

## Climate Change: A New Threat to Middle East Security

### [a] Introduction

With the Middle East being the world's most water-stressed region, the projected impacts of climate change, such as more extreme weather events, decreased precipitation, and sea level rise, will contribute to even greater water stress in the region, with severe environmental, economic, political and security implications.

That is, climate change is likely to act as a “*threat multiplier*,” exacerbating water scarcity and, as a result, tensions over water between nations linked by hydrological resources, geography, and shared political boundaries.<sup>1</sup> “In fact, the enormously intricate water politics of the [Middle East] region have been aptly described as a ‘hydropolitical security complex.’”<sup>2</sup>

The following factors will play a role in determining the likelihood for greater conflict or cooperation in this region that already possesses some of the greatest political tensions in the world, as climate impacts become more significant:

- \*\*The existence of water agreements, and their degree of *sustainability*, including the ability of Parties to deal with extreme circumstances, such as longer periods of drought;
- \*\*The influence of destabilizing economic and political factors, e.g., unemployment and mass migration due to agricultural decline and the large scale flooding of agricultural areas;
- \*\*The extent of national economic and political development, including the degree to which local institutional structures and infrastructure exist;
- \*\*A given political entity's ability to mitigate and/or adapt to climate change;
- \*\*Power relationships between the Parties involved; and
- \*\*Whether it is politically expedient at a given time to cooperate (or continue to cooperate) over water resources.

Keeping these factors in mind, climate change provides both challenges and opportunities for cross-border cooperation to ameliorate and prevent the problems that are already occurring and are projected to intensify. For this reason, water issues, for example, have been an important part of all peace talks in the region. Following are some highlights of the unique aspects as well as some of the gaps in the water sharing agreements that do exist, and some of the anticipated problems where such agreements do not yet exist, as the impacts of climate are expected to intensify.

### [a] Water-Sharing Agreements

The Middle Eastern governments believe that a lack of water will constrain their opportunities for development and thus endanger domestic political stability as well as relations with their neighbors. This belief has meant that efforts have been underway since the early 1950s to achieve agreements over water, despite larger ongoing political tensions or conflicts.<sup>3</sup>

### [b] Israeli-Jordanian Peace Treaty and Water Sharing Agreement

Jordan and Israel signed a Peace Treaty in 1994 that contains a water-sharing provision that aims to achieve a “comprehensive and lasting settlement of all the water problems” between the two countries through mutual recognition of their “rightful allocations” to water from the

Jordan River and the Yarmouk River.<sup>4</sup> It also aims to achieve mutual cooperation in the development of existing and additional water resources. Specifically, it allocates:

- \*\*For Israel – 25 million cubic meters (mcm) per year from the Yarmouk River;<sup>5</sup>
- \*\*For Jordan – 40 mcm per year from the Jordan River;<sup>6</sup> and,
- \*\*For Jordan – Jordan and Israel cooperate to try to find an additional 50 mcm per year of potable water for Jordan and develop a plan within one year (from the time of the Treaty signing) to do so.<sup>7</sup> This supply for Jordan has not yet been found.

This treaty is reputed to be “one of the most creative water treaties on record,” because it has Israel “storing” water for later transfer to Jordan.<sup>8</sup>

However, Israel and Jordan are already finding it difficult to meet their water-sharing obligations. Tensions occurred in 1999, when a severe drought caused Israel to indicate that it was unable to meet its water delivery schedule to Jordan and, therefore, to raise the possibility that it would not transfer the requisite water allocation. Jordan, in turn, threatened to take “appropriate actions” against Israel.<sup>9</sup> More recently Jordan has been unable to provide Israel with its share of the Yarmouk River, possibly due to over extraction upstream by Syria. These incidents highlight significant weaknesses in the water agreement, and thereby illustrate the need for water-sharing agreements to be able to foresee and address extreme circumstances to help mitigate the potential for conflict.<sup>10</sup>

Undoubtedly, Israel and Jordan will find it even more difficult to meet future Treaty obligations, with the various predicted climatic changes. In particular, decreased precipitation and more evapotranspiration (and/or more extreme weather events) mean that the average storage volume in surface reservoirs could decline by as much as 25 percent by 2100.<sup>11</sup>

The fact that there is a water-sharing agreement in place is an important factor in considering the two countries’ abilities to peacefully allocate and share scarce water resources, in light of projected climate impacts, as well as population and demand growth projections, and might help avoid potential conflict in the future. The fact that difficulties already are being faced in fulfilling commitments on both sides, however, raises some questions as to the agreement’s sustainability, given these expected changes. Each country’s relative ability to mitigate and adapt to climate change will also affect the Treaty’s sustainability.

More specifically, new demand- and supply-side water management policies are essential to help mitigate and adapt to climate change, continue to meet water-sharing obligations, reduce political tensions, and restore the Lower Jordan River. This is the case, particularly in Jordan, where rural communities and the agricultural sector are important to the support of the Hashemite Kingdom. The late King Hussein of Jordan said that “water is the one issue that could drive the nations of this region to war.”<sup>12</sup>

In other words, the overall Treaty could be jeopardized due to increased political instability. In Jordan, 70 percent of water resources are allocated to agriculture and, in Israel, 50 percent of water resources typically are directed toward that sector. Yet, for both countries, agriculture’s contribution to Gross Domestic Product (GDP) is no more than 3 percent. Demand-side policy changes are needed to encourage a less water-intensive form of crop production and to fewer exports of such water-intensive crops (“virtual water”) from the water-poor Middle East to the relatively water-rich European nations and Gulf States. In addition, alternative investments must be made in support of diversifying farmer incomes

away from agriculture, toward more economically and environmentally sustainable land uses, such as rural-tourism.

The water-sharing agreement also does not contain a provision for including other riparians, notably, the Palestinians, Syrians or Lebanese (all of whom share the Jordan Basin), an omission which, in the future, might lead to additional controversies. Adding other riparians to the Treaty would likely contribute to making the treaty more sustainable and to fostering broader regional cooperation. Thus, a multilateral water-sharing agreement will almost certainly be required in the future.

### **[b]Israeli-Palestinian Interim Agreement**

In 1995, Israel and the Palestinian Authority (PA) signed an Interim [peace] Agreement (Oslo II Accords).<sup>13</sup> Because of the already-existing political tensions and the need to share increasingly-scarce water resources, Annex III, Article 40 of the Interim Status Agreement was designed to address water and sewage issues by recognizing Palestinian water rights. It allocates 28.6 mcm per year to the Palestinians for domestic consumption and recognizes that the PA will need approximately 70-80 mcm per year of water in the future; and, the Palestinians requested far more.<sup>14</sup> Water, therefore, was ultimately left as one of five major issues to be addressed in the Final Status negotiations, because it remains so highly contentious.

Climate change impacts will likely exacerbate difficulties between Israel and Palestine, particularly since final water agreements are not yet in place. More extreme weather events will mean rainwater will run more quickly over the surface of the land. Consequently, much less water will be absorbed into the ground water of the shared Mountain Aquifer, which is the main source of drinking water for Palestinians in the West Bank as well as for many Israelis. Eighty percent of the waters of the Mountain Aquifer are presently consumed by Israel.

Overexploitation is a real concern. If the groundwater resource is over pumped beyond the “safe yield,” this could increase the salinity of the Mountain Aquifer and affect the recharge potential, which ultimately could lead to permanent damage. And, while the PA is presently restricted in extracting water from the Mountain Aquifer without prior Israeli approval, as water resources become increasingly scarce, the necessity and likelihood of doing so will increase.

Because of domestic and agricultural needs, the PA will be seeking larger amounts of water from the Mountain Aquifer and access for the first time to Jordan River waters. The Lower Jordan River has had all of its fresh water diverted by Israel, Syria and Jordan and little more than sewage today makes its way down the River to the Palestinian West Bank. Climate change is predicted to reduce precipitation in the Jordan Valley even further. Independent and joint actions by the two Parties will be needed to address climate impacts and water needs. Israel, in particular, will have to make significant reforms in these regards.<sup>15</sup> At the same time, the PA and Israel remain at odds over the issue of water rights and the basis for allocations. The fact that there is an Interim Agreement in place and discussions over water resources were ongoing throughout the Second Intifada, and since, could signal an opportunity for the two Parties to eventually reach a longer-term water-sharing agreement.

As noted above, a multilateral arrangement that includes Israel, Palestine, Jordan, Syria and Lebanon would likely ensure a more sustainable agreement. Third parties, such as the United States and/or the European Union, should facilitate such an accord.

### **[b]Syria-Jordan and Yarmouk Water Agreements**

Jordan and Syria also have a water allocation agreement.<sup>16</sup> It has been renegotiated several times under circumstances detrimental to Jordan, such that the Jordanians feel that their interests have been compromised. Consequently, tensions are often high between Jordan and Syria over water allocations of the Yarmouk River and ground water.

The fact that an agreement is in place is valuable. However, the extent of violations, and anticipated reduced water availability due to climate change, mean that such tensions can only be expected to grow, and thereby call into question the agreement's sustainability.

### **[b]Lack of Water Agreements and Peace Treaties: Syria, Lebanon, and Israel**

Currently, there are no formal agreements between Israel and Syria or between Israel and Lebanon. Both Lebanon and Syria currently have adequate water supplies.<sup>17</sup> However, with projected climate impacts, including reductions in precipitation, altered rainfall distribution patterns, and increased evapotranspiration, as well as projected population growth, available water resources will decline and likely will be insufficient to meet projected demand.

For example, available water resources are expected to decline by 15 percent for Lebanon by 2020.<sup>18</sup> The Litani is no longer expected to flow into the Mediterranean and reports have predicted that Lebanon will be unlikely to be able to meet local demand in the coming 10-15 years.<sup>19</sup> With these projected changes, Lebanon will likely seek to extract more water out of the Wazzani, which is one of the tributaries of the Jordan River that is shared with Israel. This is likely to lead to greater political instability between these two nations. Several years ago, Israel said that Lebanese attempts to divert water were a "casus belli," that is, a cause of war.<sup>20</sup> This "incident" required third party intervention to prevent a heightened conflict.

Syria and Israel share the resources of the Jordan River and the Sea of Galilee. Syria, like the other riparians of the Jordan River, is already using about 95 percent or more of its "annual renewable freshwater supply."<sup>21</sup> Syria is expected to experience water shortages by 2020.<sup>22</sup> With 30 percent of the waters of the Sea of Galilee originating in the Golan Heights, the return of the Golan to Syria and the water and related physical security issues at stake are intricately linked. As climate change becomes a "threat multiplier" by making scarce water resources more so, and by tending to lead toward increased tensions over resources in the region, the lack of formal water-sharing agreements now between these countries could make the possibility of achieving such agreements in the future much more difficult and could increase the risk of future tensions or conflicts.

### **[a]Socioeconomic Factors**

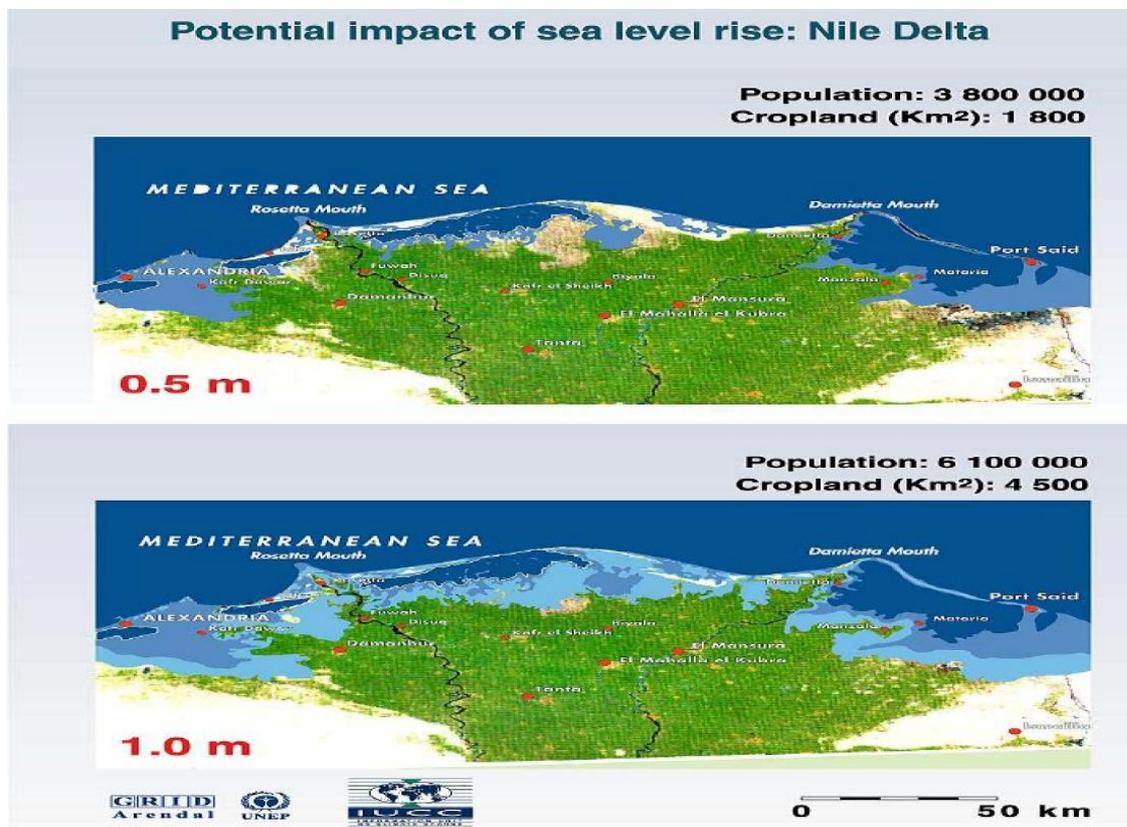
Climate change's far-reaching consequences will differ greatly depending on geography and economic conditions, with the poorest populations most likely being hit the hardest. As at least one expert has noted, "human economic behavior and global environmental change may pose for people with a high degree of societal and environmental vulnerability a 'survival dilemma.'"<sup>23</sup>

Moreover, 800 million people currently are at risk of hunger, and malnutrition causes nearly four million deaths each year, most of them in Africa. With projected temperature increases

of two to three degrees Celsius, 30 to 200 million more people will be at risk of hunger, and this figure will increase rapidly with higher temperature increases. This trend can largely be attributed to the fact that approximately 75 percent of the poorest populations rely on agriculture for their economic livelihoods.<sup>24</sup> Even though some countries would benefit from a modest temperature increase, the Least Developed Countries will not be able to adjust their crop patterns easily. Temperature increases of three to four degrees Celsius would result in declines in crop yields in Africa, Western Asia and the Middle East by 15 to 35 percent.

For example, already poor Jordanian and Palestinian farmers will have their livelihoods threatened further. In the Palestinian West Bank, up to 30 percent of GDP is presently dependent on subsistence agriculture. And, with no industry or tourism, and few job opportunities in neighboring states, Palestinians are becoming even more dependent on subsistence agriculture for their livelihoods. Unfortunately, less water recharge in the Mountain Aquifer will result in less water output in springs, the West Bank's main water source for agriculture. Less water for agriculture will mean that Palestinians in Gaza (assuming there is no blockade in place) will not be able to export food to Israel and Europe for hard currency – and survival.

Egyptians, too, also depend heavily on agriculture, particularly in the predominantly rural areas. Yet, loss of productive agricultural lands in Egypt due to climate change could lead to a 20 percent drop in wheat and maize production by 2050. Moreover, agricultural production will be under further threat, due to expected sea level rise, for example, in the Nile Delta. To elaborate, a one-half meter climate-induced rise in sea level, for example, could displace two to four million Egyptians by 2050 (see graphic).<sup>25</sup> An anticipated one meter rise could displace six to eight million Egyptians.<sup>26</sup>



Potential impacts of 0.5 and 1 meter sea level rise in the Nile Delta  
Source: Cartographer/Designer, Otto Simonett, UNEP/GRID –Arendal

Even without taking climate change into account, Egypt already is facing water supply shortages and cannot meet its agricultural, industrial and domestic levels of demand. The creation of water and food shortages, and large numbers of displaced people and even greater unemployment due to loss of agricultural lands, industries, and infrastructure from climate-induced precipitation declines and sea level rise, will not only affect livelihoods, but also will increase competition for existing resources, which could lead to internal migration. Consequently, these factors will likely further erode public confidence in the Egyptian Government, with potential for political unrest and for radical fundamentalism to grow. The Muslim Brotherhood as the leading opposition, threatens the current regime's hold on power.<sup>27</sup> A new regime may have a different attitude towards peace with its neighbors with drastic regional security ramifications.

Several U.S. security experts have noted that "in the developing world, even a relatively small climatic shift can trigger or exacerbate food shortages, water scarcity, destructive weather events, the spread of disease, human migration, and natural resource competition. These crises are all the more dangerous because they are interwoven and self-perpetuating: water shortages can lead to food shortages, which can lead to conflict over remaining resources, which can drive human migration, which, in turn, can create new food shortages in new regions."<sup>28</sup> In fact, the term "climate refugees" was coined in recent years. The number of these climate refugees is estimated to reach or even exceed 200 million people by 2050 due to uninhabitable land, extreme weather events, desertification, sea level rise and/or the salinization of agricultural lands. Along these lines, the question will arise as to whether such persons or refugees will be allowed to enter other countries, and how these issues will be addressed.<sup>29</sup>

The projected damage in Egypt mentioned above could lead not only to internal migration but also to migration out of the country. People trying to cross political boundaries in the region could face problems and not be allowed to enter a neighboring state. Cross-border political tensions due to the Darfur conflict and the related refugee issue already exist between Sudan and Egypt as is the case between Israel and Egypt with thousands of Sudanese refugees now crossing from Egypt to Israel.

### **[a]Conclusions and Recommendations**

Existing water resources in the Middle East are inadequate to meet each country's current internal agricultural, domestic and other usage, let alone to meet the needs of new transboundary water agreements or the minimum water needs of nature.

The political, economic, and physical security risks that could result from the potential water shortages, due to projected climate changes are of such a magnitude that preventive actions must be taken now to protect the security of the region.

Countries that have water-sharing agreements and/or broader "peace" agreements in place might find it easier to cooperate towards sustainable solutions provided there is the political will to do so. Where no or only interim agreements exist, it is important to finalize such arrangements now, because, with anticipated climate changes, water-sharing arrangements will only become politically more difficult to achieve. Third parties will need to facilitate bilateral and regional long-term solutions.

Other factors, such as each country's level of institutional, economic, and infrastructure development will determine the extent to which it is affected by climate and its ability to mitigate and adapt to climate change. Aid agencies therefore should tailor assistance programs to recipient Middle East countries with climate change policy objectives in mind.

Countries will have to act domestically, with near-term and long-term planning that consists of mostly demand-side but also some supply-side water and energy management policies.

Demand management policies should be the first option to be adopted by Middle East countries. Less fresh water for agriculture, an expanded use of recycled wastewater, and alternative income support mechanisms for rural communities should become the norm. Along these lines, more domestic water conservation is critical. To help achieve this goal, measures such as government incentives for water conserving policies and technologies, for example, waterless toilets and rainwater harvesting are essential.

Supply-side options, such as sea water desalination, which are presently promoted throughout the region, are energy intensive, contributing to increased greenhouse gas emissions that further exacerbate climate change. Desalination technology is also not equally affordable to the different countries in the region. Though the region is blessed with sunshine, it lags behind in investments in solar power. Desalination based on solar energy could be the basis for more sustainable supply-side water management options. Cross-border cooperation for sustainable solutions that involve water conservation technology transfer and joint development of large solar fields, for example, could not only help water security but advance political security, as well.

Without combined national, regional, and international commitments to deal with the climate crisis, climate change will become the new and real threat to Middle East security with spillover security implications for the rest of the world.

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<sup>14</sup> Israeli-Palestinian Interim Agreement, "Article 40", available at <http://www.mfa.gov.il/MFA/Peace+Process/Guide+to+the+Peace+Process/THE+ISRAELI-PALESTINIAN+INTERIM+AGREEMENT+-+Annex+III.htm#app-40>

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<sup>24</sup> Those living on less than 1 dollar per day

<sup>25</sup> Cartographer/Designer, Otto Simonett, UNEP/GRID –Arendal; 2 million by 2050 figure from National Environmental Trust (2005) *Global Warming in the Middle East and Central Asia*, Washington, DC, p16

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<sup>27</sup> Bensahel, N and Byman, D L (2004) “The Future Security Environment in the Middle East,” report prepared for the United States Air Force, Rand Corporation, Santa Monica, pp58-59, available at [http://www.rand.org/pubs/monograph\\_reports/MR1640/MR1640.pdf](http://www.rand.org/pubs/monograph_reports/MR1640/MR1640.pdf)

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