



STUDY AND ROLE OF ZAB, SIRVAN AND ALVAND RIVERS IN HYDROPOLITICS OF WESTERN IRAN BASINS

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Abstract:

Population growth and water scarcity, and the common interests of governments over water, such as rivers, have made water a decisive factor in government policy. Today, water has entered the field of relations and disputes between governments as a competitive and desirable material, which is why water resources (such as rivers) are often considered as a security problem at the national and international level. ; Because in many countries, water resources management has created fierce competition for dominance and control of transnational water resources, Iran's future is geographically in the dry land belt. Due to its topographic features, Iran loses about 8 billion cubic meters of water annually due to the flow of several rivers to Iraq. Therefore, we are obliged to exploit this great natural wealth. However, we must remember that the use of these resources will have internal and external hydro-political consequences. The first and most important consequence will affect Iran-Iraq relations. Due to geopolitical issues, relations between the two countries have been turbulent in recent decades. However, it seems that the Iran-Iraq relationship could be affected by the water issue. Due to Turkey's activities in the Tigris and Euphrates rivers, Iraq is currently facing problems. Therefore, Iraqis may react to Iran's water transfer projects in the small Zab, Alvand and Sirvan basins and resort to deterrent measures. At the same time, these basins are mostly located in Kurdish areas, which are mostly Sunni, and any activity in these basins can provoke the Kurds in the region. The present study uses a descriptive-analytical method to evaluate the hydro-political nature of these basins and their political consequences. At the same time, the present study seeks to provide appropriate approaches to reduce the political and social costs of implementing these projects.

Key words: Alvand river, Zab river, Sirvan river, hydro-politic, Iraq, , West of Iran.

INTRODUCTION

Nature is not confined by political boundaries. It has bestowed specific resources on each region, nation, and ethnicity. The conflict among human societies is rooted in the disproportionate and uneven distribution of such resources among different regions and nations, especially, nations who are incapable of managing their own affairs based on their environmental conditions. High rates of population growth, accelerated pace of urbanization, development of agricultural methodologies, enhancement of communication means, and environmental erosions have exerted an ever - increasing pressure on drinking water resources in different countries. These pressures have exasperated tensions over water resources among various nations. Since old times, rivers have played a significantly important role in providing water resources for human societies. Upon the emergence of modern states and the establishment of political boundaries among these states, water resources played more tangible roles in political orientations. As a result, we are witnessing an ever - increasing tension among rival states in attaining greater shares of these natural resources, especially, in arid and semi - arid regions. From this perspective, many realists believe that water crisis will be the basis for many regional tensions in the future. In the Middle East, as a region which tensions over water resources have adopted an accelerated pace, those states which have greater access to water resources will be able to play a more influential role in hydro-political and geopolitical relations in the region. Those rivers which pass through several countries are referred to as international rivers (Williams, 2021). Nowadays, there are more than 200 international rivers throughout the world. The kind of actions and interactions among nations that



are taking advantage of such common sources cover a wide spectrum: from full compatibility and cooperation to total incompatibility and confrontation (Husseini, et al, 2020).

Hydro-politics is a balanced combination of the two terms of water and politics. Hydro-politics studies the effect of water on politics and political decision - making at local, regional, and global levels. It can create divergence (tension) or convergence (relief) at each of the aforementioned levels (Alizadeh, 2004). Hydro-politics is the study of confrontation or cooperation among nations in order to share water resources among themselves (Elhance, 1999). As a result, we can describe hydro-politics as a science which, given the scarcity of fresh water resources and increasing consumption of these resources, studies the interaction among political units at local, regional, and global levels. Perhaps, we can consider Peter Heggett's "Hypothetical Pattern" as the first pattern which concentrated on geographical origins of such tensions among neighboring states. He has evaluated and assessed tensions over water resources in a hypothetical country within the following two contexts:

1. Seizure of upstream waters of a river; and interpretational differences over the water division line. (Hegget, 2000). As a result, we can argue that knowledge about the distribution of water resources and its consequences for different parts of the world can give us a better understanding of the so - called century of Hydro-politics.

2. Water scarcity crisis: According to existing data and statistics, some 4.2 million people (over a half of the world population) have no access to healthy and hygienic drinking water. Some of these problems are enumerated as follows:

(a) Disproportionate distribution of water resources throughout the world. We should specifically remember that some 70% of fresh water resources throughout the world are located in Polar Regions and glacial mountains.

(b) Many great rivers of the world and their water resources belong to several countries. In other words, such countries are dependent on water resources that are located outside their national boundaries.

(c) Underground water resources become rapidly depleted and brackish.

(d) Surface water resources are polluted due to industrial and agricultural activities (Hafeznia and Nikbakht, 2002).

In order to obtain their necessary water supplies, some countries have constructed dams over rivers. At the same time, most of the dams throughout the world have been constructed on rivers that pass through several countries. As a result, construction of dams over such rivers can create conflicts among states that are stakeholders of these water resources. More than 40% of the world population is living along the coasts of rivers that pass through the territory of more than two countries. Due to their strategic geographical status, those states that are located in upstream areas of international rivers usually take greater advantage of water supplies of these rivers. Therefore, we will deal with the hydrological and hydro-political situation of the Middle East in this article.

HYDRO - POLITICS IN THE MIDDLE EAST

There are few wars that started over water and water supplies. However, scarcity of water supplies has always played effective roles in such confrontations. Such confrontations happen in regions that are naturally exposed to the scarcity of water supplies and acute droughts. These countries are obliged to provide water for their economy and their ever - increasing population. The Middle East region is exposed to such a state of affairs. Water crisis in the Middle East region is more dangerous than any other region of the world. Currently, Israel, Jordan, and the Palestinian Authority are seriously at odds over their shares of the water of the Jordan River. Egypt, Sudan, and Ethiopia are also conflicting with each other over the water supplies of the Nile River (Farinosi et al, 2020). In the latter years of the 20th century, Petros Ghali, former secretary general of the United Nations, predicted that the next war in the world would be over water and water supplies. Turkey has differences with Iraq and Syria over the water of Tigris and Euphrates rivers. Iran and Afghanistan, too, have serious tensions over the water supplies of the Hirmand river. In order to get further access to underground water resources, authorities in Saudi Arabia are digging deeper and deeper wells. A large portion of these water supplies belong to Saudi Arabia thousands of years ago. Some experts

and analysts believed that underground water resources in Saudi Arabia will be depleted in the near future. It is for this reason that Saudi Arabia has embarked on establishing huge complexes for the desalinization of the sea water.

During the past few years, the Middle Eastern states have initiated plans and programs for obtaining new water resources and taking optimal advantages of such resources. Turkey has already initiated several of such programs. Some of the high - ranking officials of Turkey have previously been managers of the water sector in their own country. They have formulated a

Table 1. Water resources in the Middle East in 2003 (person / cubic meter)

Wet middle east	Population	Fresh water	Per capita fresh water
Iran	61,947,000	8,294,703,300	1339
Iraq	22,328,000	770,539,280,000	3451
Turkey	63,451,000	203,614,259,000	3209
Syria	15,277,000	44,700,502,000	2926
Total	163,003,000	40,831,572,200	2505
Dry middle east	Population	Fresh water	Per capita fresh water
Israel	5,963,000	109,192,000	184
Jordan	4,563,000	903,474,000	198
Kuwait	1,866,000	20,526,000	11
Lebanon	4,210,000	4,799,400,000	1140
Oman	232,000	1,010,578,000	439
Saudi Arabia	20,739,000	2,405,724,000	116
United Arab Emirates	2,724,000	198,552,000	73
Yemen	1,659,900	421,6146,000	254
Total	48,440,000	12,651,226,000	261

Turton, Anthony. 2003.

comprehensive program for the water sector of their country and constructed more than 200 dams during a specific period. Turkey has, at the same time, implemented other programs in this regard. The Persian Gulf littoral states have also embarked on spectacular programs for providing their required water supplies. The United States, Saudi Arabia, and the United Arab Emirates are the three top producers of fresh water from the sea water. According to statistics of the United Nations Educational, Scientific, and Cultural Organization (UNESCO), Kuwait will be one of the countries that will suffer greatly from the scarcity of water supplies during the next decade (that is, an annual per capita of 11 cubic meters).

THE STATUS OF WATER RESOURCES IN IRAN AND ITS WATER CRISES

Iran is geographically located in the tropical region of the Northern hemisphere. It is also situated on the so-called Desert Belt of the earth. As a result, it is a country with four seasons and vast deserts. Due to internal and external factors, Iran has attained specific climatic features. A combination of these features and elements has contributed to the creation of various climatic patterns in Iran, each of which covers a portion of Iranian geographical arena (Hafeznia, 2002). Western regions of Iran are located in the basin of rivers that are currently in both Iranian and Iraqi territories. This basin is, in fact, a narrow strip which is almost situated between Northern latitudes of 32 and 35°. Mountains and highlands of this region are stretched along Iranian Western borders. This basin covers several geographical latitudes and its mountains act as a buffer against Western climatic flows. These



features are determinant factors for the climatic situation of this basin (Geographical organization, 2006).

The total annual rainfall in Iran is around 414 billion cubic meters (Shafiee, 2011). Average annual rainfall in Iran is 250 mm, that is, one - third of the average rainfall throughout the earth. Some 274 out of the 414 billion cubic meters of these annual rainfalls in Iran (almost 68% of the total annual rainfall) are precipitated (Nahazi, 1999). The volume of current surface water resources in Iran was estimated to be almost 100 billion cubic meters per annum (Hafeznia, 2002) (Table 1). There are almost five thousand small and big rivers in Iran, some of which are permanent rivers. Seventeen rivers are more than 300 km long. Karoun is the longest Iranian river; whose length is 890 km. Karoun is the 42nd big river in the world. Iran has 89 border rivers: 17 of them are jointly owned by Iran and neighboring states; 4 of the rivers enter into Iran from neighboring countries; and 68 rivers exit to the neighboring countries from Iran. Rivers that enter Iranian territories can be enumerated as follows: 1) Aras and Atrak River in North of Iran, which enters into the country from Turkey and Turkmenistan, respectively; and 2) Hariroud and Hirmand Rivers in the East of Iran, which enters into the country from Afghanistan. Rivers that exit from Iranian territory are categorized into 9 groups: 14 rivers join the Caspian Sea; 6 rivers in the North east of the country join the Aras River; 9 other rivers in the North east and East of the country carry some 60 million cubic meters of surface water resources of the country to Azerbaijan, Armenia, and Turkmenistan; the three rivers of Piran, Lar, and Routek which transfer some 50 million

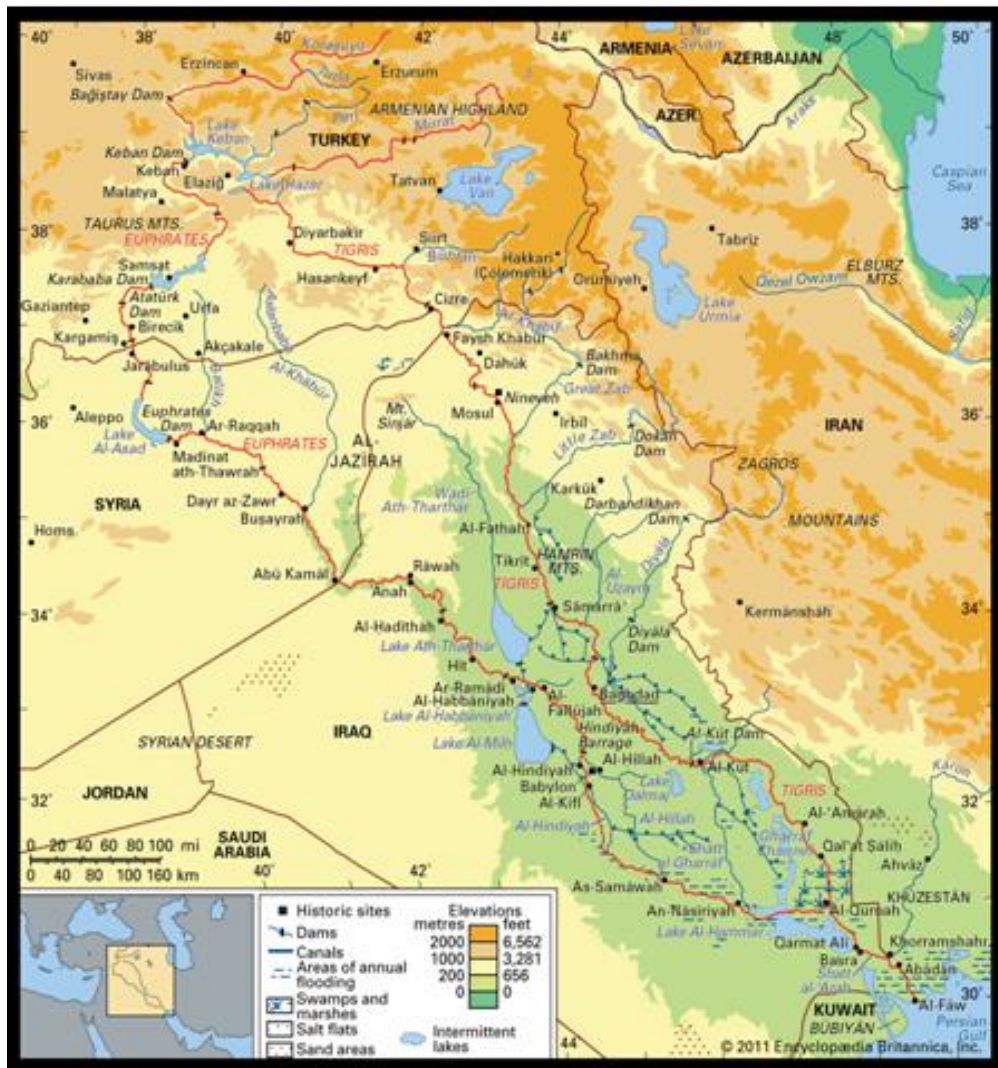


Figure 1. The state of water supplies in Iran.

cubic meters of Iranian surface water resources to Pakistan; 12 rivers join the Persian Gulf and Hour AL - Azim; Bahou, Minab, and Kajou rivers join the Oman Sea; 18 rivers in the West of Iran carry some 7 billion cubic meters of Iranian water supplies to Iraq (some assessments have announced this figure as up to 9 billion cubic meters). There are 68 rivers in Iranian border basins which move out a total of 30 billion cubic meters of water from the country each year. Some 6 billion cubic meters of this water pours into the Caspian Sea; some 16 billion cubic meters is poured into the Persian Gulf and the Oman Sea; and some 8 billion cubic meters of it moves into the territories of Iraq, Pakistan, and Turkmenistan. Ten provinces of the country have common border rivers with neighboring countries. Among Iranian neighbors, Iraq has the greatest topographical links with Iran. Iraq has the highest number of common basins with Iran. Iran is a mountainous country. It is geographically located in the upstream areas of several major rivers that pour into the Iraqi territory. As a result, several billion cubic meters of Iranian water supplies flow towards the Iraq annually (Figure 1). Iran's population is 70 million (based on the latest census of 2006). This population consumes some 100 billion cubic meters of renewable water resources of the country. Iran's population will reach 90 million in 2021. Such a population requires some 140 billion cubic meters of renewable water supplies. However, Iran's renewable water resources are only 130 billion cubic meters. If this trend continues, the country will be faced with a 10 billion cubic meter shortage of water supplies. Currently, one third of Iranian territory enjoys sufficient water supplies and the remaining two thirds of this territory are categorized among the arid and semi-arid regions of the world. Therefore, uneven and patchy distribution of water supplies in Iran is another problem which this country is

Table 2. Status of Iranian water resources.

Country	Land area	Average annual rainfall (mm)	Annual rainfall (billion cubic meters)	Volume of surface water (billion cubic meters)	Underground water resources (billion cubic meters)
Iran	1,648.195	289	400	100	35

Geographical Organization of Armed Forces, 2006.

faced with. This phenomenon has created some major problems for the country. In the near future, these problems will be further exasperated due to various phenomena, such as an ever - increasing population growth and the climate change. As a matter of fact, Iranian authorities are obliged to make serious reviews in their foreign policy towards water and water supplies.

Iraq's vulnerability in the area of water resources

Tigris and Euphrates rivers are considered as major sources of water supply for Iraq. Iraqi authorities have always been concerned with possible measures and initiatives in Turkey and Syria which can end in probable deprivation of the Iraqis of these two major water supplies in their country (Bigdeli, 1989).

Reduction of water supplies has created some fundamental problems for the agricultural sector in Iraq. This phenomenon also interrupted the production of hydroelectric power in the country. For instance, upon the construction of Tabqa Dam in Syria and installment of powerful turbines, Iraqi officials announced that this project would reduce the production of hydroelectric power in Iraqi power stations up to 40%. (Institute of Strategic Studies of London, London: Construction of Ataturk and Al-Sorah dam in Turkey and Syria, respectively, along with the implementation of other development plans in the water sector in the region created some problems for the Iraqi government that are considered as part of the Iraqi national security concerns. Through practicing their control over Tigris and Euphrates rivers and adopting a geostrategic role for themselves, Turkey and Syria have been able to impose their outlooks on the Iraqi government to a large extent (Sadeghi, 1997)

The three countries of Iraq, Turkey, and Syria are greatly dependent on these rivers for their own development. Nevertheless, their consumption of these water supplies is not equal. Each of them consumes a different volume of the water of Tigris and Euphrates rivers (Table 3).

In such circumstances, any control over water supplies that flow out of Iran will specifically become critical. Turkey and Syria made several rounds of bilateral negotiations about their legal differences over their shares of water supplies of Tigris and Euphrates rivers from 1962 to 1971. Iraq and Syria also conducted similar negotiations about their legal claims over these two rivers from 1962 to 1974. From 1972 to 1974, Turkey, Iraq, and Syria made trilateral negotiations about their legal claims over Tigris and Euphrates rivers. Their trilateral negotiations continued once again from 1983 to 1992. Syria and Turkey embarked on bilateral negotiations in 1993. Meanwhile, the three countries made several rounds of bilateral negotiations with each other in 2001. However, their differences are still unsolved.

There is an important point in Turkey's stance towards Tigris and Euphrates rivers: Turkey considers water supplies as natural resources which should be subject to the governance and authority of the Turkish government. Therefore, Turkish authorities consider it as a natural right of their country to take advantage of its water supplies as unlimitedly as possible. On the contrary, Syria and Iraq claims that Tigris and Euphrates rivers are international rivers and want a share of these rivers (Table 3).

Common water resources of Iran and Iraq

As was pointed out, Iran is a geographically extensive country which has common surface water resources with its neighbors. As a matter of fact, Iran and its neighboring countries are geographically linked with each other. Iran has the greatest topographical and geographical links with Iraq. Currently, some 9.7 billion cubic meters of Iranian surface waters from the three sub-basins of Zab and Sirwaan, ALwand, and Karkheh and the greater Karoun flow towards Iraq from the Iranian territory. This volume of water flows into Iraqi territory through Zab, Sirwan, Changouleh, Goujan Cham, Zimkan, Alvand, Karkheh, and the other rivers. Only the volume of annual surface water that flows into Iraqi territory from Zab and Sirwan sub-basin is around 5 billion cubic meters. Therefore, we can witness that Iraq receives a huge volume of surface water supplies from Iran (Table 4). As a result, border regions of Iraq (up to a depth of 100 to 200 km) are greatly dependent on water supplies that flow from Iran. Without receiving such huge water supplies from Iran, agricultural and economic activities in border areas of Iraq will be faced with fundamental problems (Figure 2). Arvandroud river (Shatt Al-Arab) is the most important Trans - Boundary River between Iran and Iraq. The annual volume of water supplies of this river is around 2 billion cubic meters. Karoun River, with

Table 3. Water supplies of Tigris and Euphrates rivers.

Country	Percentage of Tigris river (%)	Percentage of Euphrates (%)
Turkey	52	14.1
Syria	32	5.4
Iraq	65	92.5
Total	149	112

(Gurer, 2004).

Table 4. Rivers flow from Iran to Iraq.

River	Major basin	Sub - basin	Volume of exit water (million cubic meters)	Province
Zab	Persian Gulf	Zab	2144.4	West Azerbaijan
Ghezeljeh Sou	//	Sirwan	81.9	Kurdistan
Ab Sirwan	//	//	2712	//

Zlmkan	//	//	282.5	Kermanshah
Hawasan	//	Western border	151.3	//
Ghorahtou	//	//	53.6	//
Alwand	//	//	520/3	//
Kanga Goush	//	//	68.4	//
Kangir	//	//	157.6	Kermansha and Ilam
Gedar Khoush	//	//	151.3	//
Gham Sorkh	//	//	-	//
Kanjan Cham	//	//	179.7	//
Gavvy	//	//	34.6	//
Changouleh	//	//	167.1	//
Meymeh	//	//	163.9	//
Douyrij	//	//	148.2	//
Karkheh		Karkheh	2775.1	Khuzestan
Total	-	-	9791.9	-

an annual output of 24 billion cubic meters is the main source that feeds Arvandroud River (Shatt Al-Arab) (Afshin, 1994).

RESULTS AND DISCUSSION

Undoubtedly, the implementation of huge water projects in western parts of Iran is associated with both positive and negative consequences which can be enumerated as follows:

Positive effects

Enhancement of Iran's geopolitical status and its bargaining power against Iraq: With the implementation of water control projects in Western Iran, Iraqis will be deprived of billions of cubic meters of water supplies that flow in from Iranian territory. This is the most important consequence of the implementation of such projects in the Western parts of Iran. As a result of the implementation of such projects, Iran's geopolitical stance towards Iraq will be greatly enhanced (Table 5).

Economic prosperity

Implementation of such projects contributes to economic prosperity and social well-being of the people who are living in Western regions of the country. Based on the Land - Use Principle, which emphasizes on the development of each region based on potentials and features of that region, the best choice for the development orientations in this region is land - based development. In other words, due to its climatic condition and geopolitical situation, this region is dependent on agricultural activities. As a matter of fact, agriculture is the fundamental basis for the development in this region. Agricultural activities are compatible with environmental

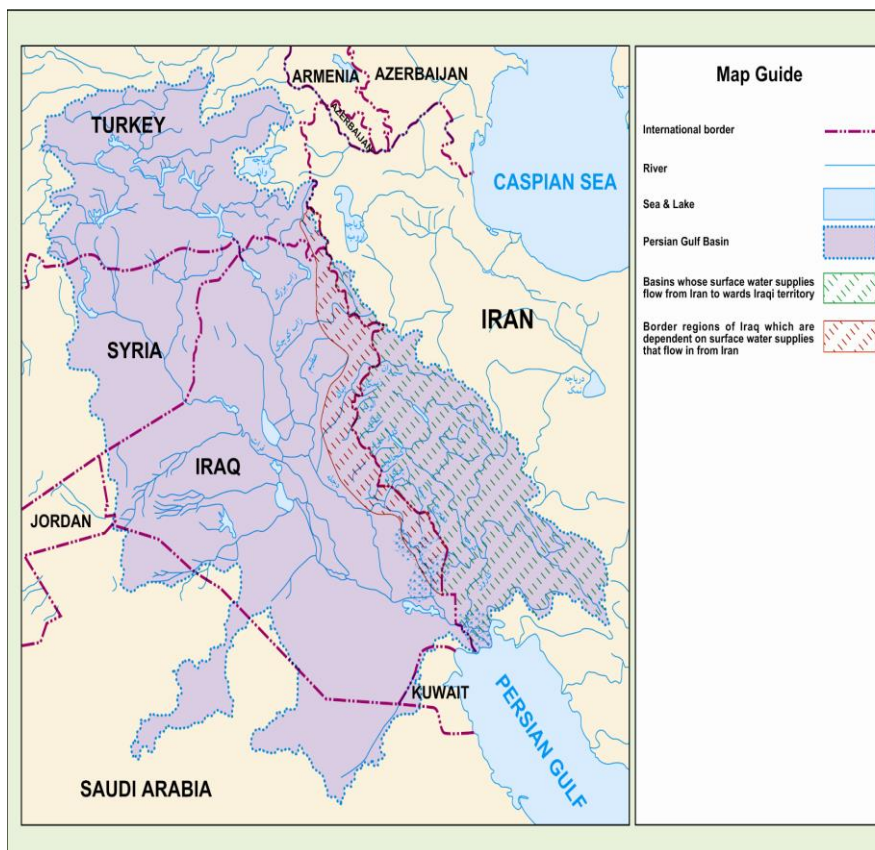


Figure 2. Water's border area in Iraq.

Table 5. A comparison of the status of water resources of Iran and Iraq.

Country	Average annual rainfall (mm)	Volume of annual rainfall (billion cubic meters)	Volume of surface water (billion cubic meters)	Volume of underground water (billion cubic meters)
Iran	289	400	100	35
Iraq	800	100	90.7	2

conditions of the region. In addition, agriculture sector is more attractive for investors who are interested in making secured investments in this region. Also, some projects have been defined for producing hydroelectric power in this region. Considering topographical features of the region, especially, in West Azerbaijan Province, and its geographical distance from hydrocarbon reserves of the country, it is highly efficient to produce hydroelectric power in this area. In addition, through implementing of such projects, we can provide necessary infrastructures for the development of other sectors of our economy. As a matter of fact, such projects contribute to the growth and development of the region and boost the prosperity and welfare of its people. They create job opportunities and enhance security in the region.

Maintaining and preserving the national security

In climatic categorizations, Iran was classified among the arid regions of the world. Due to its population growth, Iran was faced with severe problems that arose from scarcity of water supplies in the coming years. Scarcity of water supplies will severely reduce per capita water consumption in Iran, especially, in Southern, central, and eastern parts of the country. Western parts of the country have access to greater water resources. However, a great volume of surface water supplies of this region flows into the Iraqi territory. Therefore, it is quite natural to prevent our surface water

supplies from flowing out of the country in order to preserve national security and contribute to the further development of this region.

Interaction among various basins of the country and enhancement of national unity

Through implementing of different projects for the transfer of water among various basins, we can create further connectivity and linkage among geographical regions of the country and contribute to the further promotion of national unity. As a matter of fact, through implementing of such projects, we can transfer water supplies to those regions of the country which are inhabited by the Azeri and Arab ethnicities. In the long run, such a process will certainly have positive and appropriate effects on strengthening solidarity among various regions of the country. Some of the negative effects are summarized as follows:

- i. Negative reaction of local people;
- ii. Negative reaction of local elites;
- iii. Possibility of sabotage activities in these projects;
- iv. Jeopardizing border security in the region due to possibility of crises in western areas of the country;
- v. Interference of regional and global powers and hard - line groups of the region;
- vi. Environmental consequences;
- vii. Intensification of religious and linguistic gaps.

CONCLUSIONS

Utilization of the water of rivers that are jointly owned by two countries, especially, when both countries suffer from scarcity of water supplies is always a challenging issue. Iran has its own peculiar climatic condition. Water supplies in Iran are not equally distributed. At the same time, Iran is faced with the issue of population growth. Therefore, Iran is obliged to utilize water supplies that are flowing out of the country through its Western borders

with Iraq. Certainly, such an initiative can jeopardize Iran - Iraq relations. Nevertheless, implementation of such projects can have tangible economic benefits for the country. Such projects enhance Iran's geopolitical status and its bargaining power in mutual negotiations with Iraq. Considering Iran's geographical situation in this region, Iranian authorities should concentrate on the implementation of these projects in order to control water supplies that are flowing out from the Western borders of the country. Implementation of such projects is specifically important at this stage, in which Iraq is faced with multiple problems in other areas. Iran should act as cautiously as possible at this stage and Iranian authorities should be focused on protecting the national interests of the country. At the same time, they should act carefully so that implementation of such projects metes out the least possible damage on Iran - Iraq relations. Iranian authorities should also be cautious about possible repercussions of such projects and their probable provocative effects on the feelings of regional people which are:

- i. Enhancement of Iran's diplomacy regarding the formulation of laws and regulations about international rivers
- ii. Mutual negotiations with Iraq about the utilization of Border Rivers and taking advantage of all existing potentials in order to make maximum use of water supplies that are flowing out of the country;
- iii. Cooperation for providing energy requirements of Kurdish regions in Iraq in order to encourage Kurdish people in this region to cooperate with the implementation of hydro projects in western Iran;
- iv. Contributing to Iraq in attaining proper access to open seas: Such an initiative will not only reduce the intensity of Iraq's possible reaction to future Iranian water projects in Western parts of the country, but will also make Iraq dependent on the Islamic Republic of Iran geopolitically.
- v. Mutual understanding with Iraq over joint venture in various affairs of Border Rivers from constructing dams to environmental initiatives;
- vi. Providing necessary water for agricultural and industrial activities in the region and transferring the surplus water to other basins;
- vii. Implementation of publicity campaign programs in order to convince public opinion in the region;

viii. Taking advantage of Kurdish elites and influential figures in order to reduce political and social costs of such projects;

ix. Since Kurdish and Azeri people in this region have had no friendly relations with each other in the past, we are required to convince Kurdish people that such projects are national projects which will be carried out in order to save the Uremia Lake from getting dried up. Though the ideal purpose of hydro-politics should be that of sharing of fresh water resources amicably and amenable without hurting the environment. There are many hurdles for the realization of such ideal purpose. This paper presents in detail an important example to the issue of hydro-politics endangering environment, ecology and natural resources. It is about the Uremia Lake being endangered because of the construction of numerous dams over rivers that pour into this lake, the most important of which is the Boukan Dam.

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