# Syria, Palestine, and Jordan: Case Studies in Water Scarcity, Conflict, and Migration

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*Abstract*

The water scarcity, conflict, and migration nexus are parts of a growing body of research attempting to link environmental stressors and the subsequent movement of people to safer and more secure areas. Although the nexus continues to be scrutinized for validity among researchers, its intention to compare environmental factors to its effects on geopolitical problems will nonetheless become increasingly relevant as climate change alters economies and landscapes, and forces people to change their way of life. This paper examines three case studies, Syria, Palestine, and Jordan to provide insight into how each state has evolved amid growing water scarcity and how respective governments have responded. Due to the importance of effective water management strategies in relation to human migration, the study seeks to encourage the inclusion of environmental refugees in international refugee policy.

*Introduction*

Over the last two decades, scholars and the media have increasingly warned against "water wars" or conflicts caused by growing lack of water resources. In this vein of thought, growing populations and decreases in freshwater resources in some areas due to climate change will cause conflict between countries as limited resources are depleted. As with oil in the 20th century, water is being framed by the media as a resource in decline, with high demand and low supply (Waslekar, 2017). These arguments have been largely dispelled by experts, who are quick to point out that no nations have gone to war specifically over water in thousands of years (Wolf, Kramer, Carius & Dabelko, 2006). Even still, water has provoked tensions between countries, raising concerns as long term industrial consequences and climate change effects on water bodies remain unknown.

While the link between water and conflict has not been secured, much discussion has taken place over so-called "environmental refugees" or "people who can no longer gain a secure livelihood in their homelands because of drought, soil erosion, desertification, deforestation and other environmental problems" (Myers, 1997). International refugee law has not addressed this concern as rising sea levels and increasing salination of water reserves have become pressing problems for certain areas. In addition to the difficulty of creating a new refugee framework, categorizing a refugee based solely off environmental factors remains difficult as the environment itself is not always the sole reason for migration away from impacted areas. Thus, if a new refugee framework is to be developed pertaining to environmental issues, it will be necessary to consider compounding factors driving forced migration instead of traditional refugee discourse which has focused solely on persecution.

In this paper, I will consider water scarcity and security as catalysts of ongoing tension and conflicts. Despite speculation that climate change and its accompanying effects of drought and water insecurity will increase environmental migration and conflict in affected areas, the complex environmental-conflict-migration nexus (shown in Figure 1) has yet to produce substantial evidence in support of this theory. Rather, conflicts are often influenced by a lack of effective water resource management, which when properly regulated can allow communities to adapt in the face of water resource constraints and prevent migration.

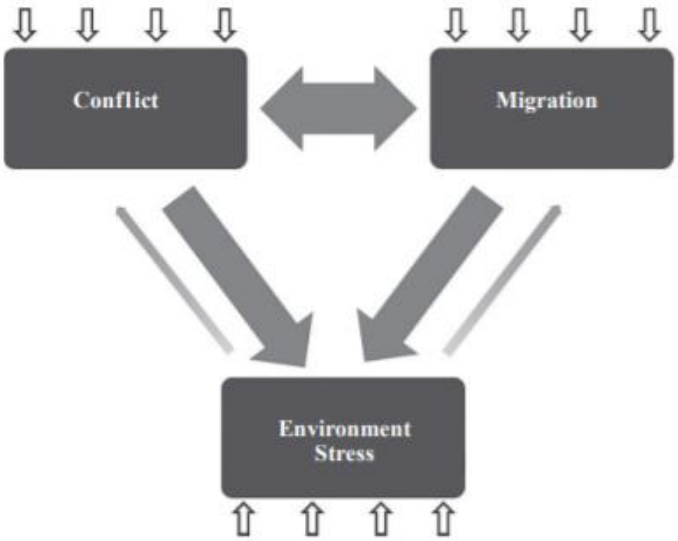


*Figure 1. Environment-Conflict-Migration Nexus*

*Source: Selby & Hoffman, 2012*

This paper will focus on three case studies in Syria, Palestine, and Jordan. These case studies were chosen due to their regional proximity, history of water vulnerabilities and similar climates, and current states of fragility in regard to ongoing regional conflicts. The first part of the paper will focus on each case study separately and will seek to outline the current water security situation, authority action which has prevented successful water management, and how migration and water are related in the region. The second section will compare and contrast each case study as it relates to water scarcity, conflict, and migration.

*Syria*

Now in its eighth year, the Syrian civil war has become an overstated example of how climate change can trigger mass political violence. Former President Barack Obama noted in a speech in 2015, "It's now believed that drought and crop failures and high food prices helped fuel the early unrest in Syria" (Obama, 2015). The idea that the conflict was caused in part from climate change pressures and subsequent water scarcity has become widespread in part due to a prominent paper published by Peter Gleick, a recognized scholar on international water issues at the Pacific Institute. Gleick's theory asserts the following path: 1) The effects of climate change on Syria's semi-arid climate led to a series of droughts culminating in the most severe drought to date in 2006. 2) The subsequent impacts on the agricultural sector led to the movement of citizens from

the country's northeastern "bread basket" region to the southern governates. 3) The added economic stress to other regions created disenfranchisement among the country's rural and semi-rural populations leading to dissidence and civil unrest (Gleick, 2014). Although Gleick's correlations between climate change and conflict have proven insubstantial, the connections between Syria's environment, water management structure, and the civil war are not without merit (Selby, Dahi, Fröhlich & Hulme, 2017). Rather, with proper water resource management, other scholars have speculated that environmental triggers that may have influenced the Syrian civil war could have been prevented.

Beginning in 2006, Syria suffered its worst 3-year drought on instrumental record. Although this drought should be placed in the larger context of Syria's semi-arid climate which experienced nearly 25 years of drought between 1961 and 2009, the 2006 drought has been cited as one of the catalysts leading to the ongoing Syrian civil war (Breisinger, Zhu, Al Riffai, Nelson, Robertson, Funes & Verner, 2011). Following the footsteps of years of water mismanagement and groundwater depletion, the drought exacerbated the effects of ongoing economic problems in the country's northeastern agricultural region. As the country's "bread basket", the northeastern region is a critical area for Syria's agricultural sector. The sector itself comprises 25% of the national area, 26% of Syria's GDP, and 87% of the country's water use (FAO, 2017; Tull, 2017; Salman, 2004).

The area had been struggling for years as the government removed subsidies for farmers especially on diesel used for water pumps and transportation and sought to deregulate the industry in order to integrate the country into the global market (De Châtel, 2014). However, the combined effects of drought and loss in government funds left many of the rural farmers in a difficult position. These, combined with years of water mismanagement and inefficient government bureaucracy, were some of the reasons driving many Syrians from the northeastern agricultural region to migrate to the southern governates and ultimately played a role in the civil unrest leading up to the war.

Syria's water problems began in the 1960s when the advent of diesel motor pumps to pump groundwater for irrigation became more widespread. This encouraged farmers to install new groundwater wells on their properties throughout the 1980s and 1990s per the government's policy objective to reach food self-sufficiency (Salman, 2004). From 1985 to 2000, agricultural

production quotas instituted by the government encouraged farmer participation by offering subsidies on equipment, fuel, seeds, and fertilizer, especially for water-intensive crops including wheat and cotton. In turn, these policies allowed farmers to more easily access well licenses by offering low-interest and medium-term loans used to dig wells and purchase pumps (Aw-Hassan, 2014).

The overall impact was the doubling of irrigated agricultural areas from 625,000 ha in 1985 to 1.4m in 2005 (De Châtel, 2010). Along with the construction of around 160 irrigation dams between 1963 and 2001, the effect of these policies was a decrease in annual per capita water availability from 1,791 $m^3$ in 1995 to 882 $m^3$ in 2005 (Hollander, W. F., 2015). In 2005, recognizing the need for changes in order to ensure water access in the future, the Ministry of Irrigation announced Water Law No. 31. The law, which began implementation in 2008 and was suspended in 2011 due to conflict, aimed to establish irrigation fees, penalize farmers exceeding water consumption limits, and modernize irrigation practices to support sustainability (Aw-Hassan, 2014). However, it has been noted that ineffective implementation of the policy has not decreased water use and the digging of illegal wells continued through 2010 (De Châtel, 2010).

This coincides with Syria's second problem with water resource management: inefficient government structures which do not coordinate well across departments. The main governing bodies are the Ministry of Irrigation and the Ministry of Agriculture and Agrarian Reform as well as local directorates and Farmers Unions (Salman, 2004). De Châtel has noted the water management institution is a large bureaucracy consisting of 22 different ministries, councils, commissions, and directorates who are directly or indirectly involved at varying levels (2010). Often the roles of each organization are ill-defined, leading to inefficient and ineffective implementation of government policies (Aw-Hassan, 2014). For example, the Water Law meant to reform unlicensed well-use and incentivize farmers largely went un-implemented as corruption among local enforcers nursed the rural population's resentment (De Châtel, 2011; Marzouq, 2011). At the same time, the government continued to espouse a message of vulnerability from the "water crisis" in the area while failing to address its own internal issues (Barnes, 2009).

The agricultural sector's issues, stemming partly from years of misdirection in water resource allocation and the 2006 drought, were a part of the larger changes in Syria's economy which triggered a 20-30% increase in rural family out-migration from rural regions to cities (UN-

OCHA, 2008). In 2010, the UN Special Rapporteur reported 600,000 people had migrated from rural areas to cities (De Schutter, 2010). Additionally, from 2008, drought victims began to increase tent settlements outside cities such as Damascus and Dara'a. While the camps had existed for more than a decade prior to the drought, the expansion of the camps further frustrated rural families who had to abandon their farms in search of work (De Châtel, 2011). Finally, as the government protests began in 2011, the initial appeal for the release of the 15 children soon changed into anger over corruption specifically relating to licensing and groundwater use.

Thus, in addition to many other compounding political, social, and economic factors, the Syrian government's inability to address longstanding water resource issues may have been an important contributing environmental causality of the civil war. It is important to note how this environmental factor only added to the fragility in the country. Far from being a lone actor, water as an environmental factor interacted with other items of national importance such as food and economic security to trigger conflict. Just as conflict without environmental factors is never the solely rooted in one problem, climate change and environmental issues should not be treated as singular causes capable of destabilizing a region.

*Palestine*

Palestine and its long-standing conflict with Israel present a different side to water stress and conflict. Mazen Ghoneim, chairman of the Palestinian Water Authority noted in 2019, "The future of the state depends directly on the water security" (Trew, 2019). Unlike in Syria, where agricultural dependencies created a growing need to move into urban areas and influenced the beginnings of conflict, large numbers of Palestinians have not migrated as a result of a water constraints for a variety of political reasons and have thus devised adaptive strategies in order to retain their claims to their ancestral homeland.

Palestinian access to water is limited through its occupation by Israel. The 1967 Six Days War brought about Israel's control of the Jordan River's headwaters and allowed Israel to tap into significant groundwater resources (Occupied Palestinian Territory Aquastat, 2008). In 1970, agriculture in the Palestinian economy was the dominant sector comprising 36% of its GDP. However, since occupation, the Palestinian territories have seen a significant decline in agriculture now representing only 9.5% of the GDP. Still, agriculture remains an important sector for

resiliency among impoverished Palestinians by providing some food security. Approximately 45% of the territories' available water is used for agriculture and it has been predicted that better water management practices could reduce irrigation needs by 20 million $m^3$/year (2008).

However, major infrastructure improvements remain unlikely as even with donor funding for water development projects, the chances of gaining Israeli permission to implement them are slim (Kramer, 2008). The Oslo Accords signed in 1993, treated water as a quantitative issue, assigning various quantities of water to Israel, the West Bank, and Gaza; however, it did not fully address natural factors and socio-economic developments, thereby creating asymmetric access to precious water resources (European Parliament, 2016). In 2013, a new water agreement between Palestine and Israel was announced in which a pipeline from the Red Sea to the Dead Sea would be built to provide Palestine with an additional 32 $m^3$/y through a deal to buy water at a fixed rate from Israel. Even still, some have noted the deal is more of a "band-aid" on the situation and fails to address Israel's long-term control of 80% of water resources in the West Bank as a result of the Oslo Accords (Hatuqa, 2017). Resentment has only grown between the groups as Israel has been able to execute a well-developed national supply system, receiving three times as much water as Palestinians (Selby & Hoffman, 2012). Palestinians are currently in critical need of water resource allocation as over-extraction from aquifers has led to infiltration of sewage and seawater and has contributed to an increase in waterborne diseases (Sarsak & Almasri, 2013).

Water issues between Israelis and Palestinians have been linked to the long-standing conflict between the two groups. Water infrastructure and pumping stations have been damaged both intentionally and collaterally through military operations on both sides; however, Palestine has shown less of an ability to cope with infrastructure damage as Israeli restrictions on movement have made it difficult to repair and manage water infrastructure (Selby & Hoffman, 2012). Additionally, conflicts in Gaza in 2014 left approximately 1.2 million Gaza residents without running water for several weeks (European Parliament, 2016). International donor support has helped to mitigate some of these effects.

The inability of Palestinians to move easily within and outside of their territories has led to a number of coping strategies which, though not a substitution for free movement rights, may provide insight into how communities may adapt to water shortage issues. It should be noted that this case study is affected by Palestinians' limited access at times to outside resources; however,

it does provide an example of solutions implemented under many constraints. The World Bank has noted that the low availability and high cost of buying water has led some villages to begin drilling unlicensed wells in order meet water needs (World Bank, 2009). This solution is unstainable as unmanaged resources extraction is a risk to the environment. Additionally, Selby & Hoffman have pointed to the responses of other water-stretched areas which typically reduce agricultural use and turning to international markets for food (2012). In 2009, 19.2% of households were using rainfall collection wells and 6.6% of households bought water from tankers (World Bank, 2009).

Thus, while Palestine has not been a major source of environmental refugees or migrants, its population has weathered increasingly acute environmental vulnerabilities which may only grow worse as groundwater aquifers are depleted and infrastructure developments are slow in a complicated political situation. In this case again, management of groundwater resources, in this case principally by Israel, has led to environmental issues and growing resentment among populations, and has been a notable factor in the ongoing conflict.

*Jordan*

The case study of Jordan presents a final example of the role of water management in mitigating conflict and migration. Similar to Syria and Palestine, Jordan is facing a rapidly decreasing supply of water both from overexploitation of aquifers and due to its proximity downstream of Israel and Syria who share water resources from the Yarmouk River and Jordan River. Jordan's agricultural sector is the largest user of water reserves accounting for 65% of water withdrawal despite only contributing 3% to the country's GDP (Jordan Aquastat, 2008).Without the same long-term conflicts that have plagued its neighbors, Jordan has so far remained above much of the instability currently plaguing the region; however, inflows of refugees from Syria, influences from regional conflict, and poor governance could potentially lead Jordan down a similar path.

Jordan's water management policies came about through the interests of the Hashemite regime who has ruled Jordan since its establishment as an independent nation in 1921. Similar to other countries in the region, water has been used as a political tool due to the economy's dependence on agriculture. As King Abdullah I and his successors began to appoint traditional and

merchant landowners to prominent government and military positions up to the 1980s, elites became a part of the administration and thus sought to further their personal water policy interest in the Jordan Valley and Highlands (Yorke, 2016). As with Syria, government subsidies for agriculture in the 1960s and 1970s, as well as the introduction of diesel well pumps, brought about the exploitation of groundwater aquifers. In 1997, realizing the negative consequences of depleting resources, the government instituted a groundwater strategy to counteract its effects. Because powerful landowners had created many of the water policies in place and controlled much of the land, the policies were ineffectual. Tariffs and fees put in place to curb groundwater use and new wells went uncollected (2016). Additionally, infrastructure leaks average losses of 45-47% water loss before reaching customers (Denny, Donnelly, McKay, Ponte & Uetake, 2008).

Jordan's situation has been further exacerbated by stress from refugees from Syria, Palestine, and Iraq which have shaped how Jordanian policymakers frame water infrastructure needs. With 2.6 million Palestinian refugees, 1.4 million Syrian refugees, and between 500,000 and 700,000 Iraqi refugees, influxes from other countries have had significant hydrological consequences. By using refugees to appeal to the international donor community, Jordan has been able to fund large- and small-scale water infrastructure projects (Weinthal, Zawahri & Sowers, 2015). Even still, the influx of people has placed Jordan in a precarious position, resulting in severe water shortages in the summer of 2012 and Germany providing funding for drinking water at the Za'atari refugee camp (Namrouqa, 2012).

*Syria, Palestine, and Jordan - A Comparative Analysis*

Though each the result of different government and external factors, Syria, Palestine, and Jordan present three different outcomes to water resource management in the same region. While all three struggle with groundwater overexploitation and years of ineffective water resource management, each has developed different water resource management techniques resulting from the constraints they have been placed under. Here I will discuss the similarities and differences between each case study as it relates to water scarcity, conflict, and migration.

*Water Scarcity*

In all three case studies, it has been shown that largely, government policies, and not climate change, have been the major driving factors in the reduction of available water. These reductions have been most pronounced in the agricultural sector which currently has dominated each nation/territories' water budget. In Syria and Jordan, increases in water well technology through the use of diesel-powered pumps led to increases in new wells using groundwater reserves. Both countries' inability to properly regulate and penalize the digging of unlicensed wells has played a major role in looming water deficits. Palestine's water supply, in contrast, has steadily declined due to an inability to access groundwater reserves tapped by Israel and lack of access to the Yarmouk and Jordan river surface waters. Jordan similarly has faced water issues as it is located downstream from Israel and Syria and has received a smaller portion in the share of transboundary water resources. Future collaboration between all parties in the Jordan River basin including Lebanon, Syria, Israel, Palestine, and Jordan will be necessary in order to ensure fair water distribution and environmental protection of groundwater reserves.

*Conflict*

In terms of conflict, Syria, Palestine, and Jordan have all had mounting tensions of water supplies, but the water's connection with conflict and the intensity of conflict within each of the countries/territories has varied. In Syria, water resource constraints and changes in agricultural subsidy policies led to rising prices and growing discontent among the population in the northeastern agricultural region. This in turn led to migration from rural to urban areas, contributing to the stressors leading up to the uprising. Due to the decrease in agriculture following the ongoing civil war and the large numbers of Syrians who have left the southern part of the country, water flows into the Yarmouk River have actually increased, sending more water to Jordan and Israel (Shpigel & Rinat 2016). In the Palestinian territories, Israeli occupation has severely limited access to water resources and growing population demands have placed stress on aquifers which have begun to show signs of salination and pollution. The restriction on water has only fueled tensions between Palestine and Israel as water constraints inhibit Palestinians economic development and health concerns. Finally, Jordan, unlike Syria and Palestine, is not currently engaged in a long-term conflict. However, the added stress of a slowing economy and influxes of refugees could provoke tensions. That being said, Jordan, with the support of the

international donor community and its governments recognition of water resource challenges, is the best placed out of the three case studies to manage water in the future and prevent conflict.

*Migration*

Finally, in terms of migration, interestingly enough, water resources have not yet played a significant role in sparking migration out of the affected area in any of the case studies. While water has been shown to play a role in conflicts in the region, so far, fears of environmental refugees in the area have not been realized. Unlike persecution, where direct threat to life may leave people with little option but to leave an area, environmental stressors often have a more limited scope. Additionally, people are more likely to move to other locations within the state instead of looking internationally. Rafael Reuveny has identified three choices when faced with environmental problems: 1) Stay in place and do nothing. 2) Stay in place and mitigate the problems. 3) Leave the affected areas (Reuveny, 2007).

In Syria, the third option can be seen in the movement of rural farmers to urban areas after the decline of the agricultural region under economic and environmental constraints, but the large exodus of Syrians due to conflict cannot be attributed to these environmental factors. Palestinians have followed the first and second approaches. Due to the political situation with Israel, Palestinian movement outside of the West Bank and Gaza is limited and subsequently Palestinians have had to adapt rather than migrate when faced with constraints. The first approach was also noted as limited access by NGOs and international actors has made water infrastructure development difficult and the water crisis has only intensified as a larger percentage of water becomes salinized and/or polluted. In Jordan, the Jordanian government has followed the second approach by taking more authoritative action through the implementation of the National Water Strategy 2016-2025. It remains to be seen if this policy will be implemented effectively and alter the decline in water reserves (Al-Karablieh & Salman, 2016).

*Conclusion*

The results of this analysis show how water scarcity, conflict, and migration can be characterized when considering the case studies of Syria, Palestine, and Jordan. As regional

neighbors, all face similar water resource constraints due to the semi-arid climate, and each have developed well-meaning water resource management strategies, which at present, have proven ineffectual in preventing groundwater overexploitation. The results of mismanagement have led to increases in tensions (Palestine) and in some cases may have served as a trigger for conflict (Syria). Thus, in order to mitigate effects in the future strategies for implementation of water conservation is a basis for future research. It is important to consider water mismanagement in the context of environmental migration as future claims of refugee status may relate to the loss of water access as climate change warms the planet. Still, water infrastructure plans such as those implemented by Jordan offer a way for governments to adapt under conditions of increasing water loss. With better government planning and leadership, water reserves—especially groundwater—can be saved, water tensions muted, and economic livelihoods sustained.

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