International Journal of Political Science
ISSN: 2228-6217
Vol 14, No 1, March 2024, (pp.141- 157)

Water Crisis and Security in the Middle East Region; Challenges and Ways out

Esmail AghaMohammadi[1], Afshin Zargar[2*], Fakhreddin Soltani[3]

[1,2*, 3] Department of Political Science and International Relations, Ka. C., Islamic Azad University, Karaj, Iran

Received: 15 Dec 2023 ; Accepted: 25 March 2024

Abstract:
The current research explores the water crisis and the security in the Middle East region. It addresses the challenges and solutions in terms of lack of available fresh water resources and its unbalanced distribution in the face of increase in water demand as a result of the industrialization of societies, population growth and negative effects of climate change which leads to the occurrence of water scarcity and turning it into a global crisis. Hence, concerns about the lack of water resources in the world in recent decades have led to two general speculations about the future. Relations between governments should be formed around international water resources. One hand, there are those who predict that in the near future, water will be a reason for creating violent conflicts between governments. On the other hand, there are writers and theoreticians who believe in the "catalytic" nature of water for the approximation of governments and more cooperation in this field. The issue of water has emerged both in the form of war and cooperation. In the meantime, the need for water in the dry and water-scarce region of the Middle East, the weakness of the international water cooperation systems and the numerous political-economic and social tensions in it, have created the arena for the emergence of water-related security threats in this region.

Keywords: Middle East region, Iran, water crisis, Environmental crisis, water shortage, national security, drought, international disputes

*Corresponding Author's Email: zargar@kiau.ac.ir

Introduction

Water is no longer just a physical commodity with no political burden, but nowadays this commodity has acquired economic, political and sometimes strategic dimensions. One of the reasons for the creation of the water issue and the globalization of this issue is the increasing importance of the environmental issue in recent decades and the focus on it since the 1980s. In today's world, factors such as the significant increase in the population of the planet and the excessive use of environmental resources to meet economic needs have left their own impact on water resources. The issues related to the water crisis and management from the point of view of the United Nations are known as the second main problems of the world after the population crisis and it is one of the biggest challenges of the current century of humanity which can be the source of many regional and international developments. Nowadays, water has become a subject to international politics. Water shortage, which was once a local phenomenon, has now invaded international borders and has faced serious challenges to governments and politicians. In today's world, no country can maintain its political, economic and social stability without ensuring that it has enough water.

Water is the foundation of life, the foundation of nature and the axis of economic, social and cultural development of societies. Providing safe and sufficient water has always been one of the most important challenges of the third millennium society, especially in the dry belt countries of the world and the Middle East region. Water is a renewable resource, but it is limited and unevenly distributed on the surface of the earth. The increase in the world's population is accompanied by the exponential trend of water consumption and the unitability of a large part of this valuable resource.

This crisis, despite its pervasiveness, may not have found and will not find political and security dimensions in any other place like the Middle East. The Middle East has been considered as one of the world's strategic resources since the past. On this basis, the great powers made a persistent effort to dominate it. The water crisis of this region, which is due to its location in the dry belt of the earth, has caused water to be considered a valuable element in this region. The Tigris and Euphrates rivers, which originate from the Kurdish regions of Turkey, Iran and to some extent Syria, have always been considered as the lifeblood of the three countries of Turkey, Syria and Iraq throughout history.

2- Water security in the 21st century

Water as a security issue implies the realism paradigm of power, competition and domination. From this point of view, "the history of mankind is a report about wars for resources, including water". Realism, a general theoretical framework for the study of international politics, declares that the prevalence of "politics from the perspective of realism" and "geopolitics" or "power politics" is the root of all crises. For realism, any resource such as water that can increase the attributed power of a state over other countries becomes a geopolitical tool. One of the researchers mentions four characteristics for water, which has become a strategic competitive force: the degree of scarcity of water, the extent of water supply and partnership with a region or a country, the power of the governments of that

water area and access to clean water sources. (Araghchi, 2014, p.95)

The issue of water shortage and its gradual aggravation due to increased consumption has caused water to play an essential role in shaping the political and social relations of nations, especially in the countries with dry climate of the world. Nowadays, water has become a geopolitical issue and affects the relations of countries. This influence has both positive aspects and cooperation between countries, such as the legal systems of the Danube River and the Black Sea, and also has negative and controversial aspects, such as the Middle East region and the Indian subcontinent. Water resources are one of the factors that create geopolitical crises. Competition between countries for common water resources and access to fresh water resources can be due to countries' efforts to achieve national security. Sufficient water resources for a country mean development in the agricultural sector, sufficient food, economic growth and public welfare. Water security, especially in arid and semi-arid regions, is related to national security (Araghchi, 2014, p.97).

The security challenges of competition over water resources are decreasing, which in a wider context also includes environmental security. This trend is strongly tied to politics and has turned the issue of water management into a security issue (Araghchi, 2014, p.98). Trans boundary water and rivers can be the source of tensions and conflicts as well as the source of good neighborliness and cooperation. In most parts of the world, usually the countries located in the upper part of the river can influence the fate and the process of economic and social development of the countries in the lower part of the river. By changing the course of the river or threatening to do so, they can push the countries in the direction towards their desired policies. Access to safe water for drinking and irrigation has become one of the most difficult issues in the Middle East (Buzan & Weaver, 2010, p.6).

Garth Porter considers environmental security to be an integral part of national security. This type of security takes into account the issues of fresh water, soil, forest, fisheries and biological species and the protection of the ozone layer. The reason for this is that the increase in competition for obtaining renewable resources is now a big risk for regional stability in the world and the destruction of the environment will eventually stop economic growth; therefore, the long-term policy strategy should focus on the appearance of environmental hazards. Garth Porter also states that: fresh water resources and fisheries resources are among the clearest examples of renewable and scarce resources that are the direct targets of possible conflicts of international violence. Conflict over the internationally divided waters of the rivers has been of interest to international security planners since the past (Buzan & Weaver, 2010, p.17).

Today, the global water crisis threatens even the security of the world and the concept of national security has also undergone transformation. This is so important that the analysts of environmental issues have divided the years 1950 to 2030 into 1) Economic period (1950-1990) and 2) Environmental life (1990-2030). The important point in this division is that in the period of 1950-1990, national security was mainly ideological and military based in nature, and the Cold War

was its indicator, while in the period (1990-2030), national security will be more influenced by food and employment security and It will be environmental issues, and hungry and jobless people who will often move across national and international borders (Bareghi & Ghanbari, 2010, p.5). In the model presented by "Peter Hoggett", an English geographer, 12 geographical factors are considered to cause tension and disputes between neighboring countries, among which 6 factors are tensions that occur over water resources. These factors include:

1- Willingness to cross the landlocked country to access open waters from the neighboring country 2- Dispute over dividing the water line 3- Changing the course of the border river, 4- Dispute over exploiting the resources of the common lake 5- Stealing water in the upper part River 6- artificial fertilization of clouds.

For this reason, in the 21st century, the water issue constitutes one of the main models of national security of countries, and along with the trend of population increase, climate change, globalization of interdependence, this issue is at the top of security issues in countries with dry climates (Buzan & Weaver, 2010, p.21).

From this point of view, Glick believes that with the arrival of the 21st century, it is more likely that water and its supply networks will become the targets of military activities, tools of war and the main elements of countries' policies. Emphasizing on water as a resource that is placed in the framework of traditional security analysis, he claims that if water becomes a source of political and economic power, which is clearly the case, the issue of water supply justifies the emergence of war and Water supply networks can be considered a part of military objectives. According to the prevailing opinion, water shortage is a very critical issue that affects the national security and survival of any society. To prove this argument, it has been repeatedly claimed that water disputes were one of the factors in the conflict in the 1967 Arab-Israeli war. The realist view of world politics establishes a positive relationship between the problem of lack of resources and the creation of conflict. From this perspective, human history is full of wars over resources. Using this analysis, Falken Mark Widzstrand argues that access to water throughout the history of the world has caused political and military conflicts. Military analysts claim that fresh water is similar to other scarce resources in many ways, and since fresh water is becoming extremely rare, it will cause future conflicts. From the perspective of a realistic approach, the issues related to water shortage in the relations between the upstream and downstream countries of the water basin, which evokes the power relationship, are the most serious issues between the countries. In this situation, at the same time as the demand for water increases and the resources decrease, the political power takes more advantage of the resources upstream of the river, as a result, it swims upstream; therefore, water security is considered as an inseparable part of national security with trade-off thinking and a main attitude towards them. Referring to the issue of water shortage in such a context, Falken mark argues that since many water resources and large underground aquifers are divided between different countries, this geographical fact increases the risk of international conflicts and even confrontations, es-

pecially in the perspective of conflicting interests that the upstream and downstream countries have in using water resources. The highest level of fluctuations related to the increase in water shortage occurs in countries whose population is growing rapidly or in countries where most of their water resources are shared with other countries (Dolatyar & Gary, 2010, p.47).

In the 21st century, water resources are the source of tension both within countries as well as in relations between countries. In other words, it has become an effective factor in domestic and international issues. The source of disputes over international rivers is mostly the excessive use of river water in the upstream parts and the reduction of water flowing to the downstream country or countries, as well as water pollution in the upstream parts of the river (Yaseri, 2010, p.72).

From the point of view of economy and health, access to fresh water is so important that it has acquired a fundamental strategic character. At least 10 rivers pass through six countries, of which the Danube is at the top, and the Nile River passes through 8 countries and Egypt is the last of them. Ethiopia uses the Nile River for irrigation, and the latter two countries are facing a severe water shortage. Egypt and Sudan signed the Nile Water Sharing Agreement in 1959. Most of the countries in the Middle East have common water tables. Israel exercises strict control over the water reservoirs of the Gaza Strip. This country supplies about 25 percent of its needs from there. Such a situation also prevails over Jordan's water resources. The Palestinians accuse the occupiers of these areas of depriving them of water by digging deep wells. Jordan complains that it has been deprived of the necessary water resources for its growing needs. The division of water is due to constant tensions between the countries of the region. The Atatürk Dam, which is meant for the development of deprived Kurdish areas, has significantly affected the flow of the Euphrates towards Syria, which had high hopes for the development of its dam downstream. Iraq, which is even lower, is also requesting its share (Dolatyar & Gary, 2010, pp.48-51). Today, the tension over the distribution of fresh water resources in the world, which has emerged in all regions of the world, has various forms, from creating a conflict between urban and agricultural "water on it" in the west of the United States to a full-scale war in the Middle East and the Persian Gulf region. But the dispute over the "water right" in the area of rivers and lakes that are shared by two or more countries or aquifers that go beyond international borders makes the problem of water access even more complicated. The Nile River, Jordan River, Tigris and Euphrates, Indus, Ganges, Brahmaputra, Helmand and Arvand areas are among the areas where the conflict over water is a potential or actual issue. The degree of dependence on the incoming surface flows from across the borders is another indicator of a country's vulnerability to water shortage. Also, due to the existence of more than 200 common watersheds between two or more countries and aquifers that go beyond international borders, there is a reason for increasing regional tensions over how to use shared waters, especially in arid and semi-arid regions which are already facing water shortage. At least 10 rivers pass through six or more countries, in places where the waters define international borders, the change in the shape of the land as a result of "erosion and

sedimentation" can cause conflict, as well as the transfer of water from one river area to other areas, if allowed to cross international borders, will usually be prohibitively expensive. Till this day, more than 300 agreements have been concluded between the countries of the world to solve specific issues related to water resources. As the population increases and demand approaches the final limit of renewable water resources, water can become the cause of conflicts in areas where, ethnic and political rivalries have a long history. In fact, some analysts believe that within the next decade, water, as a rare and expensive commodity, will be at the center of confrontations and reconciliations instead of oil (Minaii, 2008, p.136). In the next two decades until the year (2035), there is a higher possibility of international water conflict and tension, which include:

1- The Coastal region in the south of the African Sahara, including the countries of Mauritania, Senegal, Niger, Mali, Chad, Burkina Faso, and northern Nigeria, including the basin of the Senegal and Niger rivers.

2-Ganges and Brahmaputra and Indus river basin are in the countries of India, Pakistan, China, and Bangladesh.

3- The Nile River basin includes 10 countries: Egypt, Sudan, South Sudan, Ethiopia, Eritrea, Uganda, Kenya, Tanzania, Rwanda and Burundi.

4-Mediterranean coastal countries, especially the southern and eastern coasts, consist of Morocco, Algeria, Tunisia, Libya, Palestine, Lebanon, Syria, and Turkey, as well as Spain, Portugal, Italy, and Greece.

5- The Entire Middle East region, including the Arabian Peninsula, Iraq, Syria, Iran, Lebanon, Jordan and Palestine, including the Mesopotamia (Tigris and Euphrates) and the Jordan River basin.

6- The Mekong River basin and its delta including the Indochina Peninsula (Cambodia, Vietnam, Laos, Thailand) and the country of China (Araghchi, 2014, p.100)

3- Water insecurity in the Middle East

The predictions show that by 2025, half of the world's population will live in water-stressed areas, and the Middle East, with 7% of the world's population, will have only 1.5% of renewable fresh water resources and will be identified as a region that will experience the greatest amount of this tension (Krakow, 2020, p.2). Fragile climate of this region, along with the increase in population and income level, the ever-increasing demand for scarce water resources, the pollution of surface and underground water, seriously threaten water security in the Middle East. These challenges, along with the devastating internal and international wars, with unimaginable ending, will intensify the water insecurity in the region. Hypotheses have even been proposed that consider water scarcity and its lack of proper management among the root causes of many wars and riots in this region, especially the Syrian civil war. (Rashidi, 2020, p. 58) Among the other security effects of water scarcity, we can mention the phenomenon of refugees and migration, which, by exerting double pressure on the water resources of the new region, may be a new challenge in achieving water security in the Middle East and neighboring countries. It is worth mentioning that most of the sources

of water supply in the Middle East are rivers or trans boundary aquifers.

This issue results in greater interconnection of the water situation of the Middle East countries. Today, it can be claimed that the political-security and military issues in the Middle East are dangerously intertwined with the water issues (Cahan, 2017, p.4). Internal and international wars in countries such as Iraq, Syria, Lebanon, and Palestine lead to increased pressure on the small water resources in the region, so that the pollution and salinization of these resources, the lack of sufficient water supply for Citizens of these countries, improper protection of the stability of wetlands, rivers and lakes is one of the inevitable consequences of political and security instability in Middle East countries. The weaponization of water, both in the field of hard power, i.e. the use of water and water facilities as a weapon during wars, which reached its peak by ISIS in the war in Iraq and Syria, and also in the field of soft power, i.e. the attempt to gain hegemony and Water supremacy by upstream countries in international watersheds through the construction of dams and as a result water control, such as Turkey's actions in the implementation of the Gap project on the heads of the Tigris and Euphrates or the construction of the great Renaissance Dam by Ethiopia. The Nile is one of the other challenges of the water crisis in the Middle East and North Africa. In order to solve their water scarcity problems and the dire future that they may face, the countries of this region use various solutions and strategies such as water desalination, water purification and recycling, water trading, cultivation of water scarce crops etc. (Al-Rimmawi, 2012, pp.28-34) but adopting appropriate water diplomacy is one of the measures that can help the Middle East countries in reducing the security effects of the water crisis. (Minaii, 2008, p.142)

3-1- The role of international law in the establishment of water security in the Middle East

Considering that one of the important tools in the path of objectifying water diplomacy is a legal tool, the important issue that can be raised is in order to solve or reduce the severity of the water shortage crisis and realize water security in the Middle East region. what should international law do? and Does it play a role? Has international law basically entered this valley or is there a legal gap in this field?

In order to answer this question, it is necessary to pay attention to the fact that rights, alone and independent of other aspects of society, are incapable of solving the water crisis and establishing water security throughout the world or in a specific region. But since rights, as a part of social norms, have the possibility of social control, changing the behavior of actors and preventing conflicts, it can help the process of achieving water security.

At the level of international relations, the issue of interrelationship between water and security reached its peak in 2016, when the Security Council, as the most powerful institution with the primary responsibility for maintaining international peace and security, held a meeting with the theme "Water, Peace and Security". Because it was the first time that the members of this council addressed water as an independent security issue. Raising this issue in the Security Council, as the highest level of international political rela-

tions, indicates the importance and necessity of paying more attention to the issue of water security. In simple terms, water security is proof of a situation where water is managed in a sustainable and optimal way in a society (whether at the national, regional or international levels); in such a way that both its productive potential is actualized and its threatening and destructive power is controlled (Minaii, 2008, p.150). Thinkers in the field of diplomacy and water rights have divided and summarized the thematic dimensions of water security in three important areas: 1. water availability; 2- access to water; 3. Conflicts around the uses of water

The first dimension refers to the "availability of water" in the right quantity and quality for the current and future generations at the right time and place and is related to the comprehensive management of water resources and especially the sustainable support and preservation of the integrity of water resources. Maintaining the quantitative and qualitative stability of water in the current crisis situation in the Middle East requires countries to overcome the sovereignty-oriented theories and instead of trying and competing to meet their own water needs, consider the needs of the entire river basin countries regardless of political borders. With the aim of assigning the most benefits and the least damage to each other and to the ecosystem of the watershed, they should turn to water cooperation and interpret or modify the existing rules with this approach. It is clear that, examples of progress towards this approach can be seen in the current rules of international law. According to Articles 5 and 20 of the United Nations Convention on the Rights of Non-Navigational Uses of International Waterways (1997), governments are required to use and develop common water resources with the aim of "sustainable and optimal use" along with sufficient support and preservation of the international waterway ecosystem. Also, the new tendencies in the international community regarding the need to protect water ecosystems, including taking into account the environmental rights for rivers, lakes and international wetlands, which are in dispute in the Kishanganga arbitration decision in the conflict between Pakistan and India was approved in 2013 and the Court of Arbitration linked it to the issue of sustainable environmental protection, it can bring about positive changes in realizing the security of access to water and solving the current problems in providing sufficient and healthy water, (Indus Waters Kishanganga Arbitration 2013, pp.449-453).

"Access to water" forms the central focus of the water security discussion. This dimension implies the right to use water resources by the users, at the domestic and international levels. Lack of proper access to water is also one of the water challenges in the Middle East. To the point that more than 60% of the population living in this area do not have safe drinking water or have limited access to it. Meanwhile, "the principle of fair and reasonable use of trans-boundary water resources, as a fundamental rule of international water rights, seeks to ensure access to this basic element for coastal countries in an international watershed. In addition, the efforts made in order to recognize the right to water and oblige the governments in domestic and cross-border dimensions to provide the conditions of access to clean water for people living in their own country or other countries, will play a fundamental role in realizing water security. So that if the governments in the

cross-border dimension adhere to this rule that in their exploitation of the common waterway, which is the source of supply of water necessary for drinking and domestic use of the people of other countries, they will not cause problems for these people's right, an important part of water access problems will be solved (Buzan & Weaver, 2009, pp.44-45).

The third dimension of water security refers to the prevention of domestic and international armed conflicts around water, protecting water resources and facilities from the harmful effects of conflicts, as well as restoring water resources and trying to meet the needs of consumers after the end of hostilities. Considering that the aridity of the Middle East can be a reason for the beginning of water wars and conflicts in the future, international law by providing methods of peaceful settlement of international disputes and also helping to create The flexible legal regime in the use of international waterways tries to prevent the occurrence of water conflicts through the use of cooperation tools. Also, considering the continuation of armed conflicts in some water-scarce regions of the Middle East such as Syria, Iraq and Yemen, the principles and rules of humanitarian law and the emergence of some rules governing the post-war phase, the minimum legal framework necessary to protect water resources and facilities during war and facilitates the achievement of water security in the post-war phase (Rashidi, 2020, pp.215-274).

3-2- Cooperation: international law solution to solve water insecurity in the Middle East

In any case, although the water crisis may occur in a region of the world such as the Middle East, the fluid nature of water, its cross-sector nature and the interconnectedness of the international relations system cause the effects and consequences of this crisis, to threaten the entire peace and security international community. It is clear that the establishment of water security, which can facilitate the movement towards maintaining international peace and security, as the most important goal of international law, above all, requires the participation and cooperation of international law subjects. Especially, governments and international organizations (Fazaeli & Rashidi 2019, p.220). Apart from the fact that the principle of cooperation is one of the fundamental foundations of the current international order, in many documents and special treaties in the field of international water resources management, including Article 8 of the United Nations Convention on the Rights of Non-Navigational Uses of Water International Waterways (1997) has taken a more objective form. Despite this, international governance in the field of environment in general and in the management of trans boundary water resources in particular, especially in the Middle East, has long been dominated by the preference of sovereignty over joint management of these resources. Therefore, passing the narrow concept of sovereignty and moving towards the acceptance of the issue that sovereignty is not a negation of responsibility for cooperation is the key to solving the pervasive water crisis in the Middle East region. Although there are signs of this approach in the declaration of the principles of international law regarding friendly relations and cooperation between states, where the duty of

cooperation between states regardless of differences in political, economic and social systems in order to achieve It can be seen that it recognizes international peace and security, but still international law is incapable of making fundamental changes in the traditional perception of governments on sovereignty, and it is appropriate to use the available tools, including the drafting of binding documents. In the field of trans-boundary water resources management, creating a judicial procedure and with the help of international organizations and institutions, the duty of governments to international cooperation in this field should be made one of the basic elements of governance. In this regard, goal 6.5 of the 2030 sustainable development goals, which stipulates the comprehensive management of water resources at all levels through cross-border cooperation, can be a beacon for this action. by establishing and making operational this cooperation at the level of each trans-boundary watershed requires the role of international law based on a formula, the main elements of which should include: concluding an international treaty overseeing the management of that watershed, establishing a regional joint institution to carry out coordination, establish and formulate coordinated and joint programs using continuous negotiations based on the commitment to regular exchange of information, information and consultation and also predicting suitable methods for a peaceful settlement of disagreements. Also, the recognition and commitment of the governments of this region to ensure and guarantee the human right to water and advance towards the community of interests' approach for the management of trans-boundary watersheds will facilitate the solution of the water crisis in the Middle East and, consequently, in the world.

3-3- Middle East, water crisis and suitable strategy for Iran

In recent years, the results of unstable land management, the occurrence of climate change and destruction caused by military activities, have led to the emergence of various environmental crises in the Middle East region. In Iran, lakes and lagoons have dried up, permanent rivers have turned into seasonal rivers or completely dried up, there is no trace of the fountains in mountainous areas, in most parts of Iran wells are moved. They are permanent and daily acts, the small and large ponds which used to be the jewel of this land, have become the center of fine dust, the deterioration of ecosystems in the form of oak drying in the west, the removal of boxwood in the north, the lack of species reproduction and desertification and the emergence of various diseases and pests have occurred, all these cases are a sign of the convergence and synergy of unsustainable water management with climate change in this region, especially in Iran. Following these environmental developments, with mass migrations, buying property in neighboring countries, moving to the north of Iran and living in that region, increasing the departure of elites and educated people from the country, gradually the cultural, social, economic and Finally, security issues will appear. It is clear that, this is the picture of the environmental developments inside the country, on a regional scale, Turkey has used the emptiness created by the various wars in Iraq, Syria and Yemen and all kinds of political, military and security conflicts and implemented and developed Water control projects and the con-

struction of all kinds of dams, regardless of the international environmental commitments and its neighbors, have carried out extensive measures in the last two decades, the countries of Syria, Iraq and Iran are victims of this country's actions, these actions are the ground for the gradual destruction of the two countries Syria and Iraq, which were once the cradle of great civilizations, also the effects of these measures have been well demonstrated by the creation of permanent centers of fine dust in these two countries, unfortunately, the movement of fine dust in the aforementioned centers is towards Iran due to the direction of the western winds. Undoubtedly, in the not-so-distant future, Turkey will not be without the consequences of its actions, this region will have major events such as water wars, the massive movement of migrants and the start of new conflicts on its southern borders. The selfish policies of Turkey, the intervention and colonial movements of the great powers and the incompetence of the officials of the countries of Syria and Iraq, who have involved themselves in internal and regional conflicts without paying attention to the demands of the nation. Therefore, we are facing two challenges caused by the water crisis: the water crisis within the borders and the water crisis in the neighboring countries in the west and east of the country. The impact of the water crisis inside and outside the border is different and requires appropriate management strategies: 1- The water crisis on the territorial and national scale has wide environmental, economic and social consequences and must be managed in such a way that the effects of the challenges caused by it in the development process of the country, are controlled at the lowest cost. 2- Environmental effects caused by water management in neighboring countries including Turkey, Syria and Iraq in the west of the country and Afghanistan in the east of the country. (Minaii, 2007, p.14)

Currently, two common terms "water issue" and "water crisis" appear in conversations and writings, which are different in terms of definition and quantitative indicators, and different strategies, are used to manage and control them. Fresh water that can be extracted in the world is about 5400 cubic meters, in Iran based on the long-term average water yield, which is about 126 billion cubic meters, and considering the population of 84 million people, the water per capita is about 1500 cubic meters, now if the average water yield of the last ten years Considering the decrease in rainfall and the increase in evaporation due to the increase in temperature due to climate change, it has decreased by about 30%, reaching a number of 88 to 90 billion cubic meters. Taking into account this major decrease, the number per capita is 1047 cubic meters. According to the internationally agreed index, if the water per capita in a country is less than 1700 cubic meters, that country has entered the phase of water issue, and when this number approaches 1000 cubic meters, that country will enter the period of water crisis, considering the average in the last ten years, the country's water supply per capita is about 1000 cubic meters, in other words, Iran has entered the era of water crisis and this situation is permanent, the appropriate strategy in this situation is acceptance and adaptation. Ignoring the water crisis has irreversible consequences in the environment and economy, as well as creating widespread and irreversible cultural and social crises. Accepting the permanent presence of water crisis in the country, its management and

control should be in such a way that its environmental consequences are minimized, the primary human need for drinking water does not become a concern, and the remaining water satisfies the needs of economic sectors such as agriculture and to supply the industry. On a global scale, consumption of 10% of extractable fresh water is a rational and sustainable strategy, and consumption of up to 40% is acceptable. Taking into account the average of the past ten years, Iran's water yield is about 90 billion cubic meters, and assuming 40% of the country's water yield is about 36 billion cubic meters, it can be planned to meet the needs of drinking water, industry and agriculture, and the rest is about 54 billion cubic meters flows as a part of the natural hydrological system in different small water basins of the country in aquifers, fountains, rivers, lakes and lagoons, with this approach, the environmental consequences of the water crisis can be completely managed and controlled, water-dependent ecosystems continue to live peacefully and sustainably, the country's environmental concerns are minimized, and a phenomenon such as indoor dust, especially caused by the drying of wetlands, is completely eliminated. On the other hand, by adopting a suitable strategy in industrial development and focusing mainly on technological industries, which are low in water and have a relative national advantage, these industries will be transferred to areas such as the southern coasts on the Persian Gulf and the Oman Sea, and along with the development of commercial and tourism centers, most of their water and their dependent residential units are obtained through desalination, thus, the necessary amount is added to the country's water supply. It is necessary to remember that desalination of sea water and transfer to other population, industrial and agricultural centers that are located at a great distance from the coasts, considering the cost of desalination of water, transfer and especially the high consumption of energy due to the plateau conditions of this country, It is not efficient and a sustainable mechanism in any way, so it is suggested that the use of sea water should only be considered for industrial, commercial, tourism and population centers on the coasts and transfer to other places should not be considered. Also, relying on new knowledge and technologies, the policy of recycling water and reusing it with high quality in big cities and other population and industrial centers, the water demand of these centers has been greatly reduced and is carefully controlled so that the remaining water is used in the agricultural sector and to ensure the relative food security of the country. When a carefully defined right is provided to the agricultural sector, according to the knowledge and technology capacity of scientific and research centers in this sector, it is easy to provide a major part of the country's food needs by increasing the water efficiency in the production of agricultural products. Among the solutions that are proposed for water supply today, the use of inter-basin water transfer method or the use of deep water, the use of deep water is neither economical nor sustainable and is against the environmental indicators of the country, inter-basin transfer should also be only for drinking water, it should be considered as the last option and it is not suitable in any way for other sectors including agriculture and industry. The requirement to implement this approach is to adopt a suitable development strategy that is less dependent on natural resources and agriculture. Another serious is-

sue that should be considered is how to deal with possible future political and security tensions related to the water crisis and its consequences in the political geography of the region. As it was mentioned before, Turkey, regardless of these possibilities and using the opportunities created due to the lack in political and security fields, pursues all water management programs in the form of building all kinds of dams, the countries of Syria and Iraq in the near future will be the main victims of these activities and all the activities of these two countries, especially the activities of the agricultural sector, will come to a complete halt.

As in recent years, the consequences of the drying up of important rivers such as the Tigris and the Euphrates have caused the creation of large centers of fine dust in these two countries, and according to the direction of the winds, Iran has been affected by this phenomenon. In the east of the country, based on the studies conducted, contrary to the agreement between Iran and Afghanistan, the water received in the Sistan plain was not based on the agreed quota, but rather the floodwaters, if the wells were not dug halfway, this area would have had problems even in providing drinking water. Therefore, the region is filled with political and security crises caused by the water crisis and its economic, environmental and social consequences. Iran should minimize its negative effects by managing the water crisis within its borders, first, in the development process, and second, by strengthening its economic, social and security position in the geopolitical position of the region, not as a party to the challenges, but as an influencer in the agreements, to control this huge crisis. (Bareghi & Ghanbari, 2010, p.17)

4- Examining the crises and challenges of Iran with its neighbors in the water basin

4-1- Exploitation challenges in the east and northeast of Iran

In the northeast of Iran, there are two countries, Afghanistan and Turkmenistan, which, due to being located in arid and semi-arid regions, suffer from water scarcity and similar needs. In this region, population growth, disproportionate distribution of water, shared water resources, incorrect agricultural policies, lack of correct and integrated management of water resources and lack of exploitation agreements have doubled the problem (Rezaian, 2016, p.14) Unlike historical, Cultural and geographical covenants, these three countries' cooperation on the issue of water has been limited. Doosti Dam is one of the results of cooperation between two countries in the field of shared water resources, which was accepted between Iran and Turkmenistan. Unfortunately, due to the lack of tripartite cooperation between the countries of Iran, Turkmenistan and Afghanistan during the construction of the dam, Afghanistan is currently building two dams on the Hari River, due to its relative stability and dire need for water which it will affect the runoff entering the Doosti Dam and it faces a serious problem in the storage, regulation of water and the supply of agricultural water in the Sarakhs Plain, So using the water in the Doosti dam cannot be a good solution for water shortage in Iran and Special attention should be paid to border underground waters. The water contracts between Iran and Afghanistan have been focused on surface water since about 130 years ago, especially the use of Helmand water, which Iran's share in each agreement has become less compared to be-

fore, and Afghanistan, using the advantage of being at the top, has sometimes pushed Iran to a passive position. Therefore, according to the establishment of a stable government in Afghanistan, this country will need more water resources in order to revive its agriculture, which is the only major part of its economy (Karimi, Soltani & Taheri, 2015, p.84).

Among the neighboring countries, Iran and Iraq have the most topographic connection and watershed overlap in terms of surface water flows, and due to Iran's high altitude and mountainous location, billions of cubic meters of water flow into Iraq every year. What these countries have done so far in the field of water supply is mostly in the framework of their security and national interests and in the form of projects such as the creation of reservoir dams (unstable and short-term solutions to solve long-term and permanent problems)) and so far a case of Cooperation in the field of underground water has not been observed in these three countries; Therefore, in order to prevent the aggravation of the water shortage crisis and endangering human security, in addition to the comprehensive management of water resources, there should also be a comprehensive look at the hydro politics of surface and underground waters in these areas (Mohammadjanian et al., 2015, p.64).

4-2- Challenges of exploitation in the west and northwest of the country

In the north-western part, Iran has a common border with the three countries of Armenia, Azerbaijan and Turkey, and in the west with the country of Iraq. There are five border aquifers in this region, the largest of which is the Tarvus/Zagores aquifer, which is shared between the countries of Iran, Iraq, and Turkey, and Iran is located in the upper reaches of this aquifer. The total population covered by the Tarvus/Zagores watershed is 1.44 million people, which includes important cities such as Darbandikhan and Zakho in Iraq, Gilan Gharb, Qasreshirin and Sarepole Zahab in Iran, as well as small cities in Turkey like Basque and Kapili. In the rest of the watersheds of this region, Iran is in the lowest position; therefore, different approaches are needed in the field of cooperation with other countries and the management of these watersheds (Mirshekaran et al., 2020, p.127).

5- Conclusion

The water issue in the Middle East is faced with several undeniable facts. On one hand, the Middle East region is one of the dry regions in the world, while holding highest population growth rates in the world, and increase in water consumption. On the other hand, with the lowering of the underground water level and the increase in the salinity of existing waters and their increasing pollution, the water problem has become one of the serious and dangerous challenges of the region. In this sense, one of the regions of the world where the politicization of water, or in other words, hydro politics, has been openly raised and intensified is the Middle East. The water crisis in the coming years will have much wider dimensions than the current situation. Forecasts show that the demand for fresh water consumption in the Middle East will increase by 60% until 2045, and the fresh water resources of the Middle East will reach a figure 10% lower than the current level by 2050. Among the disputes regarding the way to divide water, including the countries of Iraq, Syria, Turkey on the Tigris and Euphrates Rivers, Jordan, Syria and Israel disputes on

the exploitation of the Jordan River water, Iran and Afghanistan on the Helmand River, Egypt, Sudan and Ethiopia on The water division of the Nile River is one of the examples of water challenges in the region. To face the challenge of the water crisis in the country, different solutions can be offered at international levels and different dimensions. One of the reasons for the current problems of the water sector is the existence of problems and the mismatch of upstream documents with the current situation of this sector. In this regard, it is expected that the laws of the development plan, in addition to compensating for the gaps in the previous development plans, will propose effective solutions to deal with the challenge of the water crisis. Unfortunately, such an approach is not seen not only in the laws of the development program, but also in all the upstream documents of the water sector. In this article, an attempt was made to evaluate the future water situation in Iran by designing and presenting scenarios. The proposed scenarios provide a perspective that can help decision-makers in the areas involved with water resources in formulating policies and inform them of the possible consequences of their decisions.

Implementation of reform and the application of correct and realistic management together with the use of new technologies suitable for climatic conditions, the country can be protected from serious damages caused by the future water crisis of the world. The country will also be protected against human catastrophes and environmental disasters occurrence.

- Establishing cooperation across national borders and formulating a global action plan for access to safe water for all sections of society is essential.

- The need for global participation and increasing international aid to developing and underdeveloped countries

- Demand management approaches, which is one of the main topics of water resources management, especially in countries with limited water, should be in the water resources management programs of the countries, and it should receive special attention.

- It is suggested that as a comprehensive and continuous program, governments should allocate one percent of their gross national product to solving water problems and its crisis.

- It is suggested to regulate the demand of this precious and rare resource through water pricing. But it should be noted that this price increase should not prevent countries and low-income people from accessing enough water.

- How to allocate scarce water resources with the participation of consumers is one of the other suitable proposed solutions to solve the problems caused by the water problem.

- From a theoretical point of view, the most logical way to efficiently manage trans boundary water is for countries to use water for agriculture, hydropower and other services based on their relative advantage.

- In order to solve the water crisis, cross-border and regional cooperation of countries, especially in the Middle East region, is obvious and necessary.

- It is suggested that institutions be formed to resolve disputes and coordinate common re-

sources, including common water resources and other strategic concerns.

References

Altinbilek, Dogan (2004). Development and Management of the Euphrates–Tigris Basin, Water Resources Development Journal, Vol. 20, No. 1, March, pp. 15–33.

Al-Ansari, Nadir, (2016). Hydro-politics of the Tigris and Euphrates basins, Luleå University of Technology, Sweden, Engineering Journal, August, pp. 140-172, Published Online March 2016 in Scientific Research

Arabs on water resources basis, International Journal of Business and Social Science, Vol. 3, No. 12, pp. 275-289, June 2012

Araghchi, Abbas (2014). Water Diplomacy from Conflict to Cooperation, World Politics Quarterly, No. 14

Araghchi, Abbas (2016). Trans boundary Water Diplomacy and the International System, Tehran: Ministry of Foreign Affairs Publishing House.

Buzan, Barry and Weaver, Ellie, (2010). Regions and Powers. Translated by Rahman Ghahramanpour, Tehran: Research Center for Strategic Studies.

Dolatyar, Mostafa and Gary, Tim S, (2010). "Water Policy in the Middle East", translated by Rasool Afzali and Reza Al-Tiami nia, Tehran: International Publishing.

Fazeli, Mostafa and Mahnaz Rashidi, (2019). "Investigation of governments' commitment to water security in international law", Legal Studies, Volume 11, Number 2

Karimi Soltani, Javaheri, F. & Zaheri, (2015). Water crisis in Iran and solutions for correct management and overcoming it", the first conference on water demand management and water consumption efficiency, Hamadan.

Kaviani Rad, Morad & et al. (2018). "Analysis of the concept of water security from the perspective of political geography and geopolitics", Geopolitics Quarterly, Volume 15, Number 53

Minaii, Mehdi, (2007). "Water is an effective factor in determining the role and geo-economic position of Iran in the Middle East region", Middle East Studies quarterly, 14th and 15th year, numbers 3 and 4

Mirshekaran, Yahya, (2020). The effect of climate changes on the security-orderly consequences of the water resources crisis with an emphasis on the hydro politics of border areas. Climate change studies.

Mohammad Khan, Raja (2015). A perspective on the evolving geopolitics in the Middle East, Margalla Papers.

Mohammadjani, A. and Yazdani, N. (2014). "Analysis of the water crisis situation in the country and its management requirements", Trend magazine (Trend of Economic Research)

Rashidi, Mahnaz, (2020). Water Security in International Law, Tehran: Majd Scientific and Cultural Assembly, first edition.

Rezaian, Ahad. Rezaian, Ali Hossein, (2016). The future research of water crisis in

Iran by scenario method, Eco hydrology.

Tryfon, Korontzis (2012). The Foreign Policy of Turkey and Israel against

W. Sadoff, Claudia and Grey, David (2005), Cooperation on international rivers: A continuum for securing and sharing benefits, International Water Resources Association, Water International, Vol. 30, No 4, December 2005.

Yaseri, Majid (2010). The hydro political importance of water in the security of the east of the country, Journal of Political-Economic Information, 24th year, numbers 9 and 10