam; Addressing the supply-demand gap in shared rivers using water diplomacy framework: utility of game theory in the Indus River within Pakistan. Water Policy 1 October 2020; 22 (5): 789–810. doi: https://doi.org/10.2166/wp.2020.109
7. Gordon, T.J; Glenn, J.C. (2008). Futures Research Methodology, v2.0. The Millennium Project.
8. Hafeznia, M.R; Kavianirad, M (2014). Philosophy of political Geography, Tehran.Publisher: Research Institute for Strategic Studies. **[In Persian]**
9. Https://news.un.org/en/story/2021/10/1102162.
10. Julien, F. (2012). Hydropolitics is what societies make of it (or why we need a constructivist approach to the geopolitics of water). International Journal of Sustainable Society, 4(1-2), 45–71.
11. Kavianirad, M (2019). Hydropolitics: directions and Approaches, Tehran: Research Institute for Strategic Studies Publications. **[In Persian]**
12. Klimes, M.; Michel, D.; Yaari, E; Restiani, P. (2019). Water diplomacy: The intersect of science, policy and practice. Journal of Hydrology. Volume 575.
13. Magdy, A. H (2011). Water Diplomacy: A Tool for Enhancing Water Peace and Sustainability in the Arab Region. Presented in preparation for the Second Arab Water Forum Theme 3: "Sustainable and Fair Solutions for the Trans-Boundary Rivers and Groundwater Aquifers. At: http://www.unesco.org.
14. Maitah, M (2018). Evaluation of Water Scarcity in Selected Countries of the Middle East. Water 10(10): 1482.At: https://www.researchgate.net.
15. Ozkececi Taner, B (2017). disintegraice of strategic depth doctrine and turkey, s in the middle east. contemporary islam.201-214.
16. Schmeier, S (2018). What is water diplomacy and why should youcare?.at: https://globalwaterforum.org?

17. Tomalová, E; Černovská, E; Aukes, E; Montana, J; Dall, E (2020). Water Diplomacy and its Future in the National, Regional, European and Global Environments. https://www.s4d4c.eu/wp-content/uploads.
18. Vij, S; Warner, J; Barua, A (2020). Power in water diplomacy. WATER INTERNATIONAL 2020, VOL. 45, NO. 4, 249–253 https://doi.org/10.1080/02508060.2020.1778833.
19. Www.clingendael.org/sites/default/files/07-2018/PB_PSI_.waterchallenges_ Iraq.pdf.
20. Www.eco-business.com/news/whats-being-done-to-fix-water-scarcity-in-asias-most-water-stressed.
21. Www.NSD-S Hub, NATO STRATEGIC DIRECTION SOUTH), (2019). WATER SCARCITY IN THE MIDDLE EAST. At: https://www.Thesouthernhub.org/resources.
22. Www.un.org/development/desa/en/news/population/world-population-prospects-2017.html.
23. Www.UNU-INWEH, (United Nations University Institute for Water, Environment and Health), (2017). GLOBAL WATER CRISIS: THE FACTS. Hamilton, Canada. at: http://inweh.unu.edu.
24. Www.UNU-INWEH (2017). (United Nations University Institute for Water, Environment and Health.)
25. Www.unwater.org/water-facts/scarcity.
26. Www.wholives.org/our-mission/mission.
27. Www.worldometers.info/world-population/iraq-population.
28. Www.worldwater.io/?utm_source=google&utm_medium=search&utm_campaign=WaterscarcityData&campaignid=6444167483&adgroupid=77198318295&adid=376808482551&gclid=EAIaIQobChMI0_2gmJud6wIViPdRCh25xg3REAMYAiAAEgLEPfD_BwE.
29. Www.worldwatercouncil.org/en/water-crisis.
30. Unruh, J. D. (2019). The Geography of Water and Oil Resource Governance in Post-Conflict Iraq. The Arab World Geographer.
31. Zali, N; Mansouri Birjandi, S (2015). Analysis of key factors affecting the development of sustainable transportation on the horizon of 1404 Tehran metropolis (structural analysis method). Space Planning and Planning Quarterly (Teacher of Humanities), Volume 19, Number 2 (88). **[In Persian]**