

# Consequences of the Israeli hydro-hegemony on the Jordanian water security

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## Abstract

**Purpose** – This study aims to test the role of the state of occupation, represented in Israel, as one of the most significant challenges, which faces the Jordanian water security. Where Israel expands in its policy and ideology everyday its hydro-hegemony over the Jordanian waters. Hence, its acts result in negative consequences on the Jordanian water and food security, which in turn affects the Jordanian national security as a whole.

**Design/methodology/approach** – This study relied on the following two approaches to tackle its problem: first: descriptive approach: the descriptive approach depends on defining the apparent features and describing their nature and the type of the relationship between its variables. It aims to achieving a better and deeper understanding on the situation of its future policies and measures. And research uses the system analysis approach to handle the subject matter. Given the influence of water on the development, Jordan, as an organic or a political and social state, takes into account the reasons and causes of development. Jordan turns into an active political state, with water as an influencing factor on it. This premise represents the core of the system analysis approach.

**Findings** – The research concluded that the Israeli theft of the Jordanian waters is the main factor in the Jordanian water crisis. If Jordan had received its usurped water rights by Israel, it could have been able to solve its water issue represented in the increasing deficit in its water balance. Therefore, the Israeli hydro-hegemony on the Jordanian water resources caused the imbalance in its water security and, in turn, caused the development process to falter in general.

**Originality/value** – The value of the research lies in the fact that it addresses the most important reasons behind the water crisis in Jordan, represented in the Israeli control over the Jordanian water resources and the research shows that the amount of water stolen by Israel is enough to solve the water crisis in Jordan.

**Keywords** Water security, Arab-Israeli conflict, Water scarcity, Water deficit, Climate change, National water carrier, The Jordan river basin, Water rights, The peace treaty

**Paper type** Research paper

## Introduction

Water security in Jordan represents one of the main obstacles that not only limit but also interrupt economic development. Given the vitality and the controversial state of water in Jordan, it turned into an issue of security, politics and economy. Taking due account of the water to achieve food security, the water security in Jordan stands to be a significant challenge, affecting the national security at large. Therefore, if water security drastically



deteriorated, it would cause a parallel deterioration across the entire national security, which in turn would threaten social stability.

The water challenge is one fundamental challenge facing Jordan,' H.M. King Abdulla II highlighted while setting the National Water Strategy 2008–2020, 'Our Water situation is, but a strategic challenge we cannot turn a blind eye to. We have to strike a balance between drinking water needs and industrial and irrigation water demands. Drinking water remains the most essential and the highest priority issue [1].

The Hashemite Kingdom of Jordan tops the 10 most water-scarce countries in the world. The Jordanian desert makes up to over 85% of the country due to lack of rainfall and the natural population growth that exceeds 3.1%, which makes one of the highest global ratios. On the other hand, Jordan suffers from phenomenal population growth, because of the recurrent migration from neighbouring Arab countries because of the recurrent wars. Hence, Jordan became a country of refugees. Moreover, Israel takes control over the Jordan river, which makes more than half of the water sources in Jordan, mainly after Israel took over the northern sources of the Jordan river (i.e. Banias, Hasbani and Aldan). Israel started transferring part of the water of the river to the Negev Desert and the rest of its water to the Sea of Galilee, which turned into a natural water basin. In the same vein, Israel treats the Sea of Galilee as an Israeli water source, so it was able to exclude the Sea from any future negotiations. Therefore, this study mainly looks into the period since 1953, the beginning of the implementation of the seven-year plan. The said plan introduces transferring the water of the Jordan river to Negev Desert. This measure causes depriving Jordan from one of its most significant water resources, which in turn negatively influenced the economic development in Jordan.

Israel started transferring several brackish springs surrounding the Sea of Galilee to the southern watercourse of the river. Accordingly, water arriving in Jordan tends to be brackish and unusable for agricultural purposes, except after mixing it with groundwater, which affected the development projects in Jordan. Further, it left a large area of land infertile because of water scarcity, increasing the unemployment rate because of the large number of employees who opted to leave their jobs in the agricultural sector.

Based on the information above, this research deals with a central issue represented with the Israeli hegemony over the Jordanian water resources and the attempts to take control over the Jordanian water. It suggests the major danger and threat to the Jordanian water security given that Jordan suffers from basic and natural issues like the natural challenges and the unnatural population growth with Jordan becoming a host of Arab refugees.

This study clarifies and identifies the water resources in Jordan. It then presents the risks and threats on the Jordanian water security mainly like the Israeli hydro-hegemony. Then, it discusses the different approaches of the hegemony. Finally, the study concludes the most significant consequences and their impact on the Jordanian water security.

## Study approach

This study relied on the following two approaches to tackle its problem:

### First: Descriptive approach

The descriptive approach depends on defining the apparent features and describing their nature and the type of the relationship between its variables. It aims to achieving a better and deeper understanding on the situation of its future policies and measures. It also goes beyond merely collecting descriptive data about the phenomena to analysing, connecting, interpreting, classifying and measuring this data to find the results. The goal here is to come

to the scientific evidence that stresses one answer over the other for the questions of the research (Al Rufa'i, 1998).

We aim by using this approach to describe the Israeli hydro-hegemony on the Jordanian water and its influence on the Jordanian water security.

Second: This research uses the system analysis approach to handle the subject matter. Given the influence of water on the development, Jordan, as an organic or a political and social state, takes into account the reasons and causes of development. Jordan turns into an active political state, with water as an influencing factor on it. This premise represents the core of the system analysis approach.

The social action theory lays the foundation of the system analysis approach, which views the social phenomena from political, economic and cultural perspectives. Talcott Parsons established the organic theory (Parsons, 2012) and followed the social action theory. This approach focusses on the comprehensive view of the phenomenon researched, taking into account all of its perspectives and components. Talcott suggests that every phenomenon has its reasons, factors and variables, which he studies in combination, considering they maintain inter-relationships where each of the components influences one another (Naser, 2003).

In addition, this research follows the model of David Easton of system analysis, that is rock-bedded on a simple premise that the political life is a set of interactions within the state borders, surrounded by social systems and variables that always affect the state (Easton, 1945). He also concentrates on the environmental factors that surround the political system "inputs" and the results "outputs" of the exposure to the inputs. System analysis, he sees, takes into account this never-ending cycle of interactions between the environment and the political system and its ability to remain balanced and adaptive and thus survive the outside influences, where they do not cause any system imbalances (Easton, 1949). The political system is a unit of analysis within the system analysis approach and is a set of interactive and functionally connected components in a systemic manner, which implies that a change in one component influences the rest of the components.

According to the system analysis approach and the organic theory, Jordan as an entity and a political system influenced in its ability to survive by a set of internal and external variables (inputs), acts after treating them via its internal and external policies towards it (outputs) that determine its ability to survive. Appropriately, this research follows this approach considering water as one of the inputs that constitute the political system and the Israeli hegemony over it that threatens water security (Awad, 2009).

### Literature review

Ahmad Alsaydeh explains in his book, water challenges and their effects on the Arab East, that, regarding Jordan, water sources in the Kingdom are about to deplete, because of the Israeli occupation and control of the Arab lands, especially after the war of 1967. He also elaborates that there are growing Israeli risks and aspirations and ongoing efforts to steal the Arab water using all ways. Meanwhile, it attempts to keep bolstering its relations with Ethiopia and Turkey (Alsayadeh, 2016).

Adel Aladayleh, in his book, The conflict on water in the Middle East: war and peace, stresses the depth of the water crisis that the Kingdom suffered from, prior to signing the peace convention with Israel. He sheds the light on this crisis through discussing its impact on the development process, as he believes that the shortage of water resources led to refrain from using or reforming thousands of hectares of arable lands (Aladayleh, 2005).

Omaish Omaish explains in his book, water crisis and the water situation in Jordan, the Jordanian approach in covering its water needs. He claims that the severe water shortage in

the Kingdom stems from main and other secondary reasons. He believes that the main reason for the crisis is the Israeli extortion of the Jordanian water (Omaish, 2013).

Rawa' Altawel, in his study, *The political and economic effects of water*, participated in explaining and clarifying the motives and reasons behind the Israeli behaviour in stealing the Arab water. Besides, Israel build strategic relationships with Turkey and Ethiopia; succeeding to keep Arab countries such as Egypt, Jordan, Syria, Iraq and Lebanon under siege (Altaweel, 2016).

Ibrahim Issa, in his book, *water crisis in the Arab World: the problems and the possible solutions*, believes that although Jordan river basin represents no more than 2% of the Nile river, it is of special importance because of the focus of the Israeli-Arab conflict on it. Therefore, Issa considers Jordan river basin the most important element in Arab water security. It might be the most difficult problems discussed on the level of the Arab security (Issa, 2015).

In his book, *the new Middle East*, Shimon Peres indicates that the reason behind water shortage in the region is natural phenomena, the high increase of the population, improper use of water and the politics lacking the rationalization required. When tackling the solution, peres considers water in the Middle East as a public property. The issue of water is an indicator of the need to establish a regional system, possibly, more than any other issue (Peres, 1994).

In his study, *the economic effects of the Syrian Refugee crisis on the Jordanian Economy*, Khalid Alwazy looks into the economic situations in Jordan prior to the Syrian crisis. He clarifies that there are negative and acute effects regarding unemployment, increasing the poverty rate, deterioration of the economic development rates and increasing the inflation and indebtedness (Alwazny, 2012).

The World Bank conducted a study, *“End of Immigration and promoting shared prosperity”* that clarifies the effects of water shortage, the implications of the Syrian crisis on the Jordanian economy and the inability to bring abroad investments, especially those that rely on water. This, in turn, exacerbates the issue of unemployment and the prevalence of poverty (The World Bank Group, 2016).

Given the vitality and relevance of the subject matter, the researcher divides this research into two parts. The first part sheds light on the primary water resources in Jordan and discusses the challenges that face the Jordanian water security including the Arab-Israel conflict, the Israeli confiscation of water and the massive population growth that has been confusing future water plans. The second part is given over to demonstrate the primary Israeli methodologies to take control of the Jordanian water; it also moves to discuss the way the Israeli threat could influence the Jordanian water security.

### First: Water resources in Jordan

Water plays a significant role in agriculture, economic development, social structures and relationships with neighbouring countries such as Iraq, Israel, Palestine, Kingdom of Saudi Arabia and Syria. Considering it as one of the topmost draught countries in the world, the Hashemite Kingdom faces a growing water problem. Besides, the Jordanian people are one of the most water-deprived worldwide with only 145 m<sup>3</sup> per capita per year, a number, that is, potent to reduce further by 2025 to 91 m<sup>3</sup>. Water scarcity takes place when water consumption reaches 1,000 meters per capita per year, whereas severe water scarcity occurs when water consumption reaches 500 m<sup>3</sup> per capita. Water shortages in Jordan impact economic development, political stability and national security [2].

The increasing demand for water in Jordan creates considerable pressure on the national water resources and widens the gap between supply and demand because of the rapid

population growth, high standards of living and the agricultural expansion. The supply deficits amounted to 250 million m<sup>3</sup> in 2000. It increased to reach 565 million m<sup>3</sup> in 2007. What is more, it may leap to 630 million m<sup>3</sup> by 2025 (Yorke,2013,2019). The Jordanian water resources consist of renewable and nonrenewable groundwater, rainwater, run-off.

A Rainwater: Jordan depends on rain as a primary source of water. However, water amounts are seasonal, and 5% of rainfall seeps into the ground to charge the aquifers. Whereas over 3% of it gathers in the form of run-off. The losses of rainwater outstrip 90% due to evaporation and transpiration (EMARCU, 2003).

Rainfall depends on the geographic location and features of the state. Almost 90% of the land of the Kingdom is arid or semi-arid and the average amount of the rainwater in Jordan reaches 8230 million m<sup>3</sup> per year. This amount is less than the regional average. Moreover, rainwater volume in Jordan depends on the location of the area in terms of their latitudes, their height above sea level and distance to a body of water. Therefore, rainwater in Jordan generally decreases from the west to the east and from the north to the south and it records the highest percentages around the heights. As a result, population expansion takes place in rain-fed areas (Yorke,2013, 2019).

A – Surface water and rivers: This resource consists of river water, springs, side wadis and flooding in winter. The amount of surface water and rivers reached 677 million m<sup>3</sup> per year in the early 1990s. This source of water centres mainly in the Yarmouk river basin and the rest distributes around the other basins of the Kingdom (Al-Rousan *et al.*, 2001). The researcher opts not to elaborate on listing the already scarce water basins in the Kingdom, instead to highlight the main Jordanian water resources. The Jordan river is the primary run-off water resource, followed by the Yarmouk river having one of its main tributaries flows in the Mediterranean Sea, the lifeblood of the Kingdom. Over 50% of the water resources in Jordan rely on the Jordan river, which is relatively small compared to the Nile river and the Euphrates river. However, the Jordan river brings an enormous benefit to the region because of the issues above such as water scarcity and the insufficient rainfall. Run-off water in Jordan suffers from the same problem the rest of Arab countries suffer from; water resources flow from outside the Kingdom, similar to the most important Arab water resources: Nile river and the Euphrates river. Correspondingly, the Yarmouk river flows from Syria and the source of the Jordan river fell under the Israeli hegemony after 1967. Additionally, the Jordan river remains the most significant flashpoint in the Arab-Israeli conflict on water.

Though the Yarmouk river is an affluent of the Jordan river, for research purposes, the researcher divided the Jordanian rivers into two main rivers, namely, the Jordan River and the Yarmouk river.

In addition, the Sea of Galilee adds to the list, which is a natural water reservoir of the Jordan River and its main affluent. It is almost 165 km<sup>2</sup> long and 24 km<sup>2</sup> wide, with an approximate water volume of 490 m<sup>3</sup>. It is around 214 m below sea level. Rainfall feeds it with 65 m<sup>3</sup> annually, in addition to 135 m<sup>3</sup> that it receives from wadis and side affluent. The total of water provided to the Sea is around 760 m<sup>3</sup>, 270 m<sup>3</sup> of which evaporates (Encyclopaedia of Palestine, 1984).

Israel mistreated the Jordan river in the worst possible ways through building one-sided projects on the river. One of these projects is transferring the water of the river to Negev Desert via the Israeli national water carrier since 1964. In return, this caused major deterioration to the water and environment of the river. Moreover, it prevented Jordan from using any drop of water from its northern resources. Therefore, the Sea of Galilee, which Israel considers as pure Israeli lake stores the rest of the water (New found land Labrador, 2010).

Form the other hand, nature played its role with the muddy sediments and the anthropogenically carves caused by the force of water flow of the river in some areas. Moreover, the sediments the side affluent throw to the river and that causes an increase of the muddy substances in the river, which reached up to more than 5,500 particles per million compared to 600 particles per million in Euphrates and Mississippi rivers and 800 particles per million in Tigris river ([Encyclopaedia of Palestine, 1984](#), pp. 163-164).

As for the Yarmouk river, it is the most critical surface water resource and the lifeblood of Jordan. Especially after Israel took over most of the Jordan river water. Therefore, there were attempts to use the overflow amount of the Yarmouk river by storing it by building a dam on the river and use its water in summer. It aims at providing additional water resources to meet the growing needs and to avoid the Israel pressure to store said amounts in the Sea of Galilee, considering the later as the main water reservoir – as Israel claims. Jordan reduces the aforementioned claim due to the political and economic risks it imposes on the Jordanian security. Especially with the Sea lying within the Israeli borders and under the Israeli control. In addition to that building, the dam is shown as the best economic and practical solution as it is within the Jordanian borders. Moreover, the dam is more costly when it comes to delivering water to Jordan. Oddly, Jordan agreed to store part of the water of the river in the Sea of Galilee in winter, as the agreed-upon Jordan-Israeli Peace Treaty in 1994 in the water section ([Musu, 2017](#)).

It is clear that the surface water represented by the waters of the Jordan river and the Yarmouk is a significant source of water for the Kingdom of Jordan. However, the source of these resources is outside the Jordanian borders. The Yarmouk river originates from the Syrian lands, whereas and the Jordan river is controlled by Israel. Jordan is at the mercy of Syria and Israel when it comes to obtaining a continuous flow of surface water.

B – Groundwater: It is one of the most critical water resources in Jordan and it is used for drinking purposes in the major population centres such as Amman, Zarqa and Irbid. Said cities have the largest populations. Moreover, the wells were misused by pumping water to meet the population needs that increase in an arrhythmic manner. In return, it leads to a decrease in water quality and confusion of the authorities responsible for the management of water resources in the Kingdom.

Most of the renewable aquifers in Jordan are located below the surface basins. Furthermore, the groundwater and surface basins overlap with each other. Such a spillover is a logical and normal result. Surface water works to recharge the groundwater and surface water depends on the annual rainfall rates. However, it is at risk because of the possibility of contamination of the groundwater due to the spread of waste dumps in the surface basins, where part of the surface water-bearing germs and toxic substances by the waste leaks into groundwater, can influence the quality of this water. The drinking water in the Kingdom depends almost entirely on groundwater resources, which accounted for 65% of the domestic water supply in 2012. If any, the said confirms the importance of this resource for the drinking water sector in the present and future [3].

There are misused groundwater basins, with a percentage of some reaching about (200 %) over the safe extraction. This depletion of water led to a decrease in the safe consumption of groundwater, low productivity of wells and deterioration of water quality. The water measurements of groundwater levels and their quality, through the network of observation wells, indicate a decline in groundwater levels, degradation of water quality in the extracted, low overall productivity of wells and negative impacts of groundwater abstraction. One of the most prominent evidence of the low level of groundwater in all the ponds of the Kingdom is the drying up of a large number of springs and the low draining rates of others. The low draining rates of many springs and the drying of others were observed since the end of the



1980s. Many of them continued to dry up and be drained in the 1990s and the beginning of the new century until the most considerable decline in the draining rates of springs during 2010[4].

This fact foreshadows a dark and dangerous water future for Jordan and makes it suffer from a real water crisis that threatens its water security, making its food and national security in the wind.

## **Second: Challenges and risks facing Jordanian water security**

### *Population challenges for Jordanian water security*

The primary purpose of this research is to show the extent of the influence of Israeli domination on water resources because of the conflict factor on Jordanian water security. Considering the increase of natural population is relevant to the core of the subject. The Israeli occupation is a direct cause in some of these waves of migration. The first of these waves occurred after the Palestinian Nakba in 1948, where hundreds of thousands of Palestinian people fled to Jordan. The second wave occurred after the Palestinian Naksa in 1967. In addition, it is no longer convincing to consider the main reason for the invasion of Iraq is due to its possession of weapons of mass destruction. Some suggest that Iraq aimed to possess the said weapon to hit Israel with missiles. In the same vein, Israel attacked Iraq and destroyed its under-construction nuclear reactor in the early 1980s. Reviewing this increase of population as a threat to the Jordanian water security and for research purposes, it has a separate title.

Moreover, Jordan witnesses one of the highest population growth rates in the world that amounts to 3.1%. However, external and internal events influenced population growth and distribution. For example, armed conflicts in neighbouring countries led to five waves of migration to Jordan.

The Jordanian census of 2015 showed that the total population of the Kingdom amounted to about 9.5 million; of which 6.6 million were Jordanian, making about 69.7% of the total population. While, three million were non-Jordanian, making about 30% [5].

The population growth was bigger during the past decade, especially since 2011; the annual population growth rate reached 5.3% between 2004 and 2015. This increase stems from the successive Syrian migrations to Jordan. Moreover, the Jordanian annual population growth rate was 3.1% against the same rate among non-Jordanian people; which reached 18%. This situation negatively influenced all development areas of the Kingdom, bar none [6].

The Minister of planning and international coordination, Imad Fakhoury, declared that the direct cost of the Syrian migration crisis to Jordan is US\$10.5bn including what is caused of instability in the area and the obligations to shoulder the burden of 1.5 million Syrian, who sought refuge during the past seven years. It equals 4% of the gross domestic product (GDP) of the annual government revenue. Additionally, there was an increase in the unemployment rate going up to 15% – three times higher than its % prior to the crisis and the increase of the poverty rate [7].

Moreover, the Jordanian minister of water and irrigation, Hazem Alnasser, declared that the direct cost of the Syrian refugee is almost US\$315. The indirect cost for water and sewage is US\$254, which is an equivalence to almost US\$374m annually. This result adds to the cost of groundwater, the environmental effect and the crisis management, which is JD 204 per refugee, which equals US\$364m annually. With this in mind, the total annual cost is almost US\$700m, which adds to the burden on the national budget of Jordan [8].

The consequences of the Syrian crisis continued in the entire economic sectors. This crisis created pressure on the infrastructure, water, health and education sectors in particular, as well as other sectors the government still supports it with special allocations.

This led the government to take internal and external loans to meet the increasing expenditure. The years following the Syrian crisis witnessed the biggest process of raising the prices by the government through raising the taxes to finance its increasing expenditures and to overcome the fiscal deficit. This led the Jordanian people to protests against raising the prices, which in turn affected the political stability of Jordan (Alwazny, 2016).

The crisis did not only impact education, health, water and energy sectors. Provided the need for security control over the borders by the Jordanian armed forces spread on 378 km since 2011 and the need to deal with terrorists and drug smugglers, the crises but also created security and social issues. Moreover, the crime rate increased by over 12% during the current year, not to mention the widespread of begging and prostitution phenomena [9].

These frequent migrations multiplied the population and increased demand for the already scarce water resources. Adding climate change and unpredictability makes things even more complex and critical. Rainfall in recent years became scarce and irregular among the seasons. All these things confused the strategic plans for the Jordanian ministry of water and irrigation, for reasons beyond the will of planners.

#### *The role of the Arab-Israeli conflict in competing for water*

The water cause between Israel and Arabs is the main factor in the political nature of the conflict between the countries of the Jordan river basin. This political conflict of the Jordan river basin countries involves different directions and paths, but water rests at the core of it and is the main driver in managing the conflict in the region of the basin. The political crisis emerged with the beginning of the Zionist plans to settle six million Jews in the land of Palestine and to impose pressure on its water resources, in an area already suffering from a severe shortage of water resources. Further, the displacement of Palestinian refugees to water-scarce Jordan intensified the water crisis. Additionally, Israel set a clear plan to steal Arab water and in particular the share of the participant countries in the Jordan river basin.

Water is an essential and necessary life resource. Some politicians describe it as the eldest son of the Arab-Israeli conflict. We can predict through the history of the conflict that the search for water and the capture of the land has always been deeply linked to each other. Further, the parties are yet to find peaceful solutions to the conflict over the land, unless they approach the other issue fairly and reasonably solution. The next issue of the fair and reasonable distribution of water is not any less important and complex than the importance of the water factor in the history of the Arab-Israeli conflict is twofold. The first element is materialistic: the Jordan river lies in a dry area with seriously depleted water resources. The life of people depends on the capability of the country to provide security and protection over its food security, independence and its energy resources. Hence, the Jordan river is particularly critical, specifically to the Kingdom of Jordan. The second element is historical and ideological, for the land and its cultivation have always been the first and most important pillar of the Zionist doctrine (Joseph *et al.*, 2005).

The Israeli opinion on its water security occupied a main position in the strategic thinking, as the beginning of the thought of establishing the State of Israel. This thought relied on false religious and historical claims that stemmed from their belief in what the Torah mentions: "I will give you each place your feet step on." They also were also based on the primary establishers like David Ben Gurion when he said; "The Jews are going through a war on water with the Arabs and the results of this war determine the destiny of Israel". If it does not win this battle, we will not be in Palestine (Nabil and Fouad, 1998). This situation indicates the significance of water to the Israeli governments; they consider it as a matter of existence or inexistence. Israel did not merely take water shared with the Arab countries,



but it expanded its vision to the water of the Litany river in Lebanon and the water of the river Nile and Euphrates. This is clear by the works of coordination and relationship building with Turkey in the North, Ethiopia in the South to knock the Arab world down.

In the same vein, all the Israeli projects stem from the architectural projects and comparisons to share the water resources among it and the countries in the region. Kally explained this issue in his book *water in peace: Israeli opinion*. He was the manager of economic planning for the Israeli regional waters. He proposes a set of solutions based on sharing the water outside the Israeli borders. However, he adds that these solutions may not bear their fruit unless they took place within the framework of establishing peace among Arabs and Israel. He also adds that this shall be part of the peace programme and that the negotiations among the countries of the region on the development of the water resources and sharing them will in turn help establish a sustainable peace (Kally, 1991).

The research addresses the issue of the Israeli hegemony over Arab waters through two main axes. The first axis is the ongoing Israeli mechanisms and effort to control Jordanian water. The second axis is the repercussions of Israeli control over Jordanian water security.

### **Third: Israeli ongoing mechanisms and effort to control arab water**

Water holds a prime place in Zionist strategic thinking it often drives it. The more the water is scarce, especially in the Arab region, the more extended the investigation gets to get access to it. The Zionist movement recognized the prominence of water, as the beginning of its establishment. Therefore, all the plans set by them enable it to seize the water resources in Palestine and neighboring Arab countries.

Moreover, the Zionist movement urged Israel using all ways to guarantee to control the most critical water resources in the region. One of the most critical approaches was:

#### *Political approaches*

The first real beginning of the interest of the Zionist movement in Arab water, specifically in the Jordan river basin, goes back to 1867. The British royal society, in cooperation with the World Zionist Organization, sent a delegation of experts and engineers to Palestine to find the Palestinian natural resources. They said that Palestine is a country with the capacity to settle millions of people. The Negev desert could absorb a large number of Jews if they diverted water from the north where water is abundant (Al'Amri, 1988).

The Zionist movement tried to set the borders of their state based on the water-based facts. The movement also requested, as the beginning, to include the entire Golan Heights, Mount Sinai, the Litani river and the Jordan Heights (the mountains of the Levant). It aimed to have full control over water resources and sources and to bring the largest number of Jews to Palestine. Additionally, it aimed to pose pressure on and to blackmail the Arab countries.

This was evident through the agreements between the Zionist movement, the British Government and the advisory committee to set the borders of Palestine. The movement aimed to convince them to border these areas within historical Palestine. Moreover, it managed to convince the commission on the 6 November 1918 to determine these borders. However, the French side opposed the agreement because it ruled Syria and Lebanon. Therefore, according to the Sykes-Picot Agreement, the borders are as follows: to the north by Lebanon and Syria, the east by the Levant desert, to the south by the Sinai Peninsula and to the west by the Mediterranean Sea (Ad-Dayim, 1988).

Chaim Weizmann asked the British and Italian foreign ministers, during Paris Peace conference, not to deny the Jewish people the elements of their economic life and stated there would be no potentiality of arranging an agreement to decide on the matter of water.

This reaffirms the importance of water to the Zionist leaders. They sent a letter to the British Prime Minister David Lloyd George on 29 December 1919. It was the decisive moment of the final negotiations on the fate of Palestine. The letter included “the Zionist organization would like to address you on the matter of the northern borders of Palestine. The Zionist movement established, as the beginning, the bottom line of the basic requirements to create a Jewish homeland. Therefore, it is needless to say that Zionism will not accept under any circumstance the plan of Sykes-Picot as a basis for negotiations because it places the supplying water sources of the Jordan and the Litani river outside of its borders, depriving the Jews of the best settlement fields in the Galilee and the Golan Heights” (Faris, 1967).

The Franco-British agreement on mandatory borders in 1920 brought out the waters of Mount Hermon, the Litani and the lower section of the Yarmouk river from the border claimed by the Zionist movement. However, the latter succeeded at adjusting the northern border and was able to join large water-rich areas close to the Litani river. It aimed to establish the right of the Jews to the obtain the water of the region by international agreements later approved by the International Community and recognized as the basis of any contract of the Arab-Israeli conflict. Israel relied on the negotiations with the Palestinians and the rest of the Arab countries (Al-Kayid, 2020).

During the British mandate period, the Jews sought to obtain water permissions in favour of the projects they were planning to implement in the future and to obstruct any investment of any Arab parties in Jordan and Palestine from any water resources related to these projects. In 1929, the Jewish Company of Rothenburg obtained permission from the mandate authorities to invest in the important internal rivers in Palestine like the Auja river, the Yarkon project in the north of Jaffa and Tal Alrabei', the Muqatta' river and the Kishon project in northern Haifa. They got the permission of investing in the waters of the Jordan and the Yarmouk rivers at their point of convergence for the generation of electricity for 70 years. During the Mandate period, the Jews intended to invest in the water of these rivers to provide drinking water. However, after the establishment of the State of Israel, the water of these rivers was used in irrigation (Kuhalah, 2020).

At the end of the British mandate period, only 350 million m<sup>3</sup> of the Palestinian water resources were to be invested: 260 million m<sup>3</sup> in agriculture, 75 million m<sup>3</sup> for regional use and 15 million m<sup>3</sup> in the industry (Sa'id, 1988).

In the peace negotiations that took place between the two countries, which Jordan relied on a lot to restore its water rights that Israel seized, the former Jordanian King Hussein bin Talal stated: “Jordan will restore through this Convention the full rights of water in the Jordan and Yarmouk river” (Al Adaylah, 2005).

Dr Munther Haddadin, head of the Jordanian negotiating delegation, approved on it when he said: “Water has a role, that is similar to its nature. It is the substance that man uses to extinguish fires, not to ignite them. The role of water in peace is to liberate what Israel took of Jordan, Syria and Lebanon from the waters of the Jordan river and the Yarmouk. Furthermore, the release of the natural rights of Palestinians and the exploitation of the water resources of their country without control but dictated by the need to preserve these resources” (Kally, 1991).

However, Israel managed to convince Arabs that it is also suffering from water issues just like the rest of the region and that solving the problem lies in the development of water resources using modern scientific means. This is one of the smart tactics, which Israel tried to provoke by trying to trade Arab water with Israeli technology. The USA administration adopted this view and analysed the water crisis and its future dimensions. This affair intended primarily not to help the region, but to protect vital American and Israeli interests

in it. Therefore, the interest in advanced water technology encouraged governments in the Middle East to produce new and more efficient methods of water resource management – and water storage strategies. If Jordan regained all its water rights, it would be able to cover a large part of its critical water problem. However, the issue seemed like it resulted from the non-use of modern technology. Therefore, it began to seek joint projects between the parties. The USA, which oversees the water issue as one of the donor countries, made it essential to differentiate between water rights and planning. Further, it was able to persuade the parties to seek solutions that contribute to solving the problem. The USA administration succeeded and parties agreed on the following four main topics: promoting information on water, water management, enhancing water supply routes and finding ideas for enhanced cooperation and water management (Al Adaylah, 2020).

Israel skillfully managed to bring out the affluents of the northern Jordan river and the Sea of Galilee from the process of negotiations with the Jordanian side, the original right owner of them, which constitute of more than half the discharge of the river water. The Jordan-Israeli peace treaty did not include any provision in the water section of Article 6 and Annex II\* [10] about the waters of the Northern Jordan river including the Sea of Galilee. Israel later diverted the waters of their northern affluent to the Negev desert through the national water carrier and stored the rest in the Sea of Galilee. Through the political negotiations with the Jordanian side, it managed to maintain the area of the Jordanian Baqura and Araba Wadi for 20 years, to renew this water-rich area, which Israel has been depleting since it occupied it in 1967.

Despite signing the agreement and bearing the political implications of Jordan because of the criticism of some Arab countries, Israel repeatedly tried to disavow and not abide by them. Further, it claimed that it is unable to implement the agreement and transfer the agreed upon quantities of water to Jordan annually. Moreover, Israel officially reported Jordan between 1997 and 1998 its intention to reduce the quantity from 50 million to 25 million m<sup>3</sup>. It justified this reduction by the decrease in rainfall and the low level of the Sea of Galilee. Jordan, in turn, disapproved and insisted on the Israeli commitment to pump the agreed-upon quantity. The two sides entered into a negotiation process on this matter. Israel used its usual policy of procrastination. In 1999, it demanded a reduction of 33 million m<sup>3</sup> providing the same excuses (Al-Hasan, 1990).

#### *The transfer of river streams*

The attempts of the Zionist movement to take over the Arab water is very old. The beginning of the Zionist thinking in establishing a Jewish state on the land of Palestine, however, the actual beginning of the conflict between the two parties and the explosive situation on water was the implementation of the project of transferring the water of the Jordan river to Negev Desert. The situation, therefore, aggravated further between the two parties and it was very close to explosion. The Arab response took place through the proposal of the Arab experts to store the water of the Jordan river away from Israel through building dams on Hasbani, Baniyas and al Yarmouk rivers. This proposal was presented in the Arab conference held in Cairo on 17/ January/1964. However, Israel strongly rejected these projects and attacked the dam of Khalid ibn al-Walid in 1966 (Al-Wazir, 2010), to introduce launching a bigger attack in the summer of 1967. The said attack allowed Israel to completely take over the northern springs of the Jordan river. The following is the detailed explanation of the transfer of the Jordan river.

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**The project of transferring the Jordan river (the national water carrier from sea of galilee to negev desert)**

The Seven-Year Plan (1953 to 1960).

The national water carrier is the most prominent Israeli water project. The idea of this project developed with the intention of establishing a Jewish state in Palestine. It is the fruit of the Zionist water projects. Accordingly, during the 1949 Armistice, the Jews were keen to control the sources of the Jordan river. When the Jews announced the flow of the Jordan river into the Negev, the diversion began in 1956 and continued until mid-May 1964.

This project is a major turning point in the Arab-Israeli conflict because of its influence and severe repercussions on the Arab water security and the national security and the future of the political, economic and social life of the Arab countries. Therefore, this project is of utmost strategic importance to Israel and was the reason for the establishment of the first Arab summit to take certain decisions and this summit was a direct cause of the war in 1967 and the subsequent wars that exhausted the Arab countries. This project posed a threat to the future of the Arab countries, especially Jordan, which relies on the river with more than half of the water needs of the country.

The Israeli control over the northern sources as a state on the top of the river does not give it the legitimate right because it gained this control because of the military force after the 1967 war. According to the law, this control was constrained by the historical conditions of the river. Based on the Madrid declaration adopted by the institute of international law “neither of these [riparian] States may, without the consent of the other and without special and valid legal title, make nor allow individuals, corporations, etc. to make alterations therein detrimental to the bank of the other State. On the other hand, neither State may, on its own territory, use nor allow the utilization of the water in such a way as seriously to interfere with its utilization by the other State or by individuals, corporations, etc., thereof” (Al-Hasan, 1990). This situation affirms the Israeli violation of the rules of international law.

*Blocking arab projects to benefit from the waters of the Jordan and yarmouk rivers*

Israel has sought to obstruct the Arab projects to exploit the Jordan and Yarmouk rivers under the pretext that these projects will affect the flow of the river and thereby deprive it of the lion's share of these resources. As previously mentioned, Israel obstructed a countless amount of projects.

- *MacDonald Project*: The Jordanian Government ordered Sir Macdonald to launch this project. He commanded not to transfer or use the Jordan river beyond the borders of the basin and denied the Israeli plans to transfer the water of the river to the Negev Desert. He stated “the waters in a catchment area should not be diverted outside that area unless the requirements of all those who use or genuinely intend to use the waters within the area have been satisfied.” However, this moral commitment to the rights of others did not last long, as he backed down from his principles and changed his opinion later because of pressure exerted by the Zionist movement. Moreover, he agreed to change his point of view on the Israeli proportion to the desire of the Zionist movement (Rizq, 2020).
- *Ponger Project 1953*: The Jordanian Government commissioned the water expert Ponger, who worked on the fourth point programme in Jordan, to develop a project that would enable Jordan to meet the increasing demand for water as large numbers of Palestinians migrating to it in 1948. Further, the project aimed to achieve the development of the agricultural sector, which depends on the majority of the population of the Kingdom, by irrigating the arable land in the West Bank and

the East and the generation of electric power. Ponger, in return, proposed to build al-Maqarin Dam on the Yarmouk river with a storage capacity up to 500 million m<sup>3</sup>. The project received support from the International Agency for the Employment and Relief of Palestinian Refugees, which expressed its willingness to contribute to its funding and provided it with US\$40m (Al-Aqali, 1997).

Israel opposed the Ponger this project as it ignored the Israeli demand for water in the river and it demanded to store its water in al-Maqarin Dam and not in the Sea of Galilee as Israel would have wished. Israel wanted to keep the water under its direct control and use water as a tool of imposing pressure against the participating Arab parties. Therefore, it exerted intensive pressure on the USA administration and urged it not to contribute to its funding and it imposed more pressure through UNRWA, as the largest financier of the project to withdraw its approval of the funding process. The USA has responded to the Israeli request to achieve the success of the mission of the envoy of president Eisenhower to the region (Eric Johnston). Further, the goal was to achieve political and diplomatic victory through the issue of water and to strengthen its foundations in the Arab region in response to the growing communism at the time. Moreover, he complied with applying the principle of filling the vacuum adopted by the American president mentioned.

- *Israel has restrained the Jordanian-Syrian agreement:* Signed in 1953 on the investment and the distribution of the Yarmouk river between the two countries. Israel fought it because it ignored its demands for 70 million m<sup>3</sup> of water. Moreover, Israel used its influence with the USA administration to obstruct the project and impose pressure on it not to contribute to its financing. The USA president adopted the Israeli opinion and saw an opportunity to allow room for his envoy to the region, Eric Johnston, to perform his connections and to find a solution to the water issue to achieve a diplomatic victory to the USA policy. Jordan has been incompetent to implement the project until today due to the weak Arab position in the face of the USA administration, the lack of the Jordanian limited abilities and the high cost of the project. In 1964, the Arab League summit in Cairo decided to adopt and implement the project. However, Israel hindered the project again and managed to occupy the northern Jordan river sources and affluent and the Yarmouk river affluent that meets with the Jordan river in 1967 [11].

Jordan and Syria developed a plan to revive the al-Maqarin Dam project in the mid-1970s in the context of the seven-year plan. Jordan focussed on the construction of the dam and it completed all the designs and studies and attracted some foreign funding for the project. The American opinion stated that these technicians do not provide Jordan with what it aims for Irrigation wise and only allow Syria and Israel to gain more water throughout the year. The project postponed because of Syrian-Jordanian differences and it was revived and an agreement was signed between the two countries to reestablish it under the name of al-Wihda Dam. The agreement stated that Jordan bears the expenses of the entire phases of the study. In return, Jordan receives most of the water provided by the project and it guarantees Syria to have access to most of the electricity produced (Subhi, 1994).

However, Israel stood against the construction of the dam and its financing from the World Bank and commanded Jordan to agree to acknowledge 25 million m<sup>3</sup> of Yarmouk water to irrigate the territory of the Yarmouk triangle. It also demanded that Jordan recognize its right to excess water, which Israel has been carrying for several years from the Yarmouk river to the Sea of Galilee. Israel transfers this water through a channel and

pumping stations forcibly set up by Israel on the Yarmouk river before it meets with the waters of the Jordan river and unilaterally. Jordan insisted that the annual share of the Yarmouk triangle is 17 million m<sup>3</sup> as stated in the Arab project presented in the Johnston negotiations. It also refused to agree to give Israel any share of the excess water of the Yarmouk river in winter (Bani Hani, 2009).

#### Fourth: the repercussions of Israeli control over water on Jordanian water security

Israel and Jordan share the waters of the Jordan river mainly despite the participation of Syria, Lebanon and the occupied Palestinian territories. After the June 1967 aggression, Israel confiscated water from Jordan and it withdrew its groundwater from Araba Wadi area. Israel not only seized water from the Jordan river and carried it into the Negev Desert, depriving Jordan of any drop of water from its main sources but also turned brackish water into it because of numerous Israeli projects on the river. This matter has restricted dependent Jordanian agriculture on river water since the 1960s unless mixed with underground water or with nearby dam water (Salamah, 2000).

Here we can divide those repercussions into two parts:

- (1) *Political Consequences:* Some political analysts assume that the coming wars will be on water. Hence, this factor is of a major significance on the lives and sustainability of societies. Prince Hassan Bin Talal, the head of the Blue Peace, expressed his concern on that water and the environment are now used as a tool of war. Despite all of the effort put forward by the international society, he stressed, “the equality in obtaining water is key in having a political, regional and local stability” [12]

Therefore, the unjust distribution of water is one of the factors that add to the political instability. Jordan does not get its water rights taken by Israel by military force and it was not able to get the rights back until it signed the peace treaty between the two parties. Given that, there was a set of serious political consequences.

- *On the internal side:* Water scarcity, especially in the Jordan valley after Israel took over the springs of the Jordan river, caused the internal immigration from these areas towards the cities, specifically towards Amman. This issue, in turn, intensified the unemployment and reduced the agricultural production, which irrigation used to rely on the water of the Jordan river. As a result, Jordan turned from a country that exports agricultural products, to a country that imports them. This issue also drained the successive Jordanian Governments and it created a state of internal tensions due to the inability of the governments to fulfill the basic needs of the civilians with affordable prices. Water security, for instance, is linked to the food security and in turn to the entire national security.
- *On the external side:* The possibility of an outburst of a war on water against Israel is farfetched, if not impossible; given the current conditions. It is not owing to the inexistent just distribution, nor to the signed agreements between the two parties, which are unjust to the Jordanian party. Rather, it is due to the major imbalance between the forces of the two parties, which leans for the benefit of the Israeli side. This matter made Jordan proceed with the Israeli



projects to fulfill its water needs. This condition in turn makes Jordan a dependent state that Israel blackmails for the sake of receiving a drop of water. This situation was clear through the Bahrain Cannel Project (the Red Sea – the Dead Sea), which Jordan considers as a strategic option to relive the water scarcity. However, Israel tries to procrastinate the implementation of this project to pose a political threat on Jordan. Moreover, the past Israeli ambassador in Jordan linked the Bahrain Cannel Project to the Jordanian resolution of disregarding the related-annexes to al-Ghamer and al-Baqoura. Jordan made this resolution recently, so leaving the Jordanian decision could quicken the start of the water project, which Jordan disapproved (Al-Shara'an, 2019).

In the same vein, this situation stresses the Israeli hydro-hegemony on the Jordanian water resources. Further, it stresses its acts to hamper any Jordanian water project that requires the cooperative work between Arab and other regional sides, so long Israel was not a partner in it. Israel also takes over the developed water technologies. In addition, Jordan is poor and unable to implement any project on its own. Therefore, in case Jordan chose to implement a water project, it would be under the Israeli control and in conformity with the Israeli water projects. Given that, Israel tends, in such case, to threaten Jordan politically to trade it water for other things related to the Jordanian political security and stability.

- (2) *Economic and environmental consequences:* One of the most prominent results of the 1967 war was the suspension of construction of the al-Maqarin Dam. During the four years following the war, Jordanian territory in the eastern Jordan valley turned into a battleground. The eastern channel of Jordan valley (King Abdullah Channel) was bombed several times and in more than one location. This series of events caused the population to decrease from 60,000 to 5,000 citizens (Bani Hani, 2009). Then, it deepened the water crisis in Jordan. The displacement of more than 55,000 people into Jordan caused exacerbating unemployment and increasing the proportion of land not planted. This issue influenced food security and the national security system in general.

Zionism in the Jordan river region left a negative impact on the per capita water supply. This cause required observers to categorize Jordan as below the water poverty line. Most of the Jordanian water resources amount to 880 million m<sup>3</sup> of water per year with 495 million m<sup>3</sup> of the Yarmouk river alone, making 52% of its total water revenues. Further, the rest comes from groundwater, whereas rainwater does not represent a significant source in this region where desert forms about 90% of its territory (Barakat, 2006).

Some may assume that Israel seized a large part of the Jordanian portion of the upper Jordan river basin. However, Israel seized the Jordanian full water share in the upper Jordan river basin. Moreover, Israel carried out many projects on the river, namely, the National Water Carrier and completely denied Jordan the Jordan River water that Israel carries to the Negev Desert. As previously mentioned, the rest of the River water flows to the Sea of Galilee, which Israel turned into a natural water reservoir. Moreover, Israel installed the iron gates in the southern part, to prevent the water flow the lower part of the river and to deprive Jordan of its full water share. This situation influenced the development projects cycle in Jordan. Further, the problem intensified for Jordan when Israel transferred the brackish water of the springs surrounding the Sea of Galilee. Israel aimed through doing

that to reduce the salinity of the southern downstream and to pollute the stream with garbage and agricultural waste such as agricultural pesticides, medicines and others.

This conflict and the water looting by Israel certainly affects the water per capita in the Kingdom of Jordan. Thus, it influenced all other development sectors. The lack of water resources in Jordan led to the non-exploitation of thousands of Hectares of arable land and the reclamation of thousands more, especially after the failure of the dam project of al-Wihda Dam over the past years. Jordan has relied profoundly on al-Wihda Dam to meet the needs of the agricultural sector, which is the main resource for more than 15% of the population. Further, this sector provides more than 125 thousand jobs and offers about 15% of the exports. However, the proportion of the arable land does not exceed 311,500 hectares, which is equivalent to 3.5% of Jordan total area of 8.9 million hectares. Around 290,000 hectares are used and only 50,000 hectares are irrigated lands [13].

Thus, the limited water resources intensified the decline in agricultural and livestock production in the last quarter of the past century. This issue led to a rise in food dependency index from 43% in 1970 to 87% in 1990 and a rise in the commodity balance from less than 100 million dinars in the sixties to 342 million dinars in 1990 and 543 million dinars in 1996. Most of the imported commodities are in cereals, feed and red meat, which need abundant quantities of water to produce. Moreover, the share of agriculture in GDP declined to less than 10% [14].

To cover the deficit in its water budget, Jordan worked on the development of the aquifers. In 2000, Jordan extracted 400 million m<sup>3</sup>, of which 120 million m<sup>3</sup> were used for household purposes. Quantities extracted from the aquifers may rise in the coming years to meet the growing need for drinking and domestic uses, which is expected to rise to 280 million m<sup>3</sup> in the short term (Ar-Ruba'i, 2000).

However, the problem facing Jordan is the unfair depletion of aquifers, which threatens their strategic reserves, especially with the decline in rainfall and the drought years that swept the region in recent years. Moreover, the Disi basin is critical to Jordan at least for now, for its relatively considerable capacity and it is a common border basin with Saudi Arabia. With the basin in the far south of Jordan and the bigger communities are in the far north of the Kingdom, Jordan cannot alone exploit its entire hydropower. The Jordanian Government is facing an obstacle in providing the main cities with water because of its high cost.

This context highlights the question of Jordan's approach to deal with the water issue?

Despite the crucial situation of the water crisis of the Kingdom, the Jordanian regime did not seriously handle it until the past two decades. The first water strategic plan was set in 1998 and updated in 2002 to cover the years 2002-2010. All the projects of the plan were implemented, except for the Red Sea-Dead Sea water conveyance because of the Israeli postponement. Then, a strategic water plan was set (Water for Life) until 2022. However, the new circumstances in the Kingdom, which in turn impacted the water sector, caused the disruption to the water plans. This situation pushed the water sector to prepare a new plan to handle the water sector, which is the strategy 2016-2025 [15].

One of the main challenges was the new issues that required attention, especially, climate change, the requirement to concentrate on the economics of water, financing, energy efficiency, renewable energy and the increasing populations resulted from the Syrian migrations one after the other to the Kingdom. The said migration increased the demand for water by 12%. Therefore, it was included with the sustainable development goals (SDGs) during the implementation period in 2016. The government worked on amending the water regulations, among which was the water authority law to increase and aggravate penalties and sanctions on the disobedient uses and implementing a strict national campaign to protest the resources and put an end to the illegal water uses.

The most important part of the strategic plan is to achieve the new SDGs for the water sector. This consideration aimed to achieve the goals of the water security, improve and rehabilitate water facilities and infrastructure, improve the quality of services and expand coverage of wastewater services and bridge the gap between demand and the available resources through developing, protecting and sustaining the existing resources. Additionally, there is a need to develop the non-traditional water resources, i.e. sewage treatment and desalination of seawater. The aforesaid measures pave the way to implement the Red Sea-Dead Sea Conveyance project, increase the storage capacity of dams and use modern technology. According to the strategic plan, the proposed projects are supposed to provide additional water of about 188 million m<sup>3</sup> of domestic resources, in addition to 235 million m<sup>3</sup> of the Red Sea-Dead Sea conveyance; a total of 422.5 million m<sup>3</sup> <sup>15</sup>.

Jordan has made great strides in improving internal resources, specifically in the construction of dams and the development of existing ones. Moreover, Jordan advanced considerably the sewage treatment and the construction of water networks. However, the improvements achieved remain relatively little compared to the size of the water crisis, as Jordan bets heavily on the Red Sea-Dead Sea conveyance project. The said project provides Jordan with a great and sustainable amount of water. Nevertheless, the latest project is subject to the Israeli approval, which in turn began to stall in implementing the project, specifically after the right-wing parties came to power in Israel. The right-wing uses water for political blackmail. Although it is among the issues agreed upon within the agreements signed between the two parties.

Led by the Israeli Labor's party, representing the Israeli left-wing, the Jordanian Government and the Israeli Government signed the Jordanian-Israeli peace agreement. As a result, Jewish extremists assassinated the Israeli Prime Minister, Yitzhak Rabin. This act stemmed from their belief that he had made concessions for Palestinians and Jordanians. The rule of the labor party did not last as the right-wing parties in Israel took control. The later worked to obstruct the peace process on the Palestinian side. Moreover, they did not meet their obligations to Jordan in terms of water amounts and quality. This measure aggravated the water crisis in Jordan, as the former tried not to comply with their obligations stipulated in the aforementioned treaty and claimed their inability to implement the agreed-upon terms. The right-wing parties reported Jordan in 1997 and 1998 on their intention to mitigate what has been agreed upon regarding the water of Lake Tiberias from 50 m<sup>3</sup> to 25 m<sup>3</sup>, justifying it by the decrease in rainfall in recent years and the persistent drought that has led to a decrease in the water level of the lake [16].

The above-explained in compliance with implementing the projects agreed upon between the two parties was evident through the Red Sea-Dead Sea Canal project, which Jordan considers a strategic option to solve the water crisis. Yet, Israel tries to stall the implementation of the project to blackmail Jordan politically. For instance, the Israeli ambassador to Jordan linked the Red Sea-Dead Sea Canal project to Jordan's decision of cancelling the supplements for al-Ghamar and Baqoura area, Jordan recently adopted. Provided, a reversal of the Jordanian decision could speed up launching the water project, which Jordan rejected (Sharaan, 2019).

All these repercussions left a negative impact on the Jordanian economy and on the development projects in general, along with increasing unemployment, spreading poverty and declining cultivated areas. The World Bank group confirmed in a diagnostic study on Jordan that Jordan has made a stride in the field of reforms, specifically the water sector. Nonetheless, Jordan has always faced obstacles beyond its control, specifically the obstacles that occur in the Arab neighbouring countries. Each of these cases causes the Jordanian economy to witness a decline in growth, exacerbating the weaknesses already prevailing in

the economy as a whole and forcing the government to increase the reliance on foreign aid. The study confirms that the Syrian migration increased the pressure on the already troubled water sector, which in turn reflected on all other development segments. Other areas were also affected, as it caused reducing the area of cultivated lands and the inability to attract foreign investments; specifically, those that depend on water. This situation, in turn, exacerbated the issue of unemployment and widespread poverty ([The World Bank Group, 2016](#)).

According to the methodology followed in the study, Jordan still does not act within the pattern of inputs and outputs. It is evident that Israel's policies controlling Jordan's water sources have not been treated as a fundamental point in the perpetuation of the water crisis and those policies have not been seriously addressed. Therefore, Jordan has not made the ultimate decisions regarding the topic discussed.

On the other hand, the Israeli political system has acted upon the system of inputs and outputs and the idea of maintaining its state as a living being; considering the issue of water and its importance a crucial factor for the survival of the state. Therefore, it introduced that importance in the treatment stage, to export all its outputs in the form of policies that meet the best solution for it.

## Conclusion

The future of the Jordanian water faces many challenges that limit providing water to its population. Considering the natural challenges beyond the power of the political system, the challenges of the Israeli actions fall within the range of unnatural and hazardous risks that endangered Jordanian water security. Accordingly, the study uncovered a set of results, the most significant of which are the following.

Jordan experiences water scarcity issue due to the drought it has suffered for years and the growing natural and abnormal population of Arab migrations from the surrounding Arab countries. As happened in Singapore that has a population close to those living in the Kingdom on a land, that is 710 km<sup>2</sup> in the light on having insufficient or extremely limited, water resources. However, Singapore managed to work on developing innovative solutions to fulfil its water needs. This situation allowed it to use its expertise to present comprehensive and complete solutions to manage the matter of water. You would find companies with a long experience in the desalination of water and treating waste water and in the technical field and in the fields of research and development [17]. Drawing on the similarities between the case of Singapore and this case study highlights the lack and scarcity of water resources on both sides. Diversely, there were differences between the two countries; Singapore had a strong will and prioritized the issue of water, as the beginning. In addition, it made major improvements regarding the strategic plans, as Singapore is among the countries that took great and pioneering steps forward in the field of desalination and sewage treatment. Notwithstanding, Jordan is still in its early stages in this field, moreover, it suffers from the Israeli side's dominance over most of its water resources, which Singapore was not imposed to handle.

Israel observes water as a critical variable that plays a key role in maintaining its sustainability. In particular, it considers the Jordanian water as the closest factor to achieve its sustainability. It deals with the issue of water from strategic, political and religious perspectives. As the conflict between India and Pakistan, which resulted in an ongoing conflict between these two countries on the area of Kashmir. India attempted to use water as a weapon against Pakistan. However, it started to show more determination on this matter recently, despite having an agreement between these two countries. This agreement stemmed from the support of the World Bank that limits using the water of the River of Indus and its bayous. It has threatened India many times to cut the water supply off to Pakistan. In the same vein, the Prime Minister, Narendra Modi, said in 2016 that blood and water never mix and threatened its government to cut off the water supply from Pakistan [18]. While this

case study relates to the Indian abuse of water as a weapon against Pakistan and occasionally threatens the later with it, there still is a fundamental difference in this context; the balance of power is semi-equal between the two parties. Moreover, the two countries possess nuclear weapons and there is no desire for either to start a war. Provided this case study, the context is different; the balance of power tips towards Israel and the later repeatedly fought wars against Arab neighbouring countries, specifically the 1967 war, which is classified as a war on water sources.

Israel seeks in various ways to control Jordanian water, applying methods of theft, persuasion or pressure on Jordan. Israel also uses the method of persuading Jordan that solutions to its water predicaments require it to deal with the Israeli technology. As the conflict on the River Nile basin between Egypt and Ethiopia. Ethiopia put forth its effortful attempts to hijack the waters of the River Nile considering it as a main spring for it. This was evidently represented when it built Renaissance Dam supported by Israel because Egypt rejected transferring the water of the Nile River to it. This situation was a clear sign that the water of the river is not for purchase. Ethiopia, from its side, looks for convincing Egypt, through initiating a debate, that renaissance Dam will not affect the Egyptian portion of the water. The two parties agreed to fill the dam during seven years, but Ethiopia retreated from the agreement and declared that filling the dam will be done in three years. Given the Israeli support, Ethiopia also indicated that the water issue of Egypt does not stem from its lack of its water portion, but on its rationalized utilization of water and that, they do not use modern technology especially in irrigation (Atwan, 2019). However, there is a big difference in the principle between these two cases, there is no agreement between the parties concerning the conflict in the Jordan river basin to distribute water between the parties in dispute, not even during the colonial period. This situation allowed Israel further to control the waters of the basin. There are multiple agreements between the parties of dispute in the Nile basin that enable the Arab republic of Egypt to rely on these agreements if the case was brought to international arbitration.

The challenges Jordan faces in the water sector impose extra pressure if it fails to withstand the Israeli efforts, that Jordan will be forced to deal with Israel in the water sector. This challenge stands against the political system if it cannot meet the needs of the population.

The water-based challenge in Jordan also creates economic downfall in the agricultural and industrial areas and it generally affects the economic performance of Jordan.

It is clear that the Araba valley agreement did not bring back the water rights to Jordan. Israel managed to deprive the water from the bayous of the high Jordan river and Lake of Tiberia by negotiations. It also dealt with it as if it was a completely Israeli water; when it was completely opposite.

It is clear that Israel is voracious for water, given that it did not merely accept sharing water with other Arab countries. Its greed goes beyond that to reach the rivers of Litani, Euphrates and Nile in the neighbouring Arab counties.

The Syrian crisis has different implications on the entire Jordanian sectors, especially the water sector, which endures big and complicated issues.

The right-wing having authority in Israel left negative effects on the Jordanian water security, as they turned their back to all agreements signed between the two parties, particularly regarding the water sector.

In light of the above findings, the study concludes with a number of recommendations, the most critical of which are.

There is an urgent need for Jordan to put the surrounding water hazards at the top of its priorities in development and the search for the optimal use of water. Jordan can utilize the establishment of dams or exploitation of rain and groundwater. These solutions mean improving the performance of the system and avoiding future risks.

Jordan shall be aware that water conflict is a critical aspect of its conflict with Israel, which threatens its national security. Israel will not relinquish water because that would mean causing further damage to its infrastructure. Consequently, Jordan must exploit all available means in the face of the Israeli ambitions and fight its means to control water.

Achieving a state of integration in the optimal exploitation of water and imposing pressure on Israel and isolating it from the neighboring environment through strengthening cooperation with neighboring countries. This cooperation requires an understanding of a higher interest between Jordan and its neighboring countries based on that the state of non-action results in strengthening the Israeli role and giving it a great opportunity to exploit the region.

The agreements signed with the Israeli side shall be reconsidered. Using all possible ways to force Israel to implement the agreed-upon terms, especially regarding the quantity and quality of water transferred to Jordan on an annual basis and to implement the agreed-upon joint projects.

Jordan shall push the international community to handle the responsibility towards the Syrian refugees in Jordan to decrease the different effects of the crisis on the Kingdom.

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