

CLIMATE-FRAGILITY RISK BRIEF

# JORDAN, PALESTINE AND ISRAEL

Giulia Giordano and Lukas Rüttinger

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# CLIMATE-FRAGILITY RISK BRIEF: JORDAN, PALESTINE AND ISRAEL

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## SUMMARY

The Middle East and North Africa (MENA) region is considered a climate-security hotspot due to its natural water scarcity, low levels of socio-ecological resilience, social tensions and political conflicts. This report focuses on the area known as the Levant, comprising Jordan, Israel, and Palestine, and identifies ways in which climate change will further undermine the already tenuous political, social and economic stability of the region.

In this report, we will outline both the regional environmental threats and the distinct contexts that will shape each country's resiliency to overcome inevitable climate-related changes. Israel, Jordan, and Palestine each face a unique situation in the wake of changing environmental and climate conditions, made only more complex by the political and social conflict that has historically taken hold in this region. At its core, these climactic changes have the power to exacerbate these deep-rooted conflicts and devastate local lives and livelihoods. The main climate-fragility risks that threaten the stability of the region are:

- **Water scarcity and conflicts:** Water (in)security is at the front and centre of the climate change-security connection: increased temperatures, decreased rates of precipitation, decreased groundwater levels, and salinization of water resources, equates more competition over natural water resources between sectors and groups. The ramifications are far-reaching across the agricultural, food, health, energy, and economic sectors.
- **Food and livelihood insecurity:** The negative impact of less available natural water due to climate change is most pronounced in the agricultural sector, which consumes the highest amount of water in all three countries. Impacts on rain-fed agricultural practices, degradation of agricultural land, protracted water shortages, and more frequent extreme weather events will reduce agricultural yields and raise costs of agricultural inputs, which will hurt small to mid-sized farmers in particular. Agricultural problems may aggravate social discontent by increasing unemployment levels, triggering internal migration from rural to urban areas and even fomenting uprisings and protests, with clear security implications.
- **Energy insecurity:** In a vicious cycle, climate change both affects the energy sector and is affected by it. This is particularly evident when looking at the interdependence of water and energy, as energy is a key input in water production and water is a key input in energy production. Less available water due to climate change leads to increased use of energy for desalination and water treatment, which in turn deepens dependence on fossil fuels, increasing greenhouse gas emissions. With energy being an essential component of the functioning of a state, energy insecurity is perceived as a high-stakes threat to national and regional security.



- **Disrupted transport and damaged infrastructure:** Extreme weather events could contribute to the collapse of essential services like transport and electricity, which can have far-reaching implications for national and regional security.
- **Human health risks:** Projected increases in the rate of diseases threaten overall public health, which in turn undermines economic activity and perpetuates poverty. In conflict settings, the collapse of medical infrastructure further reinforces negative health outcomes, creating further internal discontent. Infectious diseases can also spread across borders, threatening regional security.

These adverse climate outcomes have even greater implications for the security of the region as a whole. When governments fail to address these impending humanitarian and environmental crises, it leaves the door open for further political discontent. Peaceful forms of resistance are further constrained by weak democratic structures, low accountability of political elites, corruption and the marginalization of certain groups.

Alternatively, as recommended in this report, these environmental crises offer an opportunity for these countries to overcome their differences in order to achieve a better outcome for both themselves and the region as a whole. Many opportunities exist for the countries in the Levant to start to overcome many of their historical conflict issues through cooperation in addressing environmental challenges by adapting to climate change on a regional level. This report highlights five major entry points for intervention:

- Promote a policy paradigm shift to integrate climate change considerations into the national security agenda of each country
- Resolve final status natural water allocations between Israel and Palestine
- Devise strategies to effectively upgrade and improve water infrastructure and tariffs (Jordan and Palestine)
- Create a roadmap for a regional approach to address climate change adaptation and mitigation issues
- Foster political integration through climate smart economic cooperation and international investments



## SOCIO-ECONOMIC DEVELOPMENT AND POLITICAL CONTEXT

### Political context

The geographical scope of this paper includes three countries in the area known as the Levant, located in the southwest tip of the Asian continent: Jordan, Palestine<sup>1</sup> and Israel. The three countries, which will be separately introduced in this chapter, have rather volatile diplomatic and cooperative relations, which are at high risk of escalating into conflict.

#### ➔ Jordan

Jordan, officially the Hashemite Kingdom of Jordan, is an executive constitutional monarchy located on the east bank of the Jordan River. It is an Arab, Muslim-majority country (95% of the population) that entertains close relations with the rest of the Arab world. In its western side, Jordan is separated from Israel and Palestine by a border following the Jordan River / Dead Sea rift valley.

Jordan is a resource-poor, middle-income country of 10.55 million inhabitants (Jordan Department of Statistics, 2018). Its rate of unemployment is 19.1% of the total labour force (World Bank, 2019)<sup>2</sup>. Jordan's economy is mostly service-oriented: as of 2017, the services sector accounted for 66.6% of GDP, followed by industry at 28.8% and agriculture at 4.5% (CIA World Factbook, 2020). Jordan is one of the few economies in the Middle East that does not have oil and gas reserves, so it “relies heavily on external rents including foreign aid, remittances, and foreign direct investment for financial support and to generate economic activity” (Gilmont, et al., 2017).

Situated at the crossroads of two major areas of instability, Jordan's population dynamics have been characterised by massive waves of refugees coming from neighbouring countries. From Palestine, in various waves since 1948, but also from Lebanon during the 1975-1991 civil war, from Iraq after the Second Gulf War and the collapse of Saddam Hussein's regime in 2003, and more recently from Syria, since the outbreak of the Syrian civil war in 2011 (Chatelard, 2010; De Bel-Air, 2016). As of the end of March 2020, the number of registered Syrian refugees in Jordan was 656,246, accounting for about 6% of the total population

<sup>1</sup> The present report employs the term Palestine to refer to the territories of the West Bank and Gaza Strip, also known as Palestinian Territories or Palestinian Occupied Territories. Since January 2013, the Palestinian Authority uses the name “State of Palestine” on official documents, following its recognition in 2012 as non-member observer state in the United Nations. However, its status still remains contested.

<sup>2</sup> Official rate. Unofficial rate is much higher, approx. 30%

(UNHCR, 2020).<sup>3</sup> Unofficial Syrian refugee numbers can be double or triple this number. This last great influx of refugees has put unprecedented pressure on the country's economy and infrastructure, especially related to water. On the other hand, Jordan is a migrant-sending country too, with an estimated 10% of Jordan's nationals expatriated abroad, most of them to the Gulf States (De Bel-Air, 2016).

### ➔ Israel

Israel is a parliamentary republic founded in 1948, diplomatically isolated from most the rest of the region of Arab states. It has official diplomatic relations with Egypt and Jordan, with which it has signed a peace treaty in 1979 and 1994 respectively. It recently signed peace agreements with the UAE and Bahrain (White House, 2020). Palestine and Israel have not yet reached a final peace agreement.

Israel has experienced steady population growth since 2000 (ITNC, 2018). The country reached 9.15 million residents at the beginning of 2020, with an annual population growth rate of 1.9%, one of the highest annual growth rates among the OECD (Central Bureau of Statistics, 2020). The population growth is partly fuelled by a significant immigration flow (28.100 immigrants only in 2018), that contributes to Israel's population being heterogeneous, with an Arab minority that reaches 21% of the population (Central Bureau of Statistics, 2020).

Israel is a high-income country, with a GDP of 370.588 billion dollars<sup>4</sup> as of 2018 and an unemployment rate of 3.9% as of 2019 (World Bank, 2019). The Israeli economy is dominated by services and industry (69.5% and 26.5% of the national GDP respectively), with agriculture contributing only 2.4% of GDP as of 2017 (CIA World Factbook, 2020).

### ➔ Palestine

Based on the June 1967 armistice line, Palestine is made up of the West Bank including East Jerusalem and the Gaza Strip. Palestine currently enjoys bilateral recognition from 137 States and it has seen growing recognition of its status among the international community.<sup>5</sup>

At the time of writing, the Palestinian Authority (PA) has an official government in the West Bank with the de facto Hamas government in control of the Gaza Strip, which constitutes a separate enclave. However, the Palestinian Government has only limited control over its own territory and natural resources in the West Bank. In line with the Oslo II Accord (1995) that divided the West Bank into three temporary administrative divisions until a final status agreement is signed, the PA has full civil and security control in only of those areas, Area A, while Israel has more control in the others. The fragmented nature of governmental authority has a negative impact on the Palestinian Government's environmental policies.

Palestine has a population of around 5 million people, with an annual growth rate of 2.5% (World Bank, 2018). An evaluation of poverty according to monthly consumption patterns shows that in 2017 almost 30% of the Palestinian population (14% of the West Bank's population and 53% if referring to the Gaza Strip only) was living in poverty and about 17% in deep poverty (Palestinian Central Bureau of Statistics). A lack of a better future perspective is especially high among people in Gaza. The combination of Hamas' failed governance and Israel's policy of closure has led to mass unemployment, especially among Gaza's youth: the rate of unemployment in 2018 was 26.3%, reaching 48.2% in the Gaza Strip (State of Palestine/Palestinian Central Bureau of Statistics, 2018). This makes the situation highly flammable: dissatisfaction with the governing authorities and the status quo easily transmutes into uprisings and mass riots that transcend national borders and threaten the region's security.

<sup>3</sup> According to unofficial rate the number of Syrian refugees is much higher.

<sup>4</sup> At current US\$, data from World Bank.

<sup>5</sup> In 2012 a resolution was voted by the UN General Assembly, according to Palestine "non-Member observer State status" in the United Nations, marking the first time that the General Assembly considered Palestine to be a State.





## CLIMATE CONTEXT

### The Current Climate Situation

The MENA region is characterized by an arid-to-semi-arid climate and one of the lowest per capita water availabilities in the world, which contribute to its identification by the Intergovernmental Panel on Climate Change (IPCC) as a climate change hotspot.

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#### Jordan

90% of its territory is arid to semi-arid, with very low annual precipitation, averaging less than 220 mm/year. This rainfall is concentrated in the north-eastern part of Jordan, and the rainy season extends from around October to May of the next year, with about 80% of the rainfall occurring between December and March (JTNC, 2014). Jordan has annual renewable water resources of less than 100 m<sup>3</sup>/capita/year, significantly below the global average of 500 m<sup>3</sup>/capita/year (Gilmont, et al., 2017).

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#### Israel

Approximately 45% of Israel is comprised of arid zones. Since 1993, annual rainfall in Israel is estimated to have decreased by an average of 9%, with an increase in extreme (low and high) rainfall years (Gilmont, et al., 2017). Rainfall varies between less than 100mm/year in the south (desert), to 100-700 mm/year in the centre and coastal plains (cold and warm semi-arid areas), and over 700 mm/year in the warm Mediterranean north. Nationally, the average annual rainfall is 435mm/year (Gilmont, et al., 2017). Israel has annual renewable water resources of 94 m<sup>3</sup>/inhab/year (IWA, 2017).

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#### Palestine

The West Bank and Gaza possess a diverse climate. The mean annual rainfall in the West Bank varies from about 650 mm/year in the semi-arid west to less than 100mm/year in the extremely arid east (State of Palestine Environment Quality Authority, 2016). In Gaza, annual long-term rainfall is 372.1 mm, although varies greatly from year to year and between governates (INCR, 2016, p. 40).

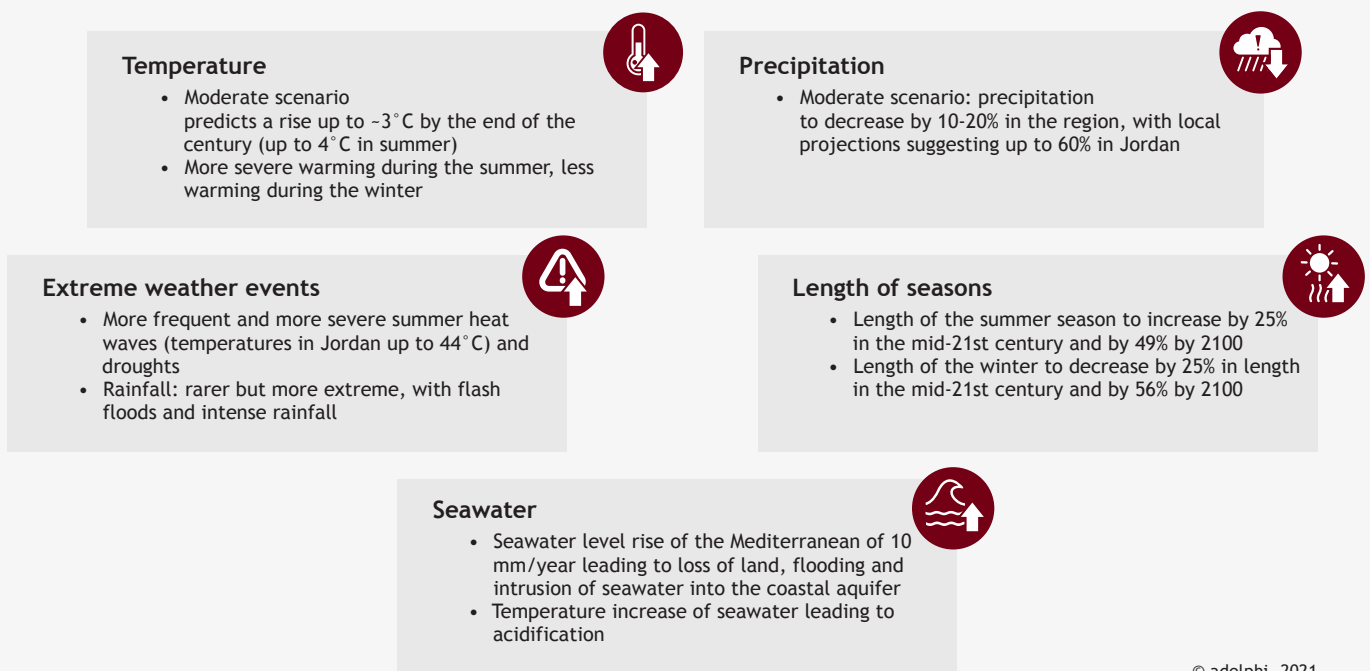
## Projections and Climate Impacts<sup>6</sup>

The MENA region will suffer from a decrease of water resources as a result of lower rates of precipitation, river flow, and groundwater recharge according to a study by Tabari and Williams (2018). Research also points to a continuous warming trend in the Middle East, with significantly large temperature increases expected for the summer. Under a moderate scenario (RCP4.5<sup>7</sup>), by the end of the century an increase of 1.5°C-3°C is expected to occur in Israel during winter (up to 4°C during summer) (State of Israel/Ministry of Environmental Protection, 2018, p. 65).

There are also indications of a trend towards more frequent extreme weather events, including more scorching summer heatwaves. While precipitation is said to become rarer, it is also expected to become more extreme, with flash floods and intense rainfall projected for all seasons but with the “highest increase in autumn [and] lowest increase in spring” (Tabari & Willems, 2018, p. 1; Trondalen, 2009, p. 1-32). Furthermore, rising seawater levels were recorded in the Mediterranean Sea over the past two decades and seawater level is projected to rise 10 mm/year, causing significant loss of land and raising concerns about the intrusion of seawater into the coastal aquifer of Israel and Gaza (ITNC, 67-68; NAP, 26). And the effects of climate change will be particularly evident in the extent to which they will affect the length of the seasons in the Eastern Mediterranean, as shown by Hochman et al. (2018) in a recent study.

The infographic below summarizes the climate change projections for the region.

### Climate change projections: Jordan, Palestine and Israel



<sup>6</sup> Despite widespread consensus about the general impact of global climate change, specific projections must take into account regional, national, and even local climatic variations. The use of different climate models, research methods, and research purposes adds complexity to the task, often leading to disagreements, and even contradictions about climate change predictions. This trend is also observable when looking at climate change predictions for Israel, Palestine, and Jordan. For this reason, the climate projections presented in this paper should be seen as general estimates derived from a wide range of studies but should nevertheless be treated with caution.

<sup>7</sup> A Representative Concentration Pathway (RCP) is a greenhouse gas concentration (not emissions) trajectory adopted by the IPCC for its fifth Assessment Report (AR5) in 2014. RCP4.5 is a moderate scenario which assumes global greenhouse gas emissions GHG emissions will peak between 2030- 2040 then decline. RCP8.5 assumes continuous rise in greenhouse gas emissions throughout the 21st century.





## CONFLICT CONTEXT

Research suggests that states affected by fragility and conflict are more vulnerable to the impacts of climate change due to their lower adaptive capacity (Kahn, 2008). The MENA region is home to a number of conflict and fragility-affected states and has been the showplace of a seismic wave of social uprisings, political repression and violent conflict. Many of the conflicts were amplified by resource mismanagement, lacking social policies to support vulnerable population, and pre-existing intergroup tensions. Israel, Palestine and Jordan lie at the heart of the MENA region, and are vulnerable to the impact of climate change. Any attempt to identify the social, political, economic and security implications of climate change in the region cannot be comprehensive without an understanding of the Arab-Israeli conflict. It still shapes the national interests of the three countries, including cooperation over environmental issues.

A quick overview of its development helps show how climate change intersects with pre-existing tensions and unresolved issues. The core conflict revolves around the dual aspirations to self-determination and territorial claims of the Jewish and Palestinian population over the territories that constitute 'historical Palestine' (Wallach, 2011). Control over land, water and natural resources constitutes a fundamental component of the conflict.

### ➔ Overview: Palestine

Almost every domestic policy issue in Palestine (and to some degree in Israel) is linked to the failure to resolve the broader Israeli-Palestinian conflict. The result is a highly flammable situation, in which dissatisfaction with the governing authorities and the status quo easily transmute into uprisings and mass riots that transcend national borders and threaten Israel and Palestine's national security.

A lack of a better future perspective is especially high among people in Gaza, where the combination of Hamas' failed de facto governance and Israel's policy of closure has led to mass unemployment. Rising prices and worsening living conditions are likely to mobilise popular anger and discontent with the Hamas movement, as demonstrated by the protests that occurred in March 2019 (Lovatt, 2020). Faced with a challenge to its authority caused by a deterioration of the domestic situation of the Strip, Hamas could react with a controlled military escalation with Israel meant to alleviate internal pressure (Lovatt, 2020).

### ➔ Overview: Jordan

In Jordan, the influx of refugees is straining the country's finances and natural resources, as well as the patience of its people. Reports indicate that a large part of the Syrian refugees have no intention of going back to their home country (Jordan Times, 2018). In the long run, this means that Jordan's population will face increasing water and energy demand, in addition to competition over arable land between refugee and host country farmers. Dwindling water, food, and energy supplies are already fuelling public discontentment with the governing authorities: in 2018, Jordan experienced mass protests of unprecedented numbers against the kingdom's raised fuel and electricity prices that were put in place to strengthen Jordan's fragile economy (Associated Press, 2018; Jordan Times 2018). Existing domestic conflicts will only be worsened by the impact of climate change.

From a national security perspective, both Israel and Palestine have a vested interest in having a stable neighbour in Jordan. As almost every family in Palestine has relatives in Jordan, the destabilization of Jordan would have tremendous ramifications for the Palestinian population as well. At the same time, as one of only two states in the region with diplomatic relations with Israel, Jordan is an important ally for Israel and its internal stability is pivotal for the region's balance and therefore Israel's national security. Thus, it is in both Palestine and Israel's strategic interest to avert any political disintegration and safeguard Jordan's integrity.

### ➔ Overview: Israel

The failure to resolve the broader Israeli-Palestinian conflict looms over discussion of Israeli security and is detailed in the following sections. However, it is also important to underline how climate and environmental has hampered relations between Israel and Jordan.

According to the peace treaty signed by Israel and Jordan in 1994, Jordan should receive 55 mcm of water from the Sea of Galilee. Government to government tensions occurred in 1999, when a severe drought caused Israel to raise the possibility that it would not transfer the full requisite water allocation. Jordan in turn threatened to take 'appropriate actions' against Israel (Berland, 2000). The episode occurred partly because the agreement did not contain provisions for extreme weather events, such as consecutive years of drought and the specific provision on the supply of a fixed quantity, independent of the actual conditions, was intentionally or unintentionally in Jordan's favour. The conflict was in this case resolved with the full supply maintained, but climate change is likely to see the reoccurrence of long periods of drought that will undermine the stability of the two countries' relations.

## The origin of the Arab-Israeli Conflict

The first tensions arose already during the British Mandate period (1920-48), when an increasing number of Jewish immigrants of European descent settled in Palestine, motivated by the aspiration to establish a national home for the Jewish people (Shalim, 2005). The local Arab majority did not see favourably such inclinations and started to nurture nationalistic ambitions too (Ghanem, 2013). From its earliest days, the Jewish Agency sought investments to be made in the water sector in order to argue a case in front of the British Mandate authorities that the

region could sustain significant Jewish immigration (Elmusa, 1996). At that time, Palestinians accessed water from springs and local wells and managed water distribution according to communal property regimes.

In 1947 the UN General Assembly voted on a partition plan for Palestine for the creation of two independent states, Jewish and Arab (UN General Assembly, 1947). This was rejected by the Arab members of the UN, and so the first Arab-Israeli war broke out following Israel's Declaration of Independence (May 1948). The first Arab-Israeli War is also known in Israel as War of Independence, while Palestinians refer to it as Naqba (catastrophe), showing how the two sides portray the event very differently (Ben-Ze'ev, 2011). Around 700,000 Palestinians fled or were forced to leave their homes, finding refuge in camps settled in Gaza and West Bank, and in neighbouring countries. To this day, the status of these refugees and their descendants, an estimated number of five million, has not been addressed, and a "right of return" still remains a contentious issue in the region.

It is noteworthy to mention that the control of natural resources, in particular water, has always been seen as part and parcel of Israeli national security. During the British Mandate period, limited water supplies were associated with limiting Jewish immigration to Palestine, and therefore as a limiting factor in the objective of state building. A national water carrier was built by Israel to supply water from the Jordan Basin in 1964. The need to ensure water availability also led to the first attempts of cooperation with Jordan (Wolf, 1993). A shared Israeli-Jordanian water security agenda already emerged under the UN-led talks on the use of the disputed waters of the Jordan River Basin in the 1950s. Israeli-Jordanian informal and discreet coordination over water management issues would be the norm from the 1950s to the 1990s, facilitating the development of trust and friendly relations (Jägerskog, 2007).

War broke out again in 1967 (the Six-Day War) between Israel and Egypt, Syria, Jordan, with minor involvement of Lebanon and Iraq. The outcome was Israeli capture of the Gaza Strip and the Sinai Peninsula from Egypt, the West Bank (including East Jerusalem) from Jordan, and the Golan Heights from Syria. The war caused another significant regional wave of refugees towards the surrounding countries and allowed the establishment of Israeli military administration throughout the occupied areas of the West Bank and Gaza (Machairas, 2017). The military administration enabled Israeli control over land and water resources. Prior to the 1967 war, Israel was already utilizing the majority of the water from the shared Mountain Aquifer. The Israeli Military Administration then placed a cap on the total quantity of water that Palestinians could withdraw from the West Bank side of the Mountain Aquifer in order to secure water supply for the Israeli side, but creating growing water stress on the Palestinian side as population and water demands increased.

In an attempt to gain back the territory captured by Israel, Egypt and Syria attacked Israel in 1973 (Yom Kippur War). The war did not bring the territories back but did eventually pave the way for Israeli-Egyptian negotiations, culminating in the 1979 Camp David Accords, a peace treaty between Israel and Egypt which saw Israel withdraw from the Sinai Peninsula (Ripsman, 2016).

Starting from the 1980s, the Arab-Israeli conflict witnessed a shift to confrontations between Israel and non-state actors. The PLO, created in 1964, was recognized as the sole legitimate representative of the Palestinians by the UN in 1974 (UN General Assembly, 1974). The first Intifada (1987-93), a spontaneous Palestinian uprising against Israeli military occupation, saw the Palestinian issue become central in the eyes of the international public opinion, leading to the PLO being invited to peace negotiations with Israel.



## The Peace Process

Developments in the late 1980s through the mid-1990s inaugurated a new era in the Arab-Israeli conflict. The Oslo Accords were intended as the initial phase of a negotiation process that would lead within five years to the final resolution of all contentious issues in a peace treaty between Israel and Palestine. The Palestinian Authority (PA), a self-governing interim institution, was established in 1994 and the West Bank was divided into three temporary administrative divisions. Area A grants full civil and security control to the PA and includes all Palestinian cities but no Israeli settlements. Area B allows for Palestinian civil control and joint Israeli-Palestinian security control; it includes many Palestinian towns and villages but no Israeli settlements. Area C (nearly 60 per cent of the West Bank) allows full Israeli civil and security control, and includes all Israeli settlements and most roadways that connect the settlements (Oslo II, 1995). The Oslo Accords dictated that Palestinian areas in Area C would gradually be transferred to Palestinian jurisdiction by 1997, although this has not materialized. Instead, to this day Palestinian activity in Area C is under Israeli control through the Coordinator of Government Activities in the Territories (COGAT), a unit of the Israeli Ministry of Defense.

Following the signing of the Oslo II Agreement (1995), the responsibility for the management of Palestinian water infrastructure and services for the Palestinian population in Areas A and B was transferred to the Palestinian Water Authority. Despite its interim purpose, water issues between Israel and the Palestinian Authority are still today 25 years later regulated under Oslo II. Article 40 states that “Israel recognizes the Palestinian water rights in the West Bank” and states that these rights would “be negotiated in the permanent status negotiations and settled in the Permanent Status Agreement relating to the various water resources”. The interim agreement regulates only the shared waters of the West Bank side of the Mountain Aquifer, excluding all other shared ground and surface waters. This allows Israel to effectively control the extraction rates and access to water, abstracting some 75% of the Mountain Aquifer’s annual water supply (Fanak Water, 2016). Israel retains full control of the West Bank stretch of the Jordan River in the form of a closed military zone, denying Palestinian farmers access. Israel’s goal has been to maximize control of Palestinian water activities concerning the Mountain Aquifer. With Israel being downstream along the aquifer, Israel saw its springs, wells and abstraction rates from Israel proper as vulnerable to any additional increases in Palestinian water abstraction (Shuval, 2000). By the mid-1990s rising public concern in Israel as to the state of the environment led also to rising Israeli public concern about pollution crossing into Israel from streams in the West Bank.



## After Oslo

The failure to reach a final agreement at Camp David in 2000 put an end to the Peace Process, leaving “final status issues,” unsolved, including water. This historical failure contributed to the events of the Second Intifada (2001). Another major development was the Israeli withdrawal from the Gaza Strip in 2005, the electoral victory of Hamas in January 2006, which led to the current separation between Gaza under the de facto government of Hamas and the West Bank ruled under Fatah (Kurz, 2015).

Despite numerous attempts at reconciliation between Hamas and Fatah (most recently in 2020 following the Abraham Accords between Israel and the UAE and Bahrain), there are still numerous differences between them in political ideology, financial backers, and behavior (Tahhan, 2017). The failure has far-reaching consequences on the situation in the Palestinian Territories, as witnessed by the differing circumstances faced in each area.

The Gaza Strip is today facing a dire humanitarian crisis with potentially devastating implications. The current crisis in Gaza is a product of a number of interconnected factors: failed governance of the Hamas leadership and its unresolved reconciliation with the Palestinian Authority (PA), the severe restrictions imposed by the Israeli and Egyptian siege, and Gaza’s over-dependence on the donor community. Lack of clean water for domestic use and unsafe sanitary conditions pose a serious public health threat to the two million Palestinians living in the Gaza Strip, and the neighbouring communities in Egypt and Israel (Hermesh, Maya and Davidovitch, 2019). The coastal aquifer, which is located under the coastal plain of Israel and the Gaza Strip, is the only source of natural water in Gaza. Due to rapid population growth, the demand for water has surged. Given the scarcity of alternative sources of water, there has been extreme overuse of the aquifer. Palestinians have been drawing an estimated 200 million cubic meters (mcm) a year for over a decade, while the renewable extraction rate is 60mcm a year, leading to the infiltration of seawater into the aquifer (Bromberg, Giordano, Eran and Elad, 2018).

The groundwater has also been extensively contaminated by sewage. The discharge of untreated sewage has caused alarming levels of Nitrate (NO<sub>3</sub>) (Bromberg, Giordano, Era and Elad, 2018). The chronic shortage of water has led residents to be increasingly dependent on small-scale desalination of brackish water, which is then sold by water suppliers that are under little supervision from health authorities and sell water at prices six times higher than regular water. These small desalination plants do not effectively remove the pollutants (Aish, 2013).

The West Bank is also facing an environmental crisis, due to the releasing of untreated sewage into the environment. In mid-2000s Israel initiated a policy response that tried to direct sewage crossing the ‘Green Line’ into existing Israeli sewage treatment plants, followed by a policy to build sewage plants directly over the ‘Green Line’ for the specific purpose of treating the sewage and preventing cross-border pollution (Eran, Bromberg and Giordano, 2018). Israel unilaterally deducted the cost of treating Palestinian sewage crossing the Green Line from taxes Israel collects on behalf of the Palestinian Authority. Until recently Israeli water policy towards the Palestinian Authority was therefore predominantly marked by a lack of diplomacy and a preference for control and enforcement through the military administration.





## CLIMATE-FRAGILITY RISKS

Climate change undermines human security, inhibits peace and can act as a risk multiplier: climate change itself is generally not regarded as a direct cause of conflict, but as a phenomenon that can worsen or exacerbate pre-existing sources of instability. Well-functioning governments can develop adaptation measures to soften the blow of climate change on their environment and people: hence it is the adaptive capacity of a state that ultimately determines the extent to which climate-related changes impact the socioeconomic development and political stability of a country. This is particularly relevant in a region like the MENA, where the adaptive capacity of the state is often reduced by weak and ineffective political institutions with low accountability, political repression and/or corruption, social tensions, a history of intra- or inter-state conflicts, as well as unsustainable livelihoods and damaged infrastructure, among others (FAO and The World Bank Group, 2018). However, despite the effects of climate change being already observable in the region, climate-fragility risks are often overshadowed by the more immediate and visible security challenges faced by Jordan, Israel and Palestine.

A particular risk in the region is the systemic failure to respond to humanitarian and environmental crises which in turn can lead to more dissatisfaction with the governing authorities, a feeling of frustration due to the lack of future perspectives, as well as potential internal and cross-border movement of people. At the same time, weak democratic structures, low accountability of political elites, corruption, and the marginalization of certain groups constrain the effectiveness of peaceful forms of resistance. There is the risk that the built-up pressure from within may ignite a wave of uprisings and mass riots that will overwhelm the resilience of the system. The Arab Spring was a conglomeration of such waves, and its effects pervade the Middle East to this day. There is increasing evidence that an important catalyst behind the social discontent that led to the uprisings in Syria, Egypt and Yemen was to differing degrees related to water shortages, and the failure of governments to respond to the resulting water crises (see the Syrian case below).

In this section, we explore the main climate-fragility risks for the region. The climate security impacts will be different for each country, but they are inextricably linked. The infographic below shows the pathways from climate change to negative security impacts.

### The Syrian Case

One example of how climate change and resource mismanagement can contribute to violent conflict is the Syrian civil war and its broader repercussions. The Syrian uprising did not happen overnight in 2011. A mix of century-long climatic trends and unsustainable agriculture policy on the use and extraction of an already scarce water supply led to a 5-year drought in the eastern region of Syria starting in 2007, recorded as the most severe on record. The drought pushed Syrian farmers to abandon their lands and move with their families to the cities, where the Syrian uprising later started (Kelley et al. 2015).

Since the 1970s the Assad government's push for food independence placed enormous stress on the water systems through the rapid expansion of irrigation systems for agricultural purposes (Northrup, 2017). From 1988 to 1994, the program entailed doubling the number of groundwater wells that extracted water for irrigation (aw-Hussan et al., 2014). Over-extraction gradually led the water table to fall by more than 40 meters in some parts of the country. When the drought began, many Syrian farmers turned to groundwater reserves for irrigation, finding them completely dry. During the drought, approximately 85% of livestock perished in Eastern Syria while crop yields dropped by up to 23% in irrigated areas and 79% in rain-fed areas (Northrup, 2017.). The gradual increase of fuel prices in 2008 placed further strain on farm operations (Fattouh and El-Katiri, 2012). Many rural Syrians were forced to abandon their failed crops and move to the outskirts of urban centres, and were a contributing factor to the protests. Interviews conducted with Syrian refugees identified animosity towards the Assad Government for its failure to support farmers staying on their land (Amery, 2019; Yaha 2018).

As several authors pointed out, the "Syrian regime's failure to establish proper water governance and irrigation systems in the south of the country (...) led to unpreparedness when drought hit harder than usual. While drought led to major internal migration, the reasons were not the drought itself, but were rather 'part of a broader pattern of rural neglect'" (Jägerskog and Swain, 2016). While a climate-related change was by no means the primary driving factor of this conflict, it was amplified by resource mismanagement, lacking social policies to support vulnerable populations, and pre-existing intergroup tensions (EcoPeace Middle East, 2019).

## Climate fragility risks in Jordan, Palestine and Israel

## 1. Water scarcity and conflicts



increases



can further increase



Increased water scarcity

competition between sectors, groups, and countries; livelihood insecurity

water theft (Palestine)

resentment towards Syrian refugees (Jordan)

animosity towards neighbours/authorities

## 2. Food and livelihood insecurity



have



contributes to



can aggravate



Changing precipitation patterns/amounts; water scarcity

negative impacts on agriculture

higher food price and unemployment, lower incomes

grievances toward government

## 3. Energy insecurity



increases



raises



increases

Climate change

energy demand esp. for water desalination and during heat waves

energy prices and fossil fuel reliance



water insecurity, food insecurity and livelihood insecurity

## 4. Disrupted transport and damaged infrastructure



contributes to



may encourage



Extreme weather events damage infrastructure

the collapse of transport, electricity, water or health systems

resentment towards the state and the radicalization of affected population groups

## 5. Human health risks



contributes to



can lead to



Climate change impacts

diseases and heat stress

increased energy, water and food insecurity

negative health outcomes

greater poverty and dissatisfaction

## Water scarcity and conflict

Water security is at the front and centre of the climate change-security connection in the MENA region. The less water available, the more competition over water resources between sectors and groups of people. The ramifications are far-reaching across the agricultural, food, health, energy, and economic sectors. Animosity about water scarcity can be directed at other states and actors who are thought to be responsible for a decline in use and access to available water. As intra- and inter-group tensions rise and water becomes further securitized, and perceived as vital for the national interest, the potential for conflict rises.

Climate change is expected to further exacerbate the water stress in all three countries: Temperature increases, lower rates of rainfall, higher evaporation, lower groundwater levels and salinization of water resources due to seawater intrusion will reduce water availability, while the demand for water will increase because of rising temperatures. However, Jordan, Palestine and Israel are grappling with water scarcity in different ways and to different degrees.

### ➔ Israel

Israel, although sharing a similar geography to Jordan and Palestine, has adopted a unique combination of policy and technological interventions that have allowed it to largely overcome the challenge of water scarcity and become a trailblazer in the field of water technology. In order to address the issues stemming from a water-intensive agricultural production and the consequent unsustainable exploitation of local aquifers, starting from the 1980's Israel has invested in programmes to substitute freshwater with recycled urban wastewater for agricultural use. Local water treatment plants have been connected to regional effluent grids, giving agriculture across the centre and south of the country access to reduced price and larger quantities of effluent. With effluents priced up to 50 per cent lower than freshwater, farmers with effluent-suitable crops who were irrigating with freshwater found themselves at a commercial disadvantage, incentivizing further efficiencies (Marin, Tal, Yeres and Ringskog, 2017). These measures were later accompanied by public information campaigns aimed at encouraging water efficiency, and an extensive seawater desalination program. Israel also closely regulates water allocation: all water is state-owned, with no scope for private ownership over a water body or a perpetuity in water rights, a system that almost completely prevents water theft (Gilmont, et al., 2017).

While domestic conflicts around water are unlikely, the dire situation of Israel's neighbours regarding their water access could create risks within Israel. The water and sanitation crises of Gaza has impacted Israel's water security and public health. Critical information was released by civil society, revealing that for several days in 2016, sewage flows out of Gaza were responsible for closure of the Ashkelon desalination plant in Israel, which supplies 15% of Israel's domestic drinking water (Eran, Bromberg and Giordano, 2018). This led to changes in policy, including a far greater support of increasing Israeli water sales to Gaza. Broader public support for changes in Israeli water related policies however only took place when the crises in Gaza led to direct threats posed for water security and public health in Israel.

Israel has published a long-term master plan that outlines strategies for the water sector up to the year 2050. As emerges from the plan, increased usage of desalination and reuse of treated wastewater will remain an important dimension of Israel's water strategy in the future. In addition to increasing water supply through sources that are not as vulnerable to climate change, Israel aims at increasing the water it supplies to its neighbours, Jordan and Palestine: in 2018 Israel supplied 150 million cubic meters of water to the two countries and is planning to supply 420 million by 2050 according to the Water Authority master plan. However, although a large portion of Israel's natural freshwater water sources stems from transboundary water basins, very little of Israel's Water Strategy speaks to a regional water management approach.

## ➔ Palestine

The failure to reach a fair water allocation and management agreement between Israelis and Palestinians is putting the Palestinian water sector under huge stress and continues to breed animosity that will only accelerate under climate change. Despite population growth and development, Palestinian withdrawals of water from the Mountain Aquifer remain limited to the terms of Oslo II. The water shortages experienced by Palestinians in the West Bank and Gaza breed animosity towards Israel, but also towards Palestinian authorities. In the summertime, women and children in particular often protest in front of Palestinian Authority municipal buildings to call for relief from water shortages. (Taha, 2016; Bollack, 2016; Nazzal, 2016). In Gaza, water shortages are often one of the issues raised in street protests against Hamas (Makovsky and Weiner, 2018; BBC, 2017; Akram 2019).<sup>8</sup> During the COVID 19 crisis, media reported public concern about lacking domestic water to meet the basic hygiene needs to combat the virus (Shezav, 2020).

Extended years of drought and reduced rainfall have resulted in the drying up of West Bank wells and springs, further reducing water availability, especially for the Palestinian agricultural sector. Palestinian farmers, with no alternative water allocation, routinely break into urban destined water networks desperate for water to maintain their crops or livestock as their source of livelihood (Melhem, 2019). The animosity, directed at both governing bodies and other sectors of the population, especially during the region's long summer months is ever-present and could contribute to a rise in violence.

The relations between Israel and Palestine regarding water allocations are extremely tense, layered with politics and conflict. As water stress increases, so does the potential for further conflict. This could also have regional implications, in particular if the moderate Palestinian leadership is unable to negotiate better outcomes, which could lead to radicalization. The failure of the 'reformed' JWC to provide alleviation through approval of more projects could shatter any remaining trust in jointly operated committees, and further undermine the two-state solution.

A new Israeli Palestinian water agreement including reallocation of natural water in favour of the Palestinian side, improved Palestinian water management, and Palestinian desalination on the Gaza Mediterranean coast are all adaptation measures that are urgently required if we are to avoid potential increased violence over water. However, neither Israel nor the Palestinian Authority and Hamas are able or willing to move forward on these.

## ➔ Jordan

The situation in Jordan is not brighter. Prior to the influx of refugees from the Syrian civil war, Jordan was already one of the most water scarce resource. Today, the combination of decreasing precipitation and the increased refugee influx from Syria have led to a dramatic increase in water rationing, with one of the lowest measures of renewable water resources per capita at 96.58 m<sup>3</sup> per inhabitant per year (AQUASTAT, 2017). Syrian refugees have increased water needs by 21 percent throughout the Kingdom and 40 percent in the north. Before the Syrian crisis, water in Amman would be supplied two days every week (Whitman, 2019). Subsequent to the refugee crisis and the decrease in precipitation, it was cut to 8 hours a week (Jordan Times, 2019). The aquifers below Jordan are in finite supply and rapidly declining due to over-extraction and decreased recharge. In the south of Jordan,

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<sup>8</sup> The Associated Press news agency reported that comedian Adel al-Mashwaki was arrested hours after posting a video criticising Hamas that included the quote "There is no work, no crossings, no food, no water to drink and also there is no electricity". See full article "Gaza electricity crisis: Hamas breaks up protest" BBC News Middle East (2017). <https://www.bbc.com/news/world-middle-east-38604904>



significant groundwater is fossil, non-renewable water that is expected to dry up in just 50 years and surface water input from the Yarmouk river is under constant decline due to climate change (FAO, 2016).<sup>9 10</sup>

As climate change reduces the sources of water, and the amount of water per person, the standard of living experienced by Jordanians and refugees declines. This can cause dissatisfaction with the ruling elite, especially if solutions are not advanced. Decreased water availability is already a source of public animosity today, especially in the long summer months in Jordan that builds on other pre-existing grievances of the Jordanian public towards their government (Proctor, 2014). This can then manifest in protests which could escalate. Water scarcity might also further exacerbate tensions between Jordanians and Syrian refugees, where there is already competition over scarce resources and employment (Alshoubaki and Harris, 2018; Francis, 2015). Indeed, there are numerous voices in Jordanian discourse which are blaming the Syrian refugee crisis for adding another layer of stress on an already water-scarce country (Hussein et al. 2020).

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9 A 2018 FAO assessment of Food Supply under Water Scarcity Conditions in Jordan reported that studies have concluded that the Aqaba can safely yield 125 MCM for another 50 years. <http://www.fao.org/3/ca1156en/CA1156EN.pdf>

10 A 2018 FAO assessment of Food Supply under Water Scarcity Conditions in Jordan reported that the Yarmouk River had a historic flow record of approximately 480 MCM per year, but with a current flow of only 80-100 MCM per year. See full assessment p.20 <http://www.fao.org/3/ca1156en/CA1156EN.pdf>





## Food and Livelihood Insecurity

Tabari and William (2018) posit that the climate change-related shift of the rain season from winter and spring to autumn will reduce precipitation rates and cause much of the rain to fall outside of the crop growing season. Additionally, the north of the Negev Desert is expected to receive less precipitation, which will harm rain-fed agriculture, which is currently very prominent in the north of Jordan, Israel and the northern parts of the West Bank. Farmers could increasingly be forced to rely on irrigation agriculture.

The negative impact of less available freshwater will be most pronounced in the agricultural sector, which consumes the highest amount of water in all three countries. The importance of maintaining affordable food is vital for internal stability, as a rise in price of food without a concurrent rise in income means a relative decline in disposable income. As climate change reduces food production and income and increases unemployment, it can increase grievances with the government and contribute to political unrest.

### ➔ Jordan

Jordan is particularly vulnerable in this sense. Despite the primary agricultural sector contributing to only little more than 4% of GDP, agriculture accounts for more than half of the nation's water use because many farmers use inefficient and water-consuming irrigation techniques like flooding. Investments and training towards a more climate-smart agriculture are needed. In fact, in an attempt to adapt to a changing climate, Jordanian farmers have adopted different agricultural practices, including planting less water-intensive and more heat-resistant crops, but they have also increased their usage of herbicides and fertilizers. In some parts of Jordan, such as the Zarqa River Basin, unsustainable agricultural practices have resulted in extreme groundwater and river pollution, leading to the closure of most of the farms along the river (International Union for Conservation of Nature, 2012).

More frequent droughts and heat waves will have long-lasting effects on Jordan's water and food security (caused by reduced agricultural production and rising food prices), with particularly harmful impacts on Jordanian farmers along the Jordan, Yarmouk, and Zarqa Rivers (Rajsekhar & Gorelick, 2017). This could threaten stability within Jordan: if unemployment and food prices rise, the dissatisfaction with the government will increase. Agriculture is an important source of employment in rural Jordan, especially for Syrian refugees (ILO, 2018). In 2017, agriculture is a source of income for 80,000 families (Jordan Investment Commission, 2017). Additionally, while primary agriculture is a small percentage of GDP, it plays an important role in the food sector (World Bank, 2018) and is the second largest export sector (Jordan Investment Commission, 2017). Reduced agricultural productivity as a result of climate-related change will directly affect Jordan's capacity for social and economic development - the lack of economic opportunities is already a major problem.



## ➔ Palestine

The repercussions of climate change will be most dramatic for Palestine's agricultural sector. Limitations imposed by the Israeli military in Area C of the West Bank combined with consecutive years of drought have reduced the significance of the agricultural sector to only 3 percent of the GDP today (UNCTAD, 2017). Nevertheless, agriculture officially employs almost nine percent of the Palestinian workforce<sup>11</sup> (The State of Palestine Ministry of Agriculture, 2016), and accounts for twenty percent of Palestine's exports (UNSCO, 2017; FAO, 2017). Agriculture further plays an important role as a supplier and consumer of other sectors of the Palestinian economy, such as the food industry, transport, mining, wholesale and retailers (The State of Palestine Ministry of Agriculture, 2016). Lower exporting capacity and higher dependence on imported foods will likely result in higher food prices, lower and less stable incomes, and possible food shortages. This will hit subsistence farmers and low-income households the hardest, especially those that rely exclusively on agricultural yield to sustain their livelihoods. In 2018, 31.5 percent of Palestinian households are reported to being moderately to severely food insecure (OCHAOPT, 2018).

In the Jordan Valley, the growing presence of Israeli settlements negatively contributes to Palestinian access to water resources that are expected to become even scarcer due to climate-related changes. Lack of access to water resources in the Jordan Valley, which is the breadbasket for Palestinian food security and has the potential for a large-scale food export economy, not only threatens the living conditions of the Palestinian communities who inhabit it, pushing them into greater poverty; it also hinders overall Palestinian economic development, which is an important part of the future stabilisation of relations with Israel. In a country where young people already have few economic opportunities - (60 percent of 15-29 year-olds in Gaza and 39 percent in the West Bank are unemployed) - there is little capacity to cope with further economic problems.

## ➔ Israel

Climate change will also impact Israeli agricultural sector, though not as severely as in Jordan and Palestine. Given Israel's preference for irrigation agriculture (largely through treated wastewater), as climate change reduces the amount of precipitation, Israelis will irrigate more. Because of quota constraints on irrigation, more agricultural land will likely be retired (Zelinger et al. 2019). In the north of Israel, where there is a stronger reliance on rain-fed crops, climate change will negatively affect agricultural productivity as precipitation declines.

## Energy Insecurity

The countries in the Levant rely primarily on coal, natural gas and oil for energy (IEA, 2020). This reliance on fossil fuels contributes to climate change and thus drives the climatic changes that contribute to the security problems discussed here. It also makes it more difficult for these countries to achieve their Paris targets, which can undermine their international legitimacy. While Covid saw a decline in energy demand, leading to downward pressure on oil and gas, the concurrent lack of investment in energy infrastructure opens the future for further volatility (IEA, 2020). Additionally, it might be too early to proclaim a quick demise of the price of some fossil fuels like oil (Ibid.).

The connection between energy insecurity and climate change is multifaceted: First, a rise in extreme weather events such as severe drought, and heat waves can increase energy demand and prices (Jessel, Sawyer and Hernandez, 2019). This can decrease the available income of households and contribute to grievances and anti-government sentiments that in turn can escalate into political instability.

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<sup>11</sup> The Palestinian government estimates that the number of Palestinians, especially women, working in the agricultural sector unofficially is much higher.

Additionally, a rise in fossil fuel prices also has adverse impacts on water and food production. Energy is required through the whole supply chain of water, especially for new energy-intensive technologies such as desalination and water is needed for energy production (Giordano and Quagliarotti, 2019).

### ➔ Israel

The increased scarcity of water, aggravated by climate-related changes, will have significant impacts on the energy sector. Water and energy are interconnected in several ways, as energy is a key input in water production and water is a key input in energy production. Since easily accessible freshwater resources are depleted, the use of energy-intensive technologies is expected to expand rapidly, as is already occurring in Israel. Israel's response to increased water scarcity, as explored above, has been to develop advanced water technologies such as wastewater treatment and desalinization, which require large energetic input. Israel's development of renewable energy sources is poorly advanced, with only around 10 percent of Israel's electricity coming from renewable sources (Wacks, 2019; Staff, 2018). Because much of Israel's open spaces in the Negev desert are either designated as nature reserves or military training areas, the country has limited capacity to develop large-scale solar energy. Instead, the country is banking on its relatively high abundance of natural gas, which is a finite and thus unsustainable resource, as well as yet another emitter of greenhouse gas. This creates a vicious circle: in the attempt to address water scarcity, the technological measures adopted by Israel can exacerbate energy insecurity and increase CO<sub>2</sub> emissions, impacting Israel's ability to be in good international standing as regards Paris climate commitments.

### ➔ Palestine

The case of the Gaza Strip best exemplifies the regional risks of energy insecurity. Periodic interruptions of energy supply have had a direct impact on the delivery of water and sanitation services in Gaza. The lack of electricity affects public health and the environment. Hospitals operate at partial capacity, and sterilization and cleaning services are reduced. Waste facilities are only partly operational, and many sewage pumping stations are at risk of flooding and pollution. Desalination facilities are not working at full capacity, and therefore the supply of water has been reduced. As of August 2020, media reports warned of an ecological disaster in southern Israel as sewage from the Gaza Strip spilled across the border.

Like water for Gaza, electricity supply issues, whether increased transmission lines from Israel or natural gas supply and expansion of Gaza's existing power station are all hostage to politics. At times the politics are related to Israel's blockade policies against Hamas and at other times due to Fatah / Hamas rivalry.

Increasing the supply of electricity is essential to the stability of Gaza. The poor state of energy supply in Palestine has previously led to protests. In January 2017, Gazans demonstrated against Hamas and the PA following a winter with electricity for only 3-4 hours a day (Waheidi, 2017). As climate change could increase energy insecurity, it can translate into national security issue as tensions and dissatisfaction rise, and living standards decrease.

### ➔ Jordan

Jordan is heavily dependent on oil and gas imports. This has made it vulnerable to energy pipelines being attacked and supply disrupted, such as the numerous attacks on the Arab-Gas Pipeline (AGP) between 2010-2012, costing Jordan billions of dollars (Danin, 2013). Jordan has a history of anti-government protests following increases in the price of fuel, and austerity measures in general (BBC 2018; Sen, 2012). In fact, the 2018 anti-tax protests were perceived as so potentially destabilising that King Abdullah II dismissed the prime minister (Duhan, 2018). As demand for energy increases over the coming decades, the





government is looking to end the cross-subsidisation of subsidies, which demands extra fees from business to fund electricity subsidies for households. Since subsidies are not targeted only to vulnerable households, households with capacity to pay are also receiving extra subsidy money that encourages high electricity consumption (IMF, 2020). This has the potential to further deepen poverty, as households spend more of their income on power.

Jordan does possess large areas of land that are well-suited for solar power generation (Global Solar Atlas, 2020). While there has been a shift to improve the level of solar energy in the power mix, the overall cost of electricity production remains high for the region and is seen as a heavy burden on Jordanian living standards.



## Disrupted transport and damaged infrastructure

Infrastructure damage due to extreme weather events can undermine security, especially in states that have a limited capacity to rebuild. Disrupted services and ineffective transport can contribute to resentment towards the state and fuel inter-group tensions, leading to protests.

Physical infrastructure is already under stress in the region today, particularly in Palestine and Jordan: extreme weather events can contribute to the collapse of essential services like transport and electricity transmission, as well as loss of life due to resulting accidents. Extreme weather events are especially disruptive when they strike during or just after a conflict. In recent years, news of accidents and deaths related to extreme weather events have been recurrent in all three countries.

### ➔ Israel

In January 2020 a wave of storms hit Israel: Tel Aviv received 20 percent of its average yearly rainfall within a few hours. Two people drowned in a flooded elevator and many others were injured (Haaretz, 2020). There have also been horrific wildfires, which become more intense due to harsher drought and frequency of heat waves. 44 people died in fires at Mount Carmel in December 2010; and in 2016 fires caused the evacuation of 80,000 people in Haifa and destroyed over 575 homes (BBC, 2016). In fact, the Haifa fire is an example of the growing encroachment of wildfires on urban areas (Tessler et al. 2019). Climate change exacerbates the severity of the forest fires, as they spread quicker due to drier conditions, and poor planning of infrastructure (Depietri and Orenstein, 2019). Wildfires can also raise tensions between Israel and Palestine, due to the accusation that the cause of some of the fires was arson by Palestinians (Amichai, 2016). While this indicates how environmental tragedies can become ensnared in the broader conflict, more effective forest management is required to avert some of these immediate dangers.

### ➔ Palestine

When it comes to Palestine, it is Gaza that offers the most worrying scenario. Gaza's water infrastructure suffered during the 2008-09 conflict as well as 2012 conflict and 2014 conflicts: in the aftermath of the 2014 conflict, lice, scabies and diarrhoea were reported to have spread, in particular among children.

When Gaza was hit by severe flooding during an extreme rain event in November 2014, the United Nations declared a state of emergency in the Gaza Strip, causing hundreds of people to be evacuated. This extreme weather event hit Gaza in a time of already extraordinary vulnerability, as thousands of Gazan families still lived in communal shelters or the ruins of their own homes after the conflict that took place between Israel and Gaza during the summer of that same year (BBC, 2014). The repeated rounds of fighting between Israel and Hamas have caused serious damage to electricity, water and healthcare infrastructure, which is in dire conditions to this day. With climate change increasing the likelihood of extreme weather events, the collapse of Gaza's civilian infrastructure appears as an imminent threat that could equally jeopardize the region's security. In Gaza, these pressures could lead to another outbreak of hostilities if Hamas believes conflict would help it solidify domestic support and gain more aid funding.

And although Israel holds Hamas responsible for all activity that occurs in Gaza, there are other militant groups which could seek to capitalize on Hamas' failure and discontent. Some commentators believe that as desperation and hopelessness rises, Palestinians may find appeal in other militant and jihadist groups, such as the Islamic State (Nielsen, 2019). This poses a major risk of destabilization.

The damage caused by the 2014 conflict and flooding was estimated at around \$30 million, while the investment needed in large-scale water sector was estimated at over \$900 million. The donor community channelled massive investments towards the reconstruction



of the civilian infrastructure through the newly-established of the Gaza Reconstruction Mechanism (GRM). This mechanism has facilitated the entry of materials that would otherwise not have been allowed, and most of the rehabilitation of water and sanitation facilities damaged in the conflict has now been completed (GRM, 2019). Additional investments are urgently needed, but are hindered by the severe restrictions Israel puts on the entry of dual use items and the internal Palestinian divide between the authorities in the West Bank and the de facto Hamas authorities in the Gaza Strip. Even when the construction of new facilities is possible, the lack of electricity to power them remains an obstacle.

### ➔ Jordan

In October 2018, flash floods swept away students and other families in the hot springs area near the Dead Sea, killing 21. Meanwhile, a bridge that led to the site where the search and rescue operation were underway also collapsed (Namrouqa, 2018). During the same period, some streets in Amman were inundated, leading to traffic jams, while large hailstorms were reported elsewhere (BBC, 2018). In April 2020, a 400 meters collapse in a major road leading to the Dead Sea was attributed to new springs bursting after years of drought (Alrai, 2020). In January of the same year, heavy rainfalls and extreme weather conditions also caused roads in Ajloun to collapse including Kafaranjah and other sub roads, linking the city with the towns of Al-Wahadna, Al-Hashimiyah, Halawa and Deir Al-Smadiya (Royanews, 2020).

## Human health risks

Climate change will have adverse health impacts on populations. It will reduce the ability to halt disease contagion, extreme weather events will increase the likelihood of illness, and as previously mentioned, the impact on water supply, energy supply and food production will in turn further negative health outcomes (Sellers et al. 2019). All of this reinforces poverty, which can contribute to dissatisfaction and political instability. Some of the risks are common to each country, as they share an environment. However, the three countries possess different levels of healthcare and medical systems. While Israel is not immune to the negative health effects of climate change, such as extreme heat, it is far better positioned than Palestine, and especially Gaza. Regarding Gaza, the combination of numerous rounds of conflict, which has negatively impacted much of the medical infrastructure, in conjunction with climate change, greatly reduces the capacity of areas to deal with health risks, and in turn increases the fragility of the area.

### ➔ Israel, Jordan & Palestine

Climate change is expected to increase the risk of Typhoid fever or Hepatitis A, as well as water, vector and food-borne diseases. The COVID 19 epidemic highlights the cross-border concerns of health issues not only to national security but regional security (Eldar, 2020). Higher temperatures and erosion of livelihoods may increase the risk of cardiovascular and respiratory diseases as well as heat strokes (Introcaso, 2018).

### ➔ Palestine

The food shortages caused by climate-related changes may lead to malnutrition, increasing the exposure to diseases. Water-borne diseases are already the primary cause of illness of children in Gaza, accounting for 26% of all reported disease. These diseases have a further indirect effect on a child's ability to absorb nutritional content, leading to a higher incidence of childhood malnutrition (Efron, Fischbach and Giordano, 2018). At the same time, lower economic capacity often prevents families from seeking medical attention. The result is an overall deterioration of public health, which in turn undermines economic activity and perpetuates poverty.

Public health is further threatened by lack of adequate water and poor sanitation conditions due to the conflict. Water and sanitation crises have already resulted in outbreaks of cholera in Iraq and Yemen that rapidly spread across borders, with implications for regional stability. It has become increasingly apparent that under such circumstances, water security can be considered as having a significant impact on broader human health concerns.

Wastewater treatment plays a major role in protecting public health through reducing potential infection. While Israel and some areas of Jordan such as greater Amman have wastewater treatment, much of Palestine and the Jordan Valley in Jordan does not. This gives wastewater the potential to seep into the groundwater, along with the infections found in it, posing a major health threat (Bromberg, Taleb and Majdalanni, 2020). As energy insecurity rises, it may impact the ability of sewage treatment plants that do exist to run.

In the region, the direst health situation is in Gaza. Following the imposition of a siege and numerous rounds of conflict between Hamas and Israel, the medical infrastructure in Gaza is always on the verge of collapse. The issues surrounding sanitation and sewage further compounds the spread of diseases. Because many Gazans require medical treatment in Israel and the West Bank, it can open up a pathway for diseases to spread across borders. This has occurred in both directions (Hermesh, Maya and Davidovitch, 2019). The recent outbreak of Covid-19 in Gaza was from a family returning from the West Bank (al-Mughrabi, 2020). Additionally, the poor conditions in Gaza has impacts on mental health, with reports on a rise in suicide in 2020 (Scammell and Balousha, 2020). As climate change furthers the rate of diseases, it has the possibility of overwhelming the limited capacity of the Gazan health system. In turn, this could worsen the humanitarian situation, and cause further conflict between Hamas and Israel as Hamas lashes out in an effort to lift the blockade. A collapse in the health infrastructure, similar to a possible collapse in sanitary infrastructure, could cause a wave of forced migration from Gaza to Israel and neighbouring countries (Hermesh, Maya and Davidovitch, 2019).







## ENTRY POINTS FOR ADDRESSING CLIMATE FRAGILITY RISKS

The analysis of climate change implications for the Middle East offered by this climate-fragility risk brief has shown that the region is in dire need of a holistic, multi-dimensional approach to climate-related security risks, integrating national and regional measures.

The implications of not moving beyond the agreements and regulations set forth in the Israel-Jordan Peace Agreement and Oslo II interim accords can already be witnessed today, and they will be exacerbated by the impact of climate change. The repercussions of climate change will be felt on multiple dimensions - from global outcomes to national, regional, and local reverberations. An approach to mitigating and adapting to climate change has to be multi-dimensional, incorporating a clear strategy for all players in the region. The leadership of all three countries needs to embrace a paradigm shift away from viewing climate security as a zero-sum game and towards a real possibility for a tangible, mutually beneficial outcome that can not only strengthen the region's climate resilience, but also comes with an invaluable peace dividend.



5 entry points to address climate-fragility risks in Jordan, Palestine and Israel

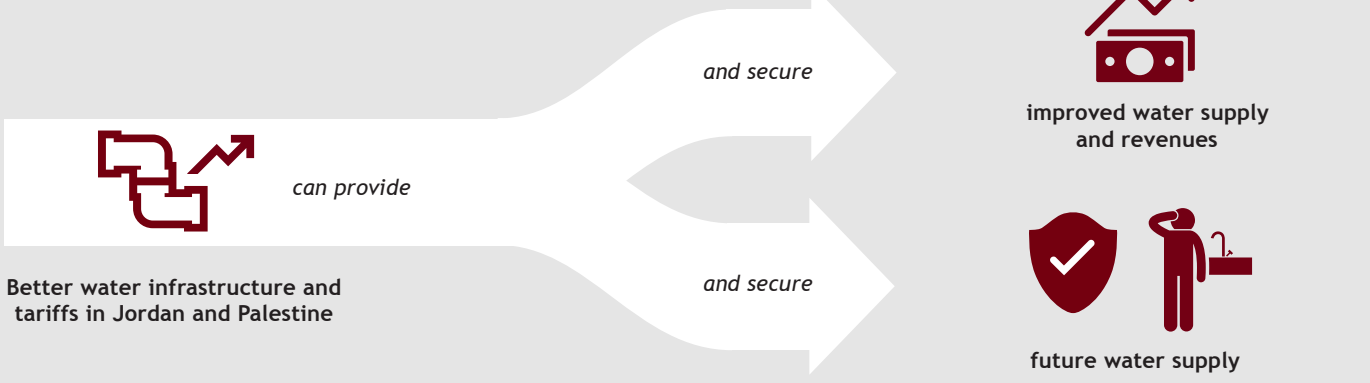
1. Promote a paradigm shift to integrate climate change considerations the national security agenda.



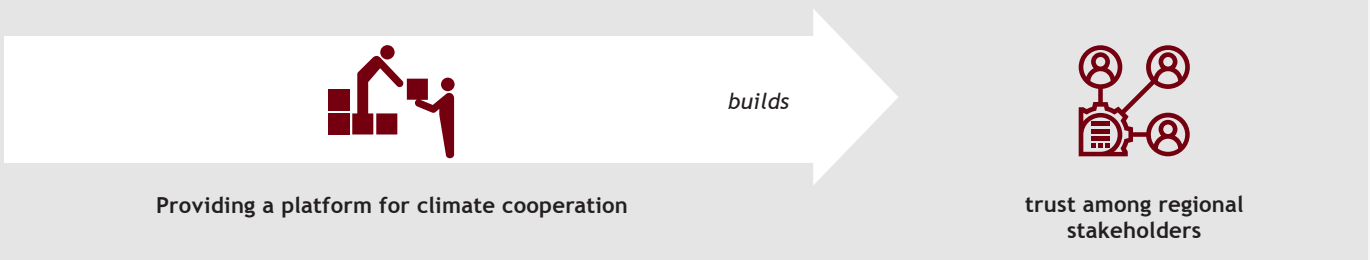
2. Resolve final status natural water allocations between Israel and Palestine.



3. Devise strategies to effectively upgrade and improve water infrastructure and tariffs in Jordan and Palestine.



4. Create a roadmap for a regional approach to address climate change adaptation and mitigation issues to provide a platform for important regional.



5. Foster political integration through economic cooperation and international investments.



## Promote a paradigm shift to integrate climate change considerations into the national security agenda of each country

While control over and access to water resources has long been a subject of national security in Jordan, Palestine, and Israel, little attention is paid to the inherent connection between climate change, regional water insecurity and national security. In general there is no widespread recognition that climate change is an emergency. According to a Pew Research Center study conducted in 2015, people in the Middle East have a lower perception of the threat of climate change compared to most other regions in the world (Stokes, Wike and Carle, 2015).

Yet climate security is essential for the wellbeing and internal stability of a state, and therefore for its national security and the welfare of its citizens. When it deteriorates, there are not only domestic repercussions but also effects on neighbouring countries, for example through disease, migration, and radicalization. States must therefore recognize the fundamental role that climate and water security plays in determining their own development and that of their neighbours' (Brooks, Trottier, Al Khatib, Mehyar, & Bromberg, 2012). Therefore, it is in the national security interest of all three countries to embrace a paradigm shift to recognize climate security as a fundamental tool for achieving more human security.

For this shift to happen, the message that climate security is a national security issue needs to reach the leadership, the public, and the private sector of all three countries. They need to integrate environmental considerations into decision-making processes at all levels. This requires breaking down disciplinary and organizational barriers to make way for inter-sectoral groups - consisting of scientists and political researchers alike, representing the environment and health sector as much as the economic and security realm - to engage the public as well as private investors. Special emphasis needs to be put on ensuring better flow of information and cooperation among ministries, as well as the fulfilment of the Principle of Public Participation that empowers people to access information, participate in decision-making on environmental matters, and promote environmental justice<sup>12</sup>. In this sense, universities, think tanks, and civil society organizations can play a major role in advancing national plans in relation to climate change through conducting research and providing quantitative and precise data needed for proper actions and decision making. And if the government creates an enabling environment and sets up the right incentives, the business community can increase its involvement in national efforts by investing in water and environmental projects.

## Resolve final status natural water allocations between Israel and Palestine

The failure to reach a fair water allocation and management agreement between Israelis and Palestinians is putting the Palestinian water sector under huge stress: despite population growth and development, Palestinian withdrawals of water from the Mountain Aquifer remain limited to the terms of Oslo II, and water shortages breed animosity and resentment.

The Palestinian discourse mostly focuses on Israel's control over large parts of the West Bank and its economic restrictions on the Gaza Strip. Palestinian stakeholders express a deep feeling of injustice with respect to their limited ability to access natural resources within the West Bank or due to closure policies for the Gaza Strip. Meanwhile, Israel's control over shared natural resources and Areas C of the West Bank constrains Palestine's ability to implement climate change adaptation measures such as the construction of renewable energy, desalination plants, and wastewater treatment facilities.

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<sup>12</sup> See "Public Participation" United Nations Economic Commission for Europe (UNECE), <https://www.unece.org/ro/env/pp/welcome.html>. This principle stems from the Aarhus Convention and its Protocol on Pollutant Release and Transfer Registers.

On the bright side, thanks to technological advances in desalination, water issues are no longer a zero-sum game as they were at the time of the signing of the Oslo Accords in 1995. Israel's status as a world leader in desalination technology means that water is no longer a finite resource to be resolved in tough negotiations: in fact, the overall availability of water is expected to increase to a point where natural water resources can be more fairly allocated between Israel and Palestine (Zeveloff, 2019).

Final status natural water allocation issues are now more easily resolvable between Israel and Palestine, so that climate cooperation can advance based on greater political certainty for the water sector for Palestine (Eran, Bromberg, & Giordano, 2018). There has been minimal progress in negotiations over water since Oslo, as external political disputes and issues impede dialogue between the governments.

## Devise strategies to effectively upgrade and improve water infrastructure and tariffs (Jordan and Palestine)

A major barrier to augmenting water supply in Jordan and Palestine is the tremendous loss of water and revenue due to damaged water infrastructure (physical and water administration loss) and inefficient service provision.

Despite high network coverage, service delivery in the West Bank is often poor with intermittent supply, high levels of physical losses and other non-revenue water, and large variations in per capita supply between communities. Damages to the water infrastructure as well as illegal water connection, meter manipulation or illegal syphoning have caused water and revenue losses of around 40 percent (in some places more than 50 percent) (World Bank, 2018). In Palestine the status of infrastructure is worsened by Israel's control, especially in Area C, that severely limits the scope of actions that can unilaterally be implemented by Palestinian policy-makers, which further adds to the feeling of stagnation. The majority of water and energy infrastructure projects in the West Bank are contingent on the approval of the Israeli Civil Administration: any Palestinian attempts to develop new resources in the territory, such as wells, must be approved by the Joint Water Committee, an Israeli-Palestinian body created by Oslo, which reportedly routinely denies Palestinian requests. Improving the humanitarian situation in Gaza also requires coordinating with the de facto governing authority of Hamas. Almost every domestic policy issue in Palestine (and to some degree in Israel) is linked to the failure to resolve the broader Israeli-Palestinian conflict.

Similarly, Jordan's estimated losses amount to more than half of the water supplied per person each day (Jordan's Ministry of Water and Irrigation, 2016). The result is not only an immense loss of revenue needed to improve and expand services, but also a decline in available water for Jordan's population and industry at a time when the gap between water demand and water supply becomes ever starker.

While the acquisition of additional water is undoubtedly a necessary step, the first task should be to work in the margins of what is unilaterally implementable and sure to increase water supply without having to invest in the development of new water sources. In order to offset lower levels of ground and surface water induced by climate-related changes, Jordan and Palestine have already initiated comprehensive reforms towards upgrading their water network systems and service provision, among which the revision of their water and wastewater tariffs to promote smart water use. However, the implementation of these reforms has advanced only slowly. It is critical for Jordan and Palestine's water security that these reforms be pursued and implemented in a timely manner.





## Create a roadmap for a regional approach to address climate change adaptation and mitigation issues

After recognizing climate change as a national security issue, the next step should be to expand the discourse on the national implications of climate change onto the regional level. Jordan, Palestine, and Israel should devise a roadmap for creating a regional, integrated plan to combat the impact of climate change on the region. Although a comprehensive peace deal between Israel and Palestine remains elusive at this point, the past years have shown that an incremental approach can bring about significant (and necessary) changes to the humanitarian and environmental situation of the region.

To create a roadmap, the three countries first have to establish a channel of communication to discuss individual and shared interests, assets, and needs. Existing bodies, such as the UNFCCC's workshop facilitative sharing of views (FsV) could serve as a guiding framework here<sup>13</sup>. The UNFCCC workshop creates an open exchange platform that can be used for countries to discuss questions, concerns, and ideas pertaining to climate change mitigation and adaptation.

Such a platform for communication could also be used to renegotiate cooperative agreements over shared water resources to incorporate the effects of climate change. When assessing the viability of regional projects, the costs and benefits should be weighed against unilateral solutions. The current water agreements between Israel and Jordan and Israel and Palestine lack the necessary flexibility to account for climate-related impacts such as consecutive years of drought. It should also be evaluated whether the regulations on water distribution should include provisions to accommodate demographic developments such as population growth or refugee movements. In light of the stark influx of refugees over the past years, the latter is a particularly pressing issue for Jordan. Past governmental projections have failed to count for emergencies including the frequent influx of refugees, and future plans must better take the scenario of more refugees as a given considering how very unstable is the region. Regional agreements should be revised especially with Syria in relation to the Yarmouk River and with Israel in relation to the Jordan River after hosting hundreds of thousands of Syrian refugees. Israel, too, identified the risk of massive population displacement as a critical threat in the future.

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13 See UNFCCC, "The Facilitative Sharing of Views under the ICA Process," <https://unfccc.int/process/transparency-and-reporting/reporting-and-review-under-the-convention/biennial-update-reports-and-international-consultation-and-analysis/facilitative-sharing-of-views>

As for the Israeli side, representatives from Israel expressed concern over the likelihood of more frequent and extreme droughts, pushing people to move across borders (EcoPeace Middle East, 2019). They went on to emphasize that Israel has the technology and know-how to ensure its own climate security, but that it needs to safeguard the stability across the region in order to ensure its national security. A concerted, regional approach to climate action could thus be an important step to build trust and confidence among regional stakeholders.

Accordingly, initiatives supported by the international community would offer the possibility of creating a space for dialogue involving other countries in the MENA region as well as Jordan, Palestine and Israel. One of the possibilities is to create a UN Special Envoy for Climate Change and Security in the Middle East to facilitate dialogue and cooperation to integrate environmental and climate change considerations into all decision-making processes in the region.

## Foster political integration through economic cooperation and international investments

One part of the conversation around climate change mitigation and adaptation in the Middle East focuses on financial and technological assistance from the international community. Jordan and Palestine both set climate mitigation and adaptation measures that are contingent on international support. Their viewpoint is congruent with many voices of the global discourse on climate finance. Although a wide variety of countries are now engaging in strategies for climate change mitigation and adaptation, the moral obligation to finance these measures is believed to lie with richer countries, given their large contribution to climate change over the past centuries.

As this analysis has shown, however, international financial assistance for climate action not only enables progress on the mitigation and adaptation level, but also promotes the international community's strategic interest to safeguard stability in the Middle East. Opportunities to engage with the international community will come through development assistance, private sector investment, and through the exchange of know-how and resource strategies in order to implement adaptation measures in sectors like wastewater treatment and climate-smart agriculture among others.

As explored in this risk brief, the effects of climate change go well beyond national borders: Jordan, Palestine and Israel will all be negatively affected by climate change, in different and interconnected ways. The three countries should have an incentive to join forces in the fight against climate change and coordinate their policies - including through economic cooperation and creating innovative strategies to foster cooperation of shared consensus on climate change.

International support is particularly strong for initiatives that centre around water and energy and that incorporate a peace dividend by strengthening regional relations. Given the technological advances in the manufacture of new water, water issues are no longer a zero-sum game. At the same time, new forms of energy production, for example through the use of large-scale solar energy fields, can lead the way towards secure, sustainable, and cost-effective energy supply. Since energy represents a critical input along different stages of the water supply chain, renewable energy technologies, associated to non-conventional water sources, could provide integrated solutions able to enhance security and sustainability across sectors, while supporting global climate ambitions. In this way, the water-energy nexus could be transformed from a vicious circle to a virtuous circle.

So far, energy and water challenges have mainly been addressed within the sectors concerned. This has resulted in policies and strategies that focus primarily on individual sectors, rather than considering the broader cross-sectoral impact. Adopting an integrated and holistic water-energy nexus approach, enhancing resource efficiency and equity, would provide an opportunity to minimise trade-offs, amplify synergies between sectors and prevent security



threats. Among the projects based on a nexus approach is the pre-feasibility study for Mid-East Water-Renewable Energy Exchanges, carried out jointly by EcoPeace Middle East and the Konrad-Adenauer-Stiftung (2017), which takes as a reference the states' relative abundance of resources to build a non-conventional water-renewable energy exchange model between Israel, Jordan and Palestine. Using this model of regionally integrated water and energy sectors would benefit all three countries, increasing interdependencies, efficiency, equity and environmental quality<sup>14</sup>.

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14 As it emerges by the interplay of several geographic and socioeconomic factors, Israel and Palestine, having easy access to the Mediterranean Sea, show a comparative advantage in producing desalinated water, while Jordan, having a relatively large amount of unpopulated spaces suitable for generating renewable energy, shows a comparative advantage in producing solar. The underlying idea is that Israel and Palestine could produce desalinated water and supply it to Jordan, and conversely, Jordan could produce solar energy and supply it to Israel and Palestine.





## REFERENCES

- Aish, A M., (2013). Drinking water quality assessment of the Middle Governorate in the Gaza Strip, Palestine. *Water Resources and Industry* 4 p. 13-20. Retrieved from <https://doi.org/10.1016/j.wri.2013.09.004>
- Akram, F. (2019). Rare protests erupt against Hamas' 12-year rule over Gaza AP News. Retrieved from <https://apnews.com/8fdc192372ed472d8043498f077d1dc0>
- al-Mughrabi, N, (August 25, 2020). Gaza in Lockdown to contain its first Covid-19 outbreak. Reuters. Retrieved from <https://www.timesofisrael.com/hamas-reports-first-cases-of-coronavirus-inside-gaza/>
- Alshoubaki, Wa'ed and Harris, Michael. (2018). The impact of Syrian refugees on Jordan: A framework for analysis. *Journal of International Studies* 11 (2).
- Amery, Hussein, A. (2019). Climate, not conflict, drove many Syrian refugees to Lebanon. *The Conversation*. Retrieved from <https://theconversation.com/climate-not-conflict-drove-many-syrian-refugees-to-lebanon-127681>
- Amichai, R. (November 24, 2016). Wildfires tear across Israel, Netanyahu calls arsonists 'terrorists'. Reuters. Retrieved from <https://www.reuters.com/article/us-israel-fires-idUSKBN13JOYJ>
- AQUASTAT Database. (2017). Food and Agriculture Organisation of the United Nations. Retrieved from <http://www.fao.org/nr/water/aquastat/data/query/index.html?lang=en>
- Associated Press (2018). Protests against fuel and electricity hikes. Retrieved from <https://arab24.com/portal/index.php/component/k2/item/10524-2018-06-01-14-57-15>.
- Aw-Hussan et al. (2014). The impact of food and agricultural policies on groundwater use in Syria. *Journal of Hydrology* 513 p. 204-215. Retrieved from <http://dx.doi.org/10.1016/j.jhydrol.2014.03.043>
- Ayyub, R. and al-Mughrabi, N. (2020). Israel halts fuel shipments to Gaza over fire balloons. Reuters. Retrieved from <https://www.reuters.com/article/us-israel-palestinians-gaza/israel-halts-fuel-shipments-to-gaza-over-fire-balloons-idUSKCN2590JN>
- BBC. (November 24, 2016). Israel Fires: Tens of Thousands flee as fires hit Haifa. BBC. Retrieved from <https://www.bbc.com/news/world-middle-east-38088651>
- BBC. (January 13, 2017). Gaza electricity crisis: Hamas breaks up protest. BBC News Middle East. Retrieved from <https://www.bbc.com/news/world-middle-east-38604904>
- BBC. (June 3, 2018). Jordanians in third night of tax rise protests. BBC. Retrieved from <https://www.bbc.com/news/world-middle-east-44345136>
- BBC. (October 25 2018). Jordan flash floods: School bus swept away near Dead Sea. BBC. Retrieved from <https://www.bbc.com/news/world-middle-east-45983337>
- BBC. (November 28, 2014). Gaza floods: UN declares state of emergency. BBC. Retrieved from <https://www.bbc.com/news/world-middle-east-30243898>
- Ben-Ze'ev, E. (2011). *Remembering Palestine in 1948: Beyond National Narratives*. New York: Cambridge University Press.
- Berland, A. (2000, May). *The Water Component of the Peace Process between the Israelis and the Palestinians*. Master's Thesis, Fletcher School of Law and Diplomacy at Tufts University.
- Bollack, E. (2016). Palestinian villages 'get two hours of water a week'. Al Jazeera. Retrieved from <https://www.aljazeera.com/news/2016/10/palestinian-villages-hours-water-week-161023105150024.html>

- Brinkman, R. and Sombroek, W.G., (1996) The effects of global change on soil conditions in relation to plant growth and food production. FAO. Retrieved from <http://www.fao.org/3/w5183e05.htm>
- Bromberg, G., Giordano, G., Eran, O., Elad, O. (2018). Gaza on the edge: The Water & Energy Crisis in Gaza. EcoPeace ME and INSS. Retrieved from [https://ecopeaceme.org/wp-content/uploads/2017/10/Gaza\\_on\\_the\\_Edge.pdf](https://ecopeaceme.org/wp-content/uploads/2017/10/Gaza_on_the_Edge.pdf)
- Bromberg, G., Taleb Y.A., and Majdalanni, N., (2020). Covid-19, Human Waste and Wastewater: A Discussion Paper for Cooperation on Water and Wastewater Management in Israel, Jordan and Palestine. EcoPeace ME. Retrieved from <https://ecopeaceme.org/wp-content/uploads/2020/05/Coronavirus-and-Water-Wastewater-Cooperation-30-April-2020.pdf>
- Brooks, N. and Adger W. N, (2004). Assessing and Enhancing Adaptive Capacity. Retrieved from <https://www4.unfccc.int/sites/NAPC/Country%20Documents/General/apf%20technical%20paper07.pdf>
- British Petroleum. (2019). BP statistical review of world energy 2019. London. Retrieved from <https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2019-full-report.pdf>
- Brooks, D., Trottier, J., Al Khatib, N., Mehyar, M., & Bromberg, G. (2012). An Agreement to Share Water between Israelis and Palestinians: the FoEME Proposal.
- Central Bureau of Statistics. (2020). Israel in Figures, Selected data from the Statistical Abstract of Israel 2019.
- CIA World Factbook (2020). The World Factbook: Jordan. Retrieved from <https://www.cia.gov/library/publications/the-world-factbook/geos/jo.html>
- Chatelard, G. (August 31, 2010). Jordan: A Refugee Haven. Migration Policy Institute. Retrieved from <https://www.migrationpolicy.org/article/jordan-refugee-haven>
- Danin R. M., (August 13, 2013). The Politics of Energy: What Morsi's Fall Means for Jordan. Council for Foreign Relations. Retrieved from <https://www.cfr.org/blog/politics-energy-what-morsis-fall-means-jordan>
- De Bel-Air, F. (2016). Migration Profile: Jordan. Migration Policy Centre: Policy Briefs (06), 1-19.
- Depietri, Y., and Orenstein, D. (2019). Fire-Regulating Services and Disservices With an Application to the Haifa-Carmel Region in Israel. *Frontiers in Environmental Science* (07). Retrieved from <https://doi.org/10.3389/fenvs.2019.00107>
- Duhan, N. (June 6, 2018). Protests in Jordan: All you need to know. Middle East Eye. Retrieved from <https://www.middleeasteye.net/news/protests-jordan-all-you-need-know>
- Dupont, A., and Thirwell, M. (2009). A New Era of Food Insecurity? Survival.
- EcoPeace Middle East, (2019). Climate Change, Water Security, and National Security for Jordan, Palestine, and Israel, Amman, Jordan; Tel Aviv, Israel; Ramallah, Palestine: Carry, Inga (Ed.) Retrieved from <https://ecopeaceme.org/wp-content/uploads/2019/01/climate-change-web.pdf>
- Efron, Shira, Jordan R Fischbach, and Giulia Giordano. Rep. (2018). Gaza's Water and Sanitation Crisis: The Implications for Public Health. RAND Corporation. Retrieved from [https://www.rand.org/pubs/external\\_publications/EP67494.html](https://www.rand.org/pubs/external_publications/EP67494.html)
- Eldar, Akiva. (March 10, 2020). Coronavirus Oblivious to Israeli, Palestinian Borders. Al-Monitor. Retrieved from <https://www.al-monitor.com/pulse/originals/2020/03/israel-cogat-coronavirus-crossborder-cooperation-environment.html>
- Elmusa, S. (1996). The Land-Water Nexus in the Israeli-Palestinian Conflict. *Journal of Palestine Studies* 25 (3), 69-78.
- Eran, O., Bromberg, G., & Giordano, G. (2018). Israeli Water Diplomacy and National Security Concerns. Tel Aviv: EcoPeace Middle East and INSS. Retrieved from <https://mewf.de/uploads/1556126932095.pdf>

- Eskjær, M. (September 26 2017). Climate Change Communication in Middle East and Arab Countries. Oxford Research Encyclopedia of Climate Science, Oxford University Press.
- Evans, J. (2009). 21st century climate change in the Middle East. *Climatic Change*, 92, 417-432.
- Fanackwater (2016). Israel: Water Sources: Groundwater. Retrieved from <https://water.fanack.com/israel/water-resources/groundwater/>
- FAO (2016) "Jordan: Water Resources" Database. Retrieved from [http://www.fao.org/nr/water/aquastat/countries\\_regions/Profile\\_segments/JOR-WR\\_eng.stm#:~:text=The%20main%20non%2Drenewable%20aquifer,3%2Fyear%20for%2050%20years.&text=The%20Water%20Authority%20of%20Jordan,3%2Fyear%20for%2050%20years.](http://www.fao.org/nr/water/aquastat/countries_regions/Profile_segments/JOR-WR_eng.stm#:~:text=The%20main%20non%2Drenewable%20aquifer,3%2Fyear%20for%2050%20years.&text=The%20Water%20Authority%20of%20Jordan,3%2Fyear%20for%2050%20years.)
- FAO. (2017). Evaluation of FAO's Programme in West Bank and Gaza Strip 2011-2015. Rome: FAO. Retrieved from <http://www.fao.org/evaluation/evaluation-digest/evaluations-detail/en/c/1037168/>
- FAO and The World Bank Group. (August 28, 2018). Water Management in Fragile Systems: Building Resilience to Shocks and Protracted Crises in the Middle East and North Africa. Retrieved from <http://www.fao.org/emergencies/resources/documents/resources-detail/en/c/1151116/>
- Fattouh, Bassam and El-Katiri, Laura. (2012). Energy Subsidies in the Arab World. United Nations Development Program Regional Bureau for Arab States. Retrieved from <https://dev-chm.cbd.int/financial/fiscalenviron/g-subsidyenergyarab-undp.pdf>
- Feitelson, E. and Tubi, A. (2017). A main driver or an intermediate variable? Climate change, water and security in the Middle East. *Global Environmental Change* 44, 39-48. Retrieved from <https://doi.org/10.1016/j.gloenvcha.2017.03.001>
- Francis, Alexandra (September 21, 2015), Jordan's Refugee Crisis. Carnegie Endowment for International Peace. Retrieved from <https://carnegieendowment.org/2015/09/21/jordan-s-refugee-crisis-pub-61338>
- Frings, M. and Lutz, J. (2017). A Breakthrough at Long Last? On the Revival of the Israeli-Palestinian Joint Water Committee. Konrad-Adenauer-Stiftung. Retrieved from <https://www.kas.de/en/web/auslandsinformationen/artikel/detail/-/content/endlich-ein-durchbruch->
- Gaza Reconstruction Mechanism. (2019). The Gaza Reconstruction Mechanism: An Agreement between the Government of Palestine (GoP) and the Government of Israel (GoI). Retrieved from <https://grm.report/>
- Ghanem, A. (2013). Palestinian Nationalism: An Overview. *Israel Studies* 18 (2).
- Giordano, G. and Quagliarotti, D. A. L. (2019). The Water-Energy-Security Nexus in the Middle East. in *Euromesco Joint Policy Study* (15).
- Gilmont, M., Rayner, S., Harper, E., Nassar, L., Tal, N., Simpson, M., & Salem, H. (2017). Decoupling National Water Needs for National Water Supplies: Insights and Potential for Countries in the Jordan Basin. WANA Institute - EcoPeace Middle East - University of Oxford.
- Global Solar Atlas, (2020). Global Photovoltaic Power Potential by Country. Retrieved from <https://globalsolaratlas.info/global-pv-potential-study>
- Haaretz. (2020). Two die in flooded elevator in Tel Aviv as heavy storms hit Israel.
- Hall, M. (March 31, 2020) Jordan switches off unsubsidized solar projects. *Pv Magazine*. Retrieved from <https://www.pv-magazine.com/2020/03/31/jordan-switches-off-all-large-scale-solar/>
- Hermesh, B., Maya, M., and Davidovitch, N. (2019). Health Risks Assessment for the Israeli Population following the Sanitary Crisis in Gaza. *EcoPeace Middle East*. Retrieved from [https://ecopeace.org/wp-content/uploads/2019/05/Gaza-Health-Report\\_ENG.pdf](https://ecopeace.org/wp-content/uploads/2019/05/Gaza-Health-Report_ENG.pdf)
- Hochman, A., Harpaz, T., Saaroni, H., & Alpert, P. (2018). The seasons' length in 21st century CMIP5 projections over the eastern Mediterranean. *International Journal of Climatology*, 1-11.



- Holmes, O. (2018). Flash flood in Jordan sweeps away school bus, killing at least 18. *The Guardian*. Retrieved from <https://www.theguardian.com/world/2018/oct/25/flash-flood-in-jordan-sweeps-away-school-bus-killing-children#:~:text=At%20least%20%20people%2C%20most,bus%20near%20the%20Dead%20Sea.&text=Search%20teams%20had%20rescued%2034,Jordanian%20civil%20defence%20sources%20said.>
- Hussein, H et al. (January 2020). Syrian Refugees, Water Scarcity and Dynamic Politics: How Do the New Refugees Discourses Impact Water Governance Debates in Lebanon and Jordan. *Water* 12(2).
- Hurt, W. (2018). No Shortage of Challenges: Jordan's Water Crisis. Retrieved from *Harvard Political Review*: <https://harvardpolitics.com/world/no-shortage-of-challenges-jordans-water-crisis/>
- IEA. (2020). Data and statistics. Retrieved from <https://www.iea.org/data-and-statistics?country=WORLD&fuel=Energy%20supply&indicator=TPESbySource>
- IEA. (2020). World Energy Outlook 2020. Paris: IEA. Retrieved from <https://www.iea.org/reports/world-energy-outlook-2020>
- IEA, (2019). Energy Security: Ensuring the uninterrupted availability of energy sources at an affordable price. IEA. Retrieved from <https://www.iea.org/areas-of-work/ensuring-energy-security>
- ILO. (2018). Decent Work and the Agriculture Sector in Jordan: Evidence from Workers' and Employers' Surveys. ILO. Retrieved from [https://www.ilo.org/wcmsp5/groups/public/---arabstates/---ro-beirut/documents/publication/wcms\\_646170.pdf](https://www.ilo.org/wcmsp5/groups/public/---arabstates/---ro-beirut/documents/publication/wcms_646170.pdf)
- International Union for Conservation of Nature. (2012). On the Path of Resilience to Climate Change in Jordan.
- IMF. (April 2020). IMF Country Report No. 20/101: Jordan. Washington DC: IMF.
- Intrascio, D. (December 19, 2018). Climate Change is the Greatest Threat to Human Health in History. *Health Affairs*. Retrieved from <https://www.healthaffairs.org.eu1.proxy.openathens.net/doi/10.1377/hblog20181218.278288/full/>
- Isabelle La Jeunesse et al. (2016). Is climate change a threat for water uses in the Mediterranean region? Results from a survey at local scale. *Science of The Total Environment* 543, part B, 981-996. Retrieved from 10.1016/j.scitotenv.2015.04.062
- Israel Ministry of Environmental Protection. (2017). Potential Effect on Israel - Predicted Climate Change in Israel. Retrieved from [http://www.sviva.gov.il/English/env\\_topics/climatechange/Pages/PotentialImpactOnIsrael.aspx](http://www.sviva.gov.il/English/env_topics/climatechange/Pages/PotentialImpactOnIsrael.aspx)
- Israel Water Authority. (Oct 2017). באה תינכת יארב מימה קשמב חותיפה ינוויכ. The water market development, in accordance to the strategic planning.
- Jägerskog, A. (2007). Why States Co-operate over Shared Water: The Water Negotiations in the Jordan River Basin. In D. H. Shoval H., *Water Resources in the Middle East*. Berlin, Heidelberg: Springer.
- Jägerskog A, and Swain A. (2016). Water, migration and how they are interlinked. SIWI. Retrieved from <https://www.sivi.org/publications/paper-migration/>
- Jessel, S, Sawyer, Samantha and Hernandez, Diana (2019) Energy, Poverty and Health in Climate Change: A Comprehensive Review of the Emerging Literature. *Frontiers in Public Health*. Retrieved from <https://doi.org/10.3389/fpubh.2019.00357>
- Jordan Department of Statistics. (2018). Jordan in Figures 2018.
- Jordan Investment Commission. (2017). Sector Profile: Agriculture. Jordan Investment Commission. Retrieved from <https://www.jic.gov.jo/wp-content/uploads/2018/07/Sector-Profile-Agriculture-Final-Mar-2018-JIC-HAS-020418-1.pdf>
- Jordanian Ministry of Environment. (2013). The National Climate Change Policy of the Hashemite Kingdom of Jordan 2013-2020 (JNCCP): Sector Strategic Guidance Framework. Jordan's Ministry of Environment. Retrieved from <https://globalnaps.org/wp-content/uploads/2018/08/climate-change-policy-of-jordan.pdf>

Jordan's Ministry of Water and Irrigation. (2016). National Water Strategy 2016-2025. Jordan's Ministry of Water and Irrigation.

Jordan Times (June 1, 2018). King freezes price hikes on fuel and electricity. The Jordan Times. Retrieved from <https://www.jordantimes.com/news/local/king-freezes-price-hikes-fuel-and-electricity>

Jordan Times. (September 6, 2018). Only 18.8 per cent of Syrian refugees want to go home soon. The Jordan Times. Retrieved from <http://www.jordantimes.com/news/local/'only-188-cent-syrian-refugees-want-go-home-soon'>

Jordan Times. (19 November 2019). Water woes come to fore at Jordan, Nato meeting. The Jordan Times, <https://www.jordantimes.com/news/local/water-woes-come-fore-jordan-nato-meeting>

Kelley et al. (2015). Climate change in the Fertile Crescent and implications of the recent Syrian drought PNAS (112) 11: p. 3241-3246. Retrieved from <https://www.pnas.org/content/112/11/3241>

Khan, S. (2008). Climate Change and State Fragility. Governance and Social Development Resource Centre. Retrieved from <http://gsdrc.org/docs/open/hd550.pdf>

Kurz, A. (2015). A Conflict Within a Conflict: The Fatah-Hamas Strife and the Israeli-Palestinian Political Process. INSS. Retrieved from <https://www.inss.org.il/wp-content/uploads/systemfiles/A%20Conflict%20within%20a%20Conflict.pdf>

Levin, N et al. (May 2016) The Human and Physical Determinants of Wildfires and Burnt Areas in Israel. Environmental Management 58, 549-562. Retrieved from <https://doi.org/10.1007/s00267-016-0715-1>

Lidman, Melanie. (June 27, 2019). Plan to Pump Desalinated Water to Sea of Galilee May Open Diplomatic Floodgates. The Times of Israel. Retrieved from <https://www.timesofisrael.com/plan-to-pump-desalinated-water-to-sea-of-galilee-may-open-diplomatic-floodgates/>.

Lovatt, H. (May 7 2020). How Will Hamas Steer Gaza Through the Pandemic? ISPI. Retrieved from <https://www.ispionline.it/en/pubblicazione/how-will-hamas-steer-gaza-through-pandemic-25964>

Machairas, D. (2017). The Strategic and political consequences of the June 1967 War. Cogent Social Sciences 3(1). Retrieved from 10.1080/23311886.2017.1299555

Martens, M. (2017). Food and Water Security in the Middle East and North, Special Report to the Science and Technology Committee of the NATO Parliamentary Assembly Africa. Retrieved from <https://www.nato-pa.int/document/2017-food-and-water-security-mena-region-martens-report-176-stc-17-e-bis>

Makovsky, D., and Weiner, L. (February 4 2018). Hamas failures in Gaza are changing Israel's stance. The Times of Israel. Retrieved from <https://www.timesofisrael.com/hamas-failures-in-gaza-are-changing-israels-stance/>

Marin, P., Tal, S., Yeres, J., and Ringskog, K. (2017). Water Management in Israel: Key Innovations and Lessons Learned from Water-Scare Countries. Washington D.C: World Bank Group. Retrieved from <http://pdfs.semanticscholar.org/c24a/f6828c8dddceef227db23418cc00c9b9864b.pdf>

McKie, Robin and Stewart, Heather (April 13, 2008). 'Hunger, Strikes. Riots. The food crisis bites', The Guardian. Retrieved from <https://www.theguardian.com/environment/2008/apr/13/food.climatechange>

Medzini, A., and Wolf A., (June 2004). Towards a Middle East at Peace: Hidden Issues in Arab-Israeli Hydropolitics. Water Resources Development, 20(2), 193-204. Retrieved from 10.1080/0790062042000206129.

Mekorot Israel National Water Co. (January 2017) Water rates datasheet.

Melhem, A. (2019). Struggle for water continues in Palestine's Jordan Valley. Al-Monitor. Retrieved from <https://www.al-monitor.com/pulse/originals/2019/09/jordan-valley-palestinians-israel-water-resources-lands.html#ixzz6TP3EbxIE>

Namrouqa, H. (Oct 26 2018). 'Death toll rises to 21 in Dead Sea flash floods', The Jordan Times. Retrieved from <http://www.jordantimes.com/news/local/death-toll-rises-21-dead-sea-flash-floods>

- Nazzal, Nasouh. (2016). Water crisis in Bethlehem sparks anger. Gulf News. Retrieved from <https://gulfnews.com/world/mena/water-crisis-in-bethlehem-sparks-anger-1.1916605>
- Nielsen, N. (March 12 2019). Hopeless Gaza Strip Ripe for Islamic State, says UN Head. Euobserver. Retrieved from <https://euobserver.com/foreign/144373>
- Northrup, S. (2017). The Growing Power of Water in Syria. The Washington Institute. Retrieved from <https://www.washingtoninstitute.org/fikraforum/view/the-growing-power-of-water-in-syria>
- OECD: Income Distribution Database. (n.d.). Retrieved from <https://stats.oecd.org/index.aspx?queryid=66670>
- Office of the United Nations Special Coordinator for the Middle East Peace Process (UNSCO). (2017). UNSCO Socio-Economic Report: Overview of the Palestinian Economy in Q2/2017. Retrieved from [https://unsco.unmissions.org/sites/default/files/unsco\\_socio-economic\\_report\\_q2\\_2017.pdf](https://unsco.unmissions.org/sites/default/files/unsco_socio-economic_report_q2_2017.pdf)
- Oslo II- The Israeli-Palestinian Interim Agreement (1995). Retrieved from <https://www.un.org/en/ga/62/plenary/palestine/bkg.shtml>
- Palestinian Water Authority. (2013). National Water Policy and Strategy for Palestine: Toward Building a Palestinian State from Water Perspective.
- Poushtar, J., and Huang, C., (2016). Climate Change Still Seen as the Top Global Threat, but Cyberattacks a Rising Concern. Pew Research Center. Retrieved from <https://www.pewresearch.org/global/2019/02/10/climate-change-still-seen-as-the-top-global-threat-but-cyberattacks-a-rising-concern/>
- Proctor, Keith. (2014). Refugee Crisis Draining Jordan's Water Resources. Atlantic Council. Retrieved from <https://www.atlanticcouncil.org/blogs/menasource/refugee-crisis-draining-jordan-s-water-resources/>
- Poverty Percentages Among Individuals in Palestine. (n.d.). Retrieved from [http://www.pcbs.gov.ps/Portals/\\_Rainbow/Documents/Levels%20of%20living\\_pov\\_2017\\_01e.htm](http://www.pcbs.gov.ps/Portals/_Rainbow/Documents/Levels%20of%20living_pov_2017_01e.htm)
- Proaktor, G., Rosen, A., Weinstein, E., & Alloul, N. (2016). Israel National Plan for Implementation of the Paris Agreement. Israel Ministry of Environmental Protection.
- Rajsekhar, D., & Gorelick, S. (2017). Increasing drought in Jordan: Climate change and cascading Syrian land-use impacts on reducing transboundary flow. *Science Advances*, 3(8), 1-15.
- Rinat, Z. (January 21 2018). Ninety-seven percent of Gaza drinking water contaminated by sewage, salt, expert warns. Haaretz.
- Ripsman, N. (2016). *Peacemaking from Above, Peace from Below: Ending Conflict between Regional Rivals*. Cornell University Press.
- Rizzo, A. (2016). Transparency of Climate Action in the ENPI South Region. *ClimaSouth Policy Series Paper N.1* .
- Roya News. (January 9 2020). Heavy rainfall causes street collapse in Ajloun. Royanews. Retrieved from <https://en.royanews.tv/news/19680/Heavy-rainfall-causes-street-collapse-in-Ajloun>
- Royal Haskonig DHV/EcoPeace Middle East. (2015). National Master Plan for the Jordan River Valley.
- Safi, A. (2016). Water insecurity in the Gaza Strip: adaptation strategies of farmers and households. Government of Germany.
- Scammell, R and Balousha H, (August 26, 2020) Gaza Enters Covid lockdown as first community case emerge. The Guardian. Retrieved from <https://www.theguardian.com/world/2020/aug/25/fears-of-catastrophic-covid-outbreak-in-gaza-after-first-cases-outside-quarantine-emerge>
- Selby, J. (2013). Cooperation, Domination and Colonisation: The Israeli-Palestinian Joint Water Committee. *Water Alternatives* 6 (1), 1-24. Retrieved from <http://www.water-alternatives.org/index.php/volume6/v6issue1/196-a6-1-1/file>



- Sellers S, et al. (2019). Climate Change, Human Health and Social Stability: Addressing Interlinkages. *Environmental Health Perspectives* 127 (4). Retrieved from <https://doi.org/10.1289/EHP4534>
- Sen, A. K. (November 14, 2012), Protests against King rock capital; anger builds with sharp increase in fuel prices. *The Washington Times*. Retrieved from <https://www.washingtontimes.com/news/2012/nov/14/protests-against-jordans-king-rock-capital-anger-b/>
- Shezav, H. (2020). Palestinians in Israeli-controlled West Bank Fall Through Cracks of Coronavirus Response. *Haaretz*. Retrieved from <https://www.haaretz.com/middle-east-news/palestinians/.premium-palestinians-in-israeli-controlled-west-bank-left-behind-in-coronavirus-response-1.8816430>
- Shalim, A. (2005). The Balfour Declaration and its Consequences in: *Yet More Adventures with Britannia: Personalities, Politics and Culture in Britain*, 251-270.
- Shual, Hillel L., (2000). A Proposal for an equitable resolution to the conflicts between the Israelis and the Palestinians over the Shared Water Resources of the Mountain Aquifer. *Arab Studies Quarterly*, 22(2), p.33.
- Smiatek, G., & Kunstmann, H. (2016). Expected Future Runoff of the Upper Jordan River Simulated with a CORDEX Climate Data Ensemble. *Journal of Hydrometeorology*. 17(3), 865-879. Retrieved from <https://doi.org/10.1175/JHM-D-15-0066.1>
- Staff, TOI. (May 19 2018). On a cloudless day, Israel breaks its solar power production record. *The Times of Israel*. Retrieved from <https://www.timesofisrael.com/on-a-cloudless-day-israel-breaks-its-solar-power-production-record/#gs.g5bqps>
- Staff, TOI. (January 15, 2017). Israelis, Palestinians sign deal to jointly improve West Bank water supply. *The Times of Israel*. Retrieved from <https://www.timesofisrael.com/israelis-palestinians-sign-deal-to-jointly-improve-west-bank-water-supply/#gs.ft4arw>
- State of Israel/Ministry of Environmental Protection. (2018). Israel's Third National Communication on Climate Change (ITNC): Submitted to the United Nations Framework Convention on Climate Change.
- State of Israel/Water Authority, (2012), Long-term Master Plan for the National Water Sector: Part A - Policy Document, Version 4. Retrieved from <http://www.water.gov.il/Hebrew/Planning-and-Development/Planning/MasterPlan/DocLib4/MasterPlanen-v.4.pdf>
- State of Palestine Environment Quality Authority. (2016). Initial National Communication Report to the United Nations Framework Convention on Climate Change (INCR). Retrieved from [https://unfccc.int/files/national\\_reports/non-annex\\_i\\_parties/application/pdf/initial\\_national\\_communication\\_report\\_state\\_of\\_palestine.pdf](https://unfccc.int/files/national_reports/non-annex_i_parties/application/pdf/initial_national_communication_report_state_of_palestine.pdf)
- State of Palestine/Environment Quality Authority. (2016). 'National Adaptation Plan (NAP) to Climate Change.' Retrieved from [https://unfccc.int/files/national\\_reports/non-annex\\_i\\_parties/application/pdf/national\\_adaptation\\_plan\\_state\\_of\\_palestine.pdf](https://unfccc.int/files/national_reports/non-annex_i_parties/application/pdf/national_adaptation_plan_state_of_palestine.pdf)
- State of Palestine/Palestinian Central Bureau of Statistics. (2018). 'Preliminary Results of the Population, Housing and Establishments Census 2017.' Retrieved from [http://www.pcbs.gov.ps/portals/\\_pcbs/PressRelease/Press\\_En\\_Preliminary\\_Results\\_Report-en.pdf](http://www.pcbs.gov.ps/portals/_pcbs/PressRelease/Press_En_Preliminary_Results_Report-en.pdf)
- Stokes, B., Wike, R., Carle, J. (November 5, 2015). 'Global Concern about Climate Change, Broad Support for limiting emissions', *Pew Research Center*. Retrieved from <https://www.pewresearch.org/global/2015/11/05/global-concern-about-climate-change-broad-support-for-limiting-emissions/>
- Stone, M. (2009). Security According to Buzan: A Comprehensive Security Analysis. *Groupe d'Etudes et d'Expertise "Sécurité et Technologies" Security Discussion Papers Series 1*.
- Tabari, H., & Willems, P. (2018). Seasonally varying footprint of climate change on precipitation in the Middle East. *Scientific Reports*, 8. Retrieved from <https://doi.org/10.1038/s41598-018-22795-8>
- Taha, S. (2016). Water shortages hit West Bank Palestinians, provoking war of words. *Reuters*. Retrieved from <https://www.reuters.com/article/us-israel-palestinians-water/water-shortages-hit-west-bank-palestinians-provoking-war-of-words-idUSKCN10Y1DS>
- Tahhan, Z. (2017). Hamas and Fatah: How are the two groups different? *Al Jazeera*. Retrieved from <https://www.aljazeera.com/indepth/features/2017/10/hamas-fatah-goal-approaches-171012064342008.html>

- Tessler N, et al. (2019). Haifa fire restoration project- urban forest management: a case study. *International Journal of Wildland Fire* 28(7), 485-494. Retrieved from <https://doi.org/10.1071/WF18095>
- The Hashemite Kingdom of Jordan. (2014). Jordan's Third National Communication on Climate Change (JTNC): Submitted To The United Nations Framework Convention on Climate Change (UNFCCC). Retrieved from <https://unfccc.int/resource/docs/natc/jornc3.pdf>
- The State of Palestine Ministry of Agriculture. (2016). National Agricultural Sector Strategy 2017-2022. Retrieved from <https://prais.unccd.int/sites/default/files/2018-07/English%20Strategy%202017-2022.pdf>
- Treaty of Peace between the Hashemite Kingdom of Jordan and the State of Israel (1994). "Article 6, - Water,". Retrieved from <http://www.kinghussein.gov.jo/peacetreaty.html>
- Trondalen, J. (2009). Climate Changes, Water Security and Possible Remedies for the Middle East. The United Nations World Water Assessment Programme. Retrieved from [http://ccsl.iccip.net/Climate\\_Changes\\_Water\\_Security.pdf](http://ccsl.iccip.net/Climate_Changes_Water_Security.pdf)
- UNCTAD. (September 12 2017). Fifty years of occupation have driven the Palestinian economy into de-development and poverty. Retrieved from <https://unctad.org/press-material/fifty-years-occupation-have-driven-palestinian-economy-de-development-and-poverty>
- UNHCR. (2020). Jordan: Statistics for Registered Persons of Concern (as of 31 March 2020). United Nations High Commissioner for Refugees. Retrieved from <https://data2.unhcr.org/en/documents/details/75096>
- United Nations Country Team in the occupied Palestinian territory. (2012). Gaza in 2020: a liveable place?
- United Nations General Assembly (1947). Resolution Adopted On The Report of the Ad Hoc Committee on the Palestine Question. Retrieved from [https://undocs.org/A/RES/181\(II\)](https://undocs.org/A/RES/181(II))
- United Nations General Assembly (1974). Question of Palestine. Retrieved from <https://www.un.org/en/ga/62/plenary/palestine/bkg.shtml>
- United Nations Office for the Coordinator of Humanitarian Affairs in the Occupied Palestinian Territory (OCHA OPT). (2018). Humanitarian Needs Overview 2018: Occupied Palestinian Territory.
- Wacks, Racheli. (November 10, 2019). 10% Green Electricity for Israel in 2020? The Jerusalem Post. Retrieved from <https://www.jpost.com/israel-news/10-percent-green-electricity-for-israel-in-2020-607404>.
- Waheidi, Majd al. (January 12, 2017) With Electricity in Short Supply, 10,000 Protest in Gaza, Defying Hamas, New York Times Retrieved from [nytimes.com/2017/01/12/world/middleeast/gaza-strip-hamas-protests.html](https://nytimes.com/2017/01/12/world/middleeast/gaza-strip-hamas-protests.html)
- Wallach, Y. (2011). Trapped in mirror-images: The rhetoric of maps in Israel/Palestine. *Political Geography* 30 (7), 358-369.
- White House (2020). The Abraham Accords Declaration. Retrieved from <https://www.whitehouse.gov/briefings-statements/the-abraham-accords-declaration/>
- Whitman, E. (2019) A land without water: the scramble to stop Jordan from running dry. *Nature*. Retrieved from <https://www.nature.com/articles/d41586-019-02600-w>
- Wolf, A. (1993). Water for Peace in the Jordan River Watershed. *Natural Resources Journal* 33(3), 797-839.
- World Bank. (2007). Making the Most of Scarcity: Accountability for Better Water Management in the Middle East and North Africa. MENA Development Report. World Bank, Washington DC: World Bank. Retrieved from <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/353971468280764676/making-the-most-of-scarcity-accountability-for-better-water-management-results-in-the-middle-east-and-north-africa>
- World Bank. (2018). Beyond Scarcity : Water Security in the Middle East and North Africa. MENA Development Report. Washington DC: World Bank.

World Bank. (2018). Toward Water Security for Palestinians West Bank and Gaza Water Supply, Sanitation, and Hygiene Poverty Diagnostic.

World Bank. (March 2018). The role of food and agriculture for job creation and poverty reduction in Jordan and Lebanon. Washington DC: World Bank. Retrived from <http://documents1.worldbank.org/curated/ar/325551536597194695/pdf/Agricultural-Sector-Note-Jordan-and-Lebanon.pdf>

Yahya, Maha (2018). Syrian refugees: The people who want four things before they go home. BBC News. Retrieved from <https://www.bbc.com/news/world-43578469>

Zelinger, Rotem et al. (2019) Economic Impacts of Climate Change on Vegetative Agriculture Markets in Israel. Environmental and Resource Economics. Retrieved from 10.1007/s10640-019-00340-z

Zeveloff, N. (2019). Sea, Sun, and Peace? The Wilson Quarterly. Retrieved from <https://www.wilsonquarterly.com/quarterly/water-in-a-world-of-conflict/sea-sun-and-peace/>