Water Scarcity High Level Event within the 13th Session of the Arab Ministerial Water Council

17 November 2021

Background paper for Session 1: Economic Impacts of Water Scarcity in the Arab Region

This document is intended to serve as a background paper for the first panel session, "Economic Impacts of Water Scarcity in the Arab Region," which will be included in the High Level Meeting on "Water Scarcity: A Challenge to Sustainable Development in the Arab Region" to be held on the sidelines of the 13th Session of the Arab Ministerial Water Council in Cairo. The primary objective of the panel is to generate greater knowledge and understanding around the Arab region's unique challenges with respect to water scarcity and the economic impacts of this scarcity across diverse economic sectors and socioeconomic dimensions.

1. Introduction

Arab States are among the most water scarce in the world with 19 out of 22 States falling below the renewable water resources scarcity annual threshold of 1,000 m3 per capita and 13 States falling below the absolute water scarcity threshold of 500 m3 per capita per year. This places nearly 392 million people in the Arab region in countries under water scarcity to absolute scarcity conditions.

Water scarcity has multiple causes, some of them natural and others man made. Throughout history, the Arab region has been defined by its scarce access to water. While access to water (or the lack thereof) shapes the geographical conglomerations of all societies, it seems to do so more acutely in the context of the Arab region with civilizations that have gathered along the Nile and coasts and where nomads survive the climatic extremes of the desert by always being in search of the next *wadi*, oases or intermittent stream.

From this already challenging historical base, one must consider the modern stressors on the water supply of the region. The freshwater scarcity situation in the Arab region is aggravated by several factors such as dependency on transboundary water resources, water pollution, occupation and conflict affecting people's ability to access water and sanitation services, climate change impacts and extreme events, non-revenue water losses from aging water systems, intermittency, inefficient use of water and high population growth rates. Furthermore, while over half of the Arab region's population is now living in cities, water use in agriculture remains significant as the sector continues to consume the majority of the region's freshwater resources for food and agriculture production and to maintain rural livelihoods. Availing additional water is highly energy and financially intensive as it is associated with desalination and pumping water from distant sources and deep groundwater aquifers.

The water systems of the region are plagued by inefficiencies borne in part out of a focus on food self-sufficiency that has motivated agricultural subsidy and price guarantee policies which contribute to the overuse and waste of limited water supplies in a context where water scarcity and lack of fertile lands combined with population growth has rendered food self-sufficiency a practically impossible objective in any case.

Finally, most recently the fiscal demands produced by the COVID-19 pandemic, including a need to bulk up spending on public health, and a drop in fiscal revenues due to the slowdown in economic activity have also left little fiscal space to be able to address the ongoing water scarcity challenges.

Water scarce nations face unique economic challenges that ripple through households, the labor market, agriculture, industry, and logistics sectors as well as others. The following section will discuss in more detail

the current scenario in terms of the economic impact of water scarcity in the Arab region. This will be followed by a discussion of potential policy interventions that will be explored in more detail in the context of the panel.

2. Current Economic Implications of Water Scarcity in The Arab Region

The economic costs associated with water scarcity cut across many different sectors and dimensions of society, some of which are summarized here:

a. Increased and unsustainable household income spending

At the most basic level, limited access to freshwater resources has an impact at home in terms of share of household income spent on water provision and costs and time investment associated with water collection, particularly for women. Findings from SDG 6 monitoring under the WHO/UNICEF Joint Monitoring Programme (JMP) have highlighted that Northern Africa and Western Asia, which largely overlaps with the Arab region, have the second-highest rate of water expenditures. Nearly 20 per cent of the population spent more than 2 to 3 per cent of their household expenditures on Water, Sanitation and Health (WASH) services.[1] Vulnerable communities, which are most often not connected to water supply and sanitation networks, end up paying much more for water-related services than their connected counterparts. According to 2010 estimates from the World Bank, insufficient water supply and sanitation systems result in $21 billion per year in economic losses for the Middle East and North Africa, about 1 percent of GDP annually for the region and more for countries impacted by conflict (2-4 per cent).[2]

Water service providers are under increasing pressure to meet the needs of growing cities and informal settlements, including around 26 million of those that are forcibly displaced (refugees and internally displaced persons) in the Arab region.[3] While the influx of displaced communities adds to the growing pressure on water and sanitation services, displaced people often do not have the means to pay for such services to meet their basic WASH needs.

For example, in Yemen, which suffers from absolute water scarcity, increases in the costs of water purchased from private vendors mean that women bear the brunt of spending hours out of everyday collecting water. According to research by the International Rescue Committee, women in rural areas of Yemen spend one to two hours twice a day collecting water. While there may be trucked water supplies available closer to home, the high cost associated with buying from private sellers means that women must make long trips to public taps.[4] Women in the Arab region are also frequently exposed to verbal abuse and sexual assault during their trips to collect water.[5]

In Lebanon, the economic crisis in the country has also generated heavy costs for households related to water. UNICEF has warned that dollarized maintenance cost for the water sector and the failure of the power grid due to fuel costs could lead to the collapse of the public water supply system. If this were to occur, the cost of water from the private system is equivalent to 263 per cent of the average monthly income by UNICEF's estimates and therefore completely out of reach for most Lebanese families.[6]

b. Increased public health costs

Related to the household costs for access to freshwater resources are the public health and associated economic costs resulting from water scarcity. The COVID-19 pandemic brings these costs clearly to the forefront. ESCWA estimates that the increased domestic demand for water use during the pandemic would cost the Arab region $150-250 million per month.[7]

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[1] United Nations, 2018.
[2] https://openknowledge.worldbank.org/bitstream/handle/10986/27659/211144ov.pdf.
[3] UNESCWA, 2020.
[4] https://reliefweb.int/sites/reliefweb.int/files/resources/finalyemengenderassessmentreport2020.pdf.
[5] https://www.stimson.org/2021/water-crisis-in-the-mena-region/.
[6] https://www.unicef.org/press-releases/water-supply-systems-verge-collapse-lebanon-over-71-cent-people-risk-losing-access.
[7] https://afsd-2021.unescwa.org/sdgs/pdf/covid-19/en/5-20-00150_covid-19_water-scarcity-en.pdf.

When freshwater resources are unavailable in sufficient supply for WASH services for the population, this will result in poor health outcomes which reverberate into costs for the healthcare system and lost productivity due to an unhealthy workforce. In the Arab region 20 per cent of the population live without basic sanitation services and 27 per cent do not have access to basic handwashing services.[8] The mortality rate due to unsafe WASH services is significant in the least developed countries in the region, such as in Somalia where it exceeds 86.6 deaths per 100,000 people and Comoros (50.7 deaths per 100,000 people) (ESCWA, 2019; WHO Global Health Observatory, 2016). Data from UNESCO indicates that out of 2 million work-related deaths annually, one in five are caused by poor water and sanitation services and hygiene.[9]

It is important to highlight the disproportionate impact that poor water and sanitation services can have on women where 11 per cent of maternal deaths globally are caused by poor hygiene in the six weeks following birth.[10]

c. Labour market productivity and job losses

Related to the public health costs associated with water scarcity, productivity costs of poor water and sanitation systems are also evident. Measured in disability-adjusted life years (DALYs), preliminary estimates show the productivity costs of water-borne diseases are between 0.1 per cent (Qatar) and 1.5 per cent (Syrian Arab Republic) of GDP in countries of the Arab region.

Beyond potential costs to labour productivity, many jobs are dependent upon water as an input, meaning that when it is in short supply it can lead to contractions in the labour market. According to a 2016 report by UNEP, three out of every four jobs in the global labour market is either moderately or heavily dependent on water.[11] According to estimates based on data from the International Labour Organization, in the Arab region, 40 million jobs in the region are heavily water dependent. This includes jobs in agriculture, forestry, fisheries and aquaculture, mining and resource extraction, water supply and sanitation and most types of power creation. Furthermore, 46 million jobs are moderately water-dependent, including construction, recreation, transportation, manufacturing/transformation industries, such as wood, paper, rubber/plastics and metals. Some of these economic sectors represent important sources of job growth for the Middle East and North Africa labour market; agriculture, forestry and fisheries are examples, contrary to global trends of labour market contractions in these areas.

d. Increased water service delivery costs

Water scarcity increases the operation and maintenance costs for water service providers. For example, groundwater depletion results in increased costs in pumping both vertically and horizontally in the network.

In their analysis of the water sector in the Gulf Cooperation Council (GCC) countries, Al-Zubari et al. (2017) find that while the GCC countries have handled water scarcity issues in the region relatively well historically, the costly infrastructure built to confront the challenge is being tested in new ways due to factors like population growth, changes in consumption patterns, and inefficiencies in water delivery—all of which are exacerbated by the knock on effects of climate change. GCC nations have invested heavily in major water infrastructure like desalination and water treatment processes and dams. With large increases in demand and a dwindling supply, the GCC countries may have to invest in greater desalination capacity, which can be very costly in terms of the energy required to operate desalination plans and the associated costs for consuming oil and gas to do so.

Other countries in the region are confronting similar challenges with regards to scarce water supply and increased service costs arising from the need to invest in expensive water infrastructure. Egypt recently announced the issuance of new tenders to the private sector for the construction of 17 desalination plants that would quadruple the country's desalination capacity in the next five years (Werr, 2021).[12]

[8] UNESCWA, 2019
[9] https://www.unep.org/news-and-stories/press-release/three-four-jobs-global-workforce-depend-water-says-un-world-water.
[10] https://unhabitat.org/sites/default/files/2021/07/375751eng.pdf (pg. 6)
[11] https://www.unep.org/news-and-stories/press-release/three-four-jobs-global-workforce-depend-water-says-un-world-water.
[12] https://www.reuters.com/world/africa/water-poor-egypt-eyes-quadrupling-desalination-capacity-5-years-2021-10-21/.

e. Decrease in agricultural yields

In the Arab region, 84 per cent of water withdrawals are directed to the agriculture sector (UNESCWA, 2019), making it one of the most impacted sectors of the economy with respect to water scarcity. A recent report by the World Bank (2020) found that a 20 per cent reduction in water supplies for countries in the Middle East would significantly reduce crop yields. For example, a reduction of 20 per cent in the water supplies in Iraq would result in a nearly $4 billion decline in factor income to capital in the agriculture sector. The authors hypothesize that a loss of irrigated cropland will result in attempts to relocate farming activities into other untouched land, which could lead to deforestation and the destruction of other natural habitats.

Table 1 below details estimated decreases in crop yields in select countries in the region due to climate change. The projections range from -0.7 percent to nearly -25 percent.

Table 1: Change in yields (%) for selected crops for RCP 4.5 and RCP 8.5 and in case of changing and fixed CO_2 concentrations

Country (district) and crop	% change in yield							
	RCP 4.5		RCP 8.5*		RCP 4.5		RCP 8.5*	
	2020-2030	2040-2050	2040-2050	2020-2030	2020-2030	2040-2050	2020-2030	2040-2050
Rainfed Crops								
Morocco[13] (Marchouch) - Wheat	- 23	- 18	- 9	- 26	- 13.2	- 1.6	- 1.9	2.4
Sudan[14] (Gadarif) - Sorghum	- 0.7	- 7	- 7	- 11	-2	- 8	- 5	-8
Tunisia[15] (Koudiat) - Wheat	- 7	- 2.8	- 4.4	0.2	5.7	17.4	4.2	13.9
Yemen[16] (Dhamar) - Sorghum	- 26.4	- 29.8	- 3.1	- 10.3	- 21.6	- 24.3	2.64	- 2.47
Irrigated Crops								
Egypt[17] (Sakha) - Wheat	- 1.7	- 3.9	-2.9	- 5.7	10.3	13.2	10.1	12.5
Iraq[18] (Al Suwaira) - Tomato	- 1.2	- 5.3	- 6.2	- 7	11.6	12.8	6.7	11.9
Yemen[19] (Sana'a) - Wheat	- 4.2	- 6.1	- 3.81	- 7.6	8.3	12.6	13.1	10.2

** Representing higher representative concentration pathways (emissions scenarios)*

[13] ESCWA, 2019b "تقييم تأثير التغيرات في المياه المتاحة على انتاجية المحاصيل الزراعية تقرير دراسة الحالة في المغرب", [Assessing the Impact of Changes in Available Water on Productivity of Agricultural Crops, Morocco Case Study Report], Beirut, 19-00115, https://www.unescwa.org/sites/www.unescwa.org/files/uploads/national-assessment-report-morocco-arabic.pdf.

[14] ESCWA, 2019c "تقييم تأثير التغيرات في المياه المتاحة على انتاجية المحاصيل الزراعية تقرير دراسة الحالة في السودان", [Assessing the Impact of Changes in Available Water on Productivity of Agricultural Crops, Sudan Case Study Report], Beirut, 19-00116, https://www.unescwa.org/sites/www.unescwa.org/files/uploads/national-assessment-report-sudan-arabic.pdf.

[15] ESCWA, 2019d "تقييم تأثير التغيرات في المياه المتاحة على انتاجية المحاصيل الزراعية تقرير دراسة الحالة في تونس", [Assessing the Impact of Changes in Available Water on Productivity of Agricultural Crops, Tunisia Case Study Report], Beirut, 19-00222, https://www.unescwa.org/sites/www.unescwa.org/files/uploads/national-assessment-report-tunisia-arabic.pdf.

[16] ESCWA, 2019e "تقييم تأثير التغيرات في المياه المتاحة على انتاجية المحاصيل الزراعية تقرير دراسة الحالة في اليمن", [Assessing the Impact of Changes in Available Water on Productivity of Agricultural Crops, Yemen Case Study Report], Beirut, 19-00082, https://www.unescwa.org/sites/www.unescwa.org/files/uploads/national-assessment-report-yemen-arabic.pdf.

[17] ESCWA, 2019f "تقييم تأثير التغيرات في المياه المتاحة على انتاجية المحاصيل الزراعية تقرير دراسة الحالة في مصر", [Assessing the Impact of Changes in Available Water on Productivity of Agricultural Crops, Egypt Case Study Report], Beirut, 19-00096, https://www.unescwa.org/sites/www.unescwa.org/files/uploads/national-assessment-report-egypt-arabic.pdf.

[18] ESCWA, 2019g "تقييم تأثير التغيرات في المياه المتاحة على انتاجية المحاصيل الزراعية تقرير دراسة الحالة في العراق", [Assessing the Impact of Changes in Available Water on Productivity of Agricultural Crops, Iraq Case Study Report], Beirut, 19-00127, https://www.unescwa.org/sites/www.unescwa.org/files/uploads/national-assessment-report-iraq-arabic.pdf.

[19] ESCWA, 2019e.

A 2021 report by Barclays found that water scarcity could impact the earnings of major agribusiness companies like Tyson foods by up to 22 per cent of earnings.[20]For the MENA region, water scarcity is a real barrier to the investment in and development of an agribusiness industry.[21]

Water scarcity may necessitate investments by individual farmers in smart irrigation strategies. This implies additional costs for technologies like solar-powered water pumps.[22]

f. Energy source impacts

Hydropower remains a relatively underdeveloped energy source for Arab countries. According to the International Renewable Energy Agency as of 2015, only 6 per cent of total electricity generation capacity for the region was renewable, including hydropower which accounted for 4.7 per cent of total capacity.[23] Nonetheless a growing focus on increasing the development of renewable energy sources makes the impact of water scarcity on hydropower a relevant conversation for the region.

A report by the World Resources Institute (2017) documented the already tangible impacts of water scarcity on hydropower electricity generation worldwide. In 2016 in Brazil, a drought slowed power production at the Itaipu Dam and forced the country to revert to costly thermolelectric plant energy generation. As of 2016, the Hoover Dam in Nevada had experienced a capacity reduction of 30 per cent due to a decrease in water supply.[24]

A reduction in power production from hydro sources can have ripple effects on households and industries dependent on the electricity supply and, as in the case of Brazil, can require countries to substitute hydropower with more costly and potentially less environmentally sustainable forms of energy thus generating additional economic costs.

g. Other industrial impacts

Beyond the energy and agriculture sectors, water scarcity is already an important topic among industry leaders in considering adaptation to climate change in the present and in the immediate future. The previously cited 2021 report by Barclays described water as the most important challenge to the consumer staple industries and estimated that major consumer product manufacturers such as Unilever and Colgate could see their earnings impacted by 40 to 50 per cent by water scarcity. Meanwhile the cost of managing water scarcity for the production of consumer staples is also not insignificant, totaling an estimated $11 billion globally.[25] A 2020 report by McKinsey, claimed that two-thirds of all businesses globally faced a "substantial risk" with regards to water scarcity that could impact their direct operation and/or their value chains.[26]

The impact of water scarcity on industry may also be observed in credit ratings. According to a report by the Valuing Water Initiative, the Brazilian sugarcane company Coruripe was downgraded in 2019 when drought affected the company's crop processing.[27]

h. Ecosystem impacts and logistical log jams

When a drought hit Germany in 2018 causing a drop in water levels in the Rhine River that rendered sections of it unnavigable, supply chains were interrupted and it was impossible to ship out products in some cases. The drought had real economic impacts on Germany as a whole and is believed to be one of the causes behind the country's economic stagnation in 2018.[28] With an increase in extreme weather phenomena due in part to

[20] (Earnings before interest, taxes, depreciation and amortization) https://www.cnbc.com/2021/06/29/water-scarcity-why-some-of-the-worlds-biggest-companies-are-worried.html.
[21] https://hcss.nl/wp-content/uploads/2015/09/HCSS_Mapping_The_MENA.pdf
[22] https://www.unescwa.org/sites/default/files/event/materials/5.3%20Innovative%20Electricity-Groundwater%20Management%20in%20India-M.Gulati-World%20Bank.pdf.
[23] https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2016/IRENA_Arab_Region_Overview_2016.pdf.
[24] https://www.wri.org/insights/no-water-no-power.
[25] https://www.cnbc.com/2021/06/29/water-scarcity-why-some-of-the-worlds-biggest-companies-are-worried.html.
[26] https://www.mckinsey.com/business-functions/sustainability/our-insights/water-a-human-and-business-priority.
[27] https://valuingwaterinitiative.org/these-5-ways-water-scarcity-affects-businesses-might-surprise-you/.
[28] https://www.cnbc.com/2019/07/31/low-water-levels-in-the-river-rhine-could-create-havoc-for-germanys-economy.html.

changes in surrounding ecosystems, interruptions in global supply chains will only become more prevalent resulting in higher costs for producers and shortages and price increases for consumers.

Relatedly, ecosystem impacts like land degradation and desertification are also major concerns. Land degradation refers to the process by which land, due to environmental damage or overuse, loses its productivity capacity. Land degradation may also result in water erosion.[29] According to a report by the UN Convention to Combat Desertification, land degradation is on the rise and has a disproportionate economic impact on low income families living in rural areas. The report documents that 80 per cent of the global extreme poor live in rural areas that are more likely to be subject to land degradation that impacts key economic sectors like agriculture. It posits that for every 5 per cent increase in the proportion of land degraded there is a 1 per cent increase in extreme rural poverty.[30]

i. Summary of Economic Impacts

Many of the economic impacts of water scarcity across different sectors described herein are also interconnected. For example, water scarcity impacts the agriculture sector through lower crop yields but also through the labor market when lower yields require less workers for the harvest. When agricultural yields drop in a region this can impact food security, which could result in a shortage of nutritional intake for the population and thus public health consequences and an increase in public health spending. The economic impact of water scarcity along this chain of events is evident in lower yields for farmers, a loss in household income for laid off agricultural workers and increase in healthcare expenses related to malnutrition. Land degradation and desertification and related water scarcity that impacts supply chains and logistics results in higher costs for other industrialists as well and these costs are likely to be passed along to consumers, impacting the household budget and spending. In this scenario, industrialists, shipping companies and consumers feel the economic impact of water scarcity.

The complex interconnectedness of water scarcity and its impacts requires new and innovative solutions that stretch across diverse economic sectors and dimensions.

3. Policy Recommendations and Formulating Panel Questions

The potential policy options for addressing the water scarcity challenge and its economic impact will be explored in more detail in the context of the panel discussion.

a. Establishing better valuing mechanisms

In order to better manage the limited water resources available globally, and particularly in the Arab region, being able to make an accurate assessment of water's economic value could be a helpful tool to lend greater visibility to the challenges at hand and to create more efficient pricing schemes that motivate greater conservation of this precious resource. However, these valuations are notoriously complicated as is establishing and building consensus around the "right price" for water.

A key step to enhance affordability of water in the Arab region is through the improvement of efficiency in water services delivery. Nevertheless, even with most optimal levels of service delivery, the role of subsidies will remain central to advance progress towards a universal water services coverage in the region.

That is, heavily subsidized water, in the majority of Arab countries results in water costs that do not reflect their true value. Water is typically priced at around 35 percent of the production costs.[31] In the case of desalination, the cost coverage is even lower and does not exceed 10 percent of the production costs. This is further compounded by subsidized energy tariffs which encourage energy intensive water extraction activities further increasing pressure on limited water resources. Furthermore, subsidies are often focused on capital investments which benefit mostly communities that are already connected to distribution networks and hence

[29] https://archive.unescwa.org/sites/www.unescwa.org/files/publications/files/land-degradation-neutrality-arab-region-english_1.pdf.
[30] https://www.unccd.int/sites/default/files/documents/2020-09/200909_08_Brief%20note%20%E2%80%93%20Poverty%20and%20Inequality.pdf.
[31] Al-Zubari, 2015.

further exacerbate existing inequalities.[32] Therefore, in implementing subsidy policies, the financial sustainability of services provided as well as the associated environmental and social implications should be carefully considered.

Considering the tradeoff between cost recovery for the service provider and affordability concerns for the low-income households is at the center of achieving economic efficiency for water services delivered. Nevertheless, financial instruments, notably tariff structures, when designed and applied conveniently can support water conservation at the household level and not to understate the same importance in the agriculture sector.[33] Setting and implementing water tariffs in the Arab region which support cost recovery of water services has stirred opposition and disagreement in the past. Some attempts have been made recently to adjust the current tariff rates to levels that better reflect cost of the service while preserving the human right to water. For instance, Tunisia has attempted a new tariff scheme which balances short term social and financial objectives with longer term economic ones.[34] The social aspects of the water tariff are taken into consideration to ensure the right to water for the poor while balancing the financial viability of water service providers. The tariff scheme applied incorporates as well longer-term goals for the sustainable management of water resources through adequate resource allocation among the various sectors as well water rationalization considerations. The approach for setting the tariff is based on "Increasing Block Tariff" scheme that sets rates as low as 21 per cent of the average cost of service for the first block and increases along 7 blocks to reach 146 per cent recovery rates for the highest consuming segment.[35]

With reference to groundwater management, for example, Strand (2010) proposes an analytical framework for improving the efficiency of groundwater use by optimizing the pricing scheme for electricity used for pumping groundwater. He concludes that the appropriate pricing for electricity to pump groundwater would cover the full marginal cost of the electricity plus an additional charge in the electricity cost to account for the externalities of groundwater pumping. The externalities are more challenging to measure and complicated by the fact that, according to Strand, groundwater has both an "extractive value" when it is used for irrigation and an "in situ" value when it is simply left in the ground to serve a variety of purposes including preventing seawater intrusion. Ultimately, Strand chooses to focus his model on the productive or extractive value of groundwater, leaving an in situ value analysis for future research.[36]

Ruta (2005) calculated the value of groundwater depletion as a percentage of GDP in a selection of MENA countries by conducting an analysis of adjusted net savings corrected to take into account groundwater depletion. ESCWA defines adjusted net savings as a measure of "the true rate of saving in an economy after taking into account investments in human capital, depletion of natural resources and damages caused by pollution." Ruta's calculations show that the value of groundwater depleted in some countries in the region may be the equivalent of 2 per cent of GDP (World Bank, 2007).[37]

With regards to estimating the economic value of water and establishing efficient pricing mechanisms, the panel is requested to consider:

How can we come to understand the economic value of water in a quantitative sense when it has both a productive and an in-situ value, with the latter being particularly challenging to quantify?

What specific challenges do you see for cultivating better understanding of the economic value of water in the Arab region?

How can we build stakeholder consensus around more efficient water pricing schemes?

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[32] Andres and others 2019.
33 Kayaga, S. and Smout, I., 2014.
34 UNESCWA, 2017.
35 Al -Zubari, 2015.
[36] For further elaboration please see the forthcoming ESCWA, 9th Water Development Report: Groundwater in the Arab Region
[37] Ibid.

b. Upgrading infrastructure

Even with more efficient pricing schemes in place, we have already entered an era where addressing the challenge of water scarcity, particularly in the Arab region, will require expensive infrastructure investments. Desalination plants are one example. According to a recent report by the Yale School of Environment, desalination plants are on the rise globally. In 1990, there were less than 2,500 operational desalination plants in the world. As of 2020, there are more than 15,000.[38] While desalination may be necessary to ensure a safe drinking water supply, as the Yale study points out, it is not without its costs. The annual cost of a desalinated water supply for a family of four in California is estimated at $2,200. Further, desalination plants are energy intensive and in countries where the majority of the electricity supply is generated through fossil fuels, running desalination plants will result in an increase in greenhouse gas emissions.[39]

Egypt's plan to build 17 new desalination plants within the next five years aims to fuel operation with solar energy that will allow for a 20 to 25 per cent reduction in the cost of desalinated water from a current estimated cost of $1,000 per cubic meter.[40]

An additional challenge for the Arab Region is the need for investment in the water infrastructure in countries in the region that have been impacted by conflict. A 2021 report by the International Committee of the Red Cross estimated that Syria today has 40 per cent less drinking water than the country did one decade ago, with only 50 per cent of water and sanitation systems in the country in full operation in comparison to more than 90 per cent in 2010.[41] In this scenario, there is a need to restore the country's water infrastructure to its previous capacity while also facilitating upgrades to prepare for future water scarcity caused by climate change.

Recognizing the need for new water infrastructure, results in the following key questions:

What new water infrastructure do you believe will be of prime importance for the Arab region going forward?

How can the supply-side investments `be balanced with demand control measures for water through price and quantity regulations?

If desalination plants are a key solution, how can we reduce operation costs?

c. Financing solutions for water infrastructure in the Arab region

As we have outlined above, in order to fulfill Sustainable Development Goal (SDG) 6 (Ensure availability and sustainable management of water and sanitation for all), the Arab Region will require costly infrastructure investments in desalination and non-traditional water sources coupled with improvements in efficiency especially in the agriculture sector and demand side management measures. In the 2019 SDG Index and Dashboards report on the Arab Region, one of the primary solutions identified for achieving SDG 6 is developing financially sustainable solutions, which could entail financial aid from high income countries to LDCs, funding from development funding agencies and/or investments by the private sector.[42]

In terms of external financing, Official Development Assistance (ODA) is an important source of external aid in the form of grants and loans for countries with limited national resources. The 2030 Agenda indicator 6.a.1 is meant to monitor the amount of water and sanitation related ODA that is part of a government-coordinated spending plan. The condition that this ODA is part of a government-coordinated plan is meant to ensure alignment, coordination and coherence between donors and recipient countries. Since 2005 the global water sector dedicated ODA has remained constant at around 5 per cent as a proportion of total ODA.[43] This implies that the water and sanitation sectors have failed to garner the needed greater support for financing. In the Arab region and following the 2011 regional volatility, the total ODA provided to the region has increased.[44]

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[38] https://e360.yale.edu/features/as-water-scarcity-increases-desalination-plants-are-on-the-rise.
[39] Ibid.
[40] https://www.reuters.com/world/africa/water-poor-egypt-eyes-quadrupling-desalination-capacity-5-years-2021-10-21/.
[41] https://www.icrc.org/en/document/syria-water-crisis-after-10-years-war.
[42] https://s3.amazonaws.com/sustainabledevelopment.report/2019/2019_arab_region_index_and_dashboards.pdf.
[43] United Nations, 2018.
[44] Sarangi, and others, 2018.

Unfortunately this increase is tied to several crises in the region which saw an increase of ODA flow to refugees. However, the water supply and sanitation sector share between 2010 and 2016 has been relatively steady at around 5 per cent with a low of 3.21 per cent in 2013 and a high of 6.95 per cent in 2010.[45] This clearly does not match the required increase in effort needed to meet the challenges of water security or sustainable development. Arab States need to maximize benefits from this ODA by improving coordination with donors and mainstreaming this ODA into national plans that may help to attract other sources of financing.

The importance of regional financing and cooperation should not be undermined. The cumulative ODA provided by various Arab development funds to Arab States between 1970 and 2016 amounted to nearly 100 billion United States dollars and this is not accounting for the bilateral aid mostly provided by the GCC countries.[46] In addition to improving water services, a portion of this regional aid should be directed to enhance regional cooperation specifically in transboundary water basins.

Private financing and investment are a source of funds that has been underutilized in the Arab region and specifically in the water and sanitation sectors. In some cases, there may be a commercially viable investment opportunity that makes it possible to attract private sector finance or investment. Attracting the private sector can unlock access to additional sources of finance and expertise and may lead to sustainable market-based solutions that reduce the fiscal burden on the public sector. Debt is the most common type of private finance at scale, although equity and hybrid instruments can also play valuable roles and be best suited to certain funding needs.

One approach to engage the private sector that is advocated by the Addis Ababa Action Agenda is through blended finance, which "combines concessional public finance with non-concessional private finance and expertise from the public and private sector" under clear accountability mechanisms. This includes many public-private partnerships. When public climate finance is committed to blended finance, including PPPs, the blended instrument should further the adaptation or mitigation outcomes.

In its 2021 assessment of climate finance in the Arab states, ESCWA found several important funding gaps. First, 77 per cent of funding is targeted at mitigation and only 18 per cent to adaptation; the latter being a key component for confronting water scarcity. Second, most climate financing in the region flows to 4-5 countries and there are low levels of financing available for LDCs.

ESCWA is currently coordinating a Climate/SDGs Debt Swap mechanism for countries in the region. The debt swap alleviates member states from interest payments on external debt, allowing them to invest these funds in needed climate change mitigation and adaptation projects. Debtors benefit by including the written off interest payments as part of their official development assistance. A pilot of the debt swap is underway in Jordan with the potential to expand to other countries in the region.[47]

In 2020, Egypt became the first Arab country to issue green bonds. The $750 million raised in the issuance is directed towards financing sustainability projects in the transportation and energy sectors.[48] Similar fixed-income instruments could be feasible solutions for financing projects in the water sector. As previously mentioned, Egypt is also seeking private sector investment in desalination plants for the country.

Our main questions to the panel with regards to financing the needed solutions for addressing water scarcity are:

How can member states overcome the fiscal challenges generated by the COVID-19 pandemic in order to refocus spending on the water sector?

How to overcome the inability of utilities to raise the financing needed to cover their operations and investments for reliable water and wastewater services?

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[45] Ibid.

[46] Ibid

[47] https://www.unescwa.org/sites/default/files/pubs/pdf/climate-sdgs-debt-swap-mechanism-english_0.pdf

[48] https://www.reuters.com/article/egypt-bonds-int-idUSKBN26K1MJ

How can we ensure more funding is directed to climate change adaptation and LDCs for their water sectors? What innovative solutions for financing do you believe would be most applicable to the nations of the Arab Region?

What do you envision for private sector involvement in financing solutions for the water sector?

4. Conclusions

The main objective of this document was to offer an overview of some of the current economic impacts of water scarcity and potential policy solutions. It is well understood that the consequences of water scarcity have diverse and multi-dimensional impacts across economies and societies and that these impacts are often intertwined. For example, in the case of water scarcity that threatens crop yields, employment in the agricultural sector and public health spending wrought by malnutrition are additional impacts. Going forward, solutions are needed that increase efficient water use through use of innovative technologies and more appropriate valuing schemes and smart investment in new infrastructure balanced by demand management schemes. This will require the cooperation of the international community and innovative financing options. The main conclusions will be informed from the panel discussions.

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