Water scarcity in Arab region

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Abstract

Water scarcity in the Arab region is intensifying due to population growth, economic development, and the impacts of climate change. High-income Arab countries have sought to circumvent the ever-present challenges of water scarcity through agricultural imports and desalination. Recognizing the complex and interdependent challenge of water management is the first step in reforming approaches, authors say. It will help shift to more sustainable development outcomes and stability in the region and beyond, they say. Water stress is a serious issue in many parts of the world. Discover its causes and effects. But most importantly the solutions to the water crisis. Water is scarce in the semiarid region, a region housing many of the poor and hunger-prone countries. This complicates socioeconomic development greatly unless exogenous water is brought by large rivers, by water transfers or by food import.

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1. Introduction

The Nile is that the longest stream in Africa (1, 2). It's 650 kilometers long, and its basin covers eleven, countries that are: United Republic of Tanzania, Uganda, Rwanda, Burundi, the Democratic Republic of the Congo, Kenya, Ethiopia, Eritrea, South Sudan, Republic of the Sudan, and Egypt (3). Nearly all of the downfall that feeds the Nile's 2 major tributaries – the Blue and headstream – falls within the higher Nile basin, found in South Sudan, western Abyssinia and Republic of Uganda. The lower Nile basin receives little downfall and also the countries there – Sudan and Egypt – rely heavily on the Nile for water. The headstream, however, is that the supply of most of the water, containing eightieth of the water and silt. The headstream (head stream) is longer and rises at intervals the nice Lakes region of the Central African Republic, with the foremost distant supply still undetermined, however situated in either African country or Burundi. It flows north through United Republic of Tanzania, lake, Republic of Uganda and South Sudan. The Blue Nile begins at Lake Tana in Abyssinia (4) and flows into Sudan from the southeast. the two rivers meet simply north of the Sudanese capital of Khartoum (5). The northern section of the watercourse flows north nearly entirely through the Sudanese desert to Egypt, then ends throughout AN large delta and flows into the Mediterranean. Egyptian civilization, and Sudanese kingdoms have trustworthy the watercourse since past. Most of the population and cities of Egypt lie on those components of the Nile vale north of urban center, and nearly all the cultural and historical sites of Ancient Egypt area unit found on watercourse banks. Water deficiency (water stress or water crisis) is that the lack of water resources to fulfill the quality water demand (6). nowadays, around 100 percent of the basin's population faces water deficiency thanks to the extremely unequal distribution of water resources, global climate change, Natural calamities like droughts and floods, raised human consumption,

Overuse and wastage of water and a world rise in fresh demand. There are a unit 2 varieties of water scarcity: physical and economic. Physical water deficiency is wherever there's not enough water to fulfill all demands, as well as that required for ecosystems to perform effectively. Symptoms of physical water deficiency embrace environmental degradation and declining groundwater. It additionally happens wherever water looks copious however wherever resources area unit over-committed, like once there's overdevelopment of hydraulic infrastructure for irrigation. One-quarter of the world's population is littered with economic water deficiency. Economic water scarcity is caused by a lack of investment in infrastructure or technology to draw water from rivers (7). one study found that water scarcity can be significantly reduced by 2050 if we commit to making big, yet practical changes by solving water scarcity causes with different methods. Water pollution is also one of the main causes of water scarcity as it makes water unfit for consumption or use and reduce the available water resources. Pollution is indeed becoming one of the main threats to the availability and reuse of water. Solutions and methods for dealing with water shortage:

1. Education/Awareness.
2. New Conservation Technologies.
3. Recycle Wastewater.
4. Improve Irrigation and Agriculture.

2. Water Issues Facing the Arab Region

2.1 Access to Water Services

Entrance to drinking water and sanitation remains a problem for low-income countries in the Arab region and those affected by armed conflict. In most other nations, access to basic water resources is on target or moderately successful, with many Arab countries meeting the Millennium Development Goals in 2015. While access has increased, there are very significant gaps in the efficiency and accessibility of water resources across countries (Zawahri et al., 2011). Countries will need to dramatically step up their attempts to achieve the goals for clean water supplies. However, access figures conceal rural-urban inequalities that are especially acute in Morocco, Yemen, Iraq and Palestine. Access figures also obscure the unequal impacts suffered by children and women in obtaining water resources, including by higher incidences of water-related diseases. (Walker et al., 2012). Difficulties and opportunity costs of household water sources (Sorenson et al., 2011) and raised obstacles in military conflict conditions e.g. shortage of separate latrines and menstrual health management (Samari, 2017); availability and consistency of water obtained from privately owned tanker trucks (Abu-Lohom et al., 2018).

2.2 Water Quality

Water in surface and groundwater is contaminated in most countries with adverse effects on humans and the marine environment. The region is not on target to reach SDG 6.3 on water quality and sanitation by 2030, and also in countries where SDG testing results indicate strong development, such as Jordan and Tunisia, local data indicates otherwise (e.g. the River Zarqa in Jordan (Al-Omari et al., 2019) and the River (Medjerda in Tunisia, 2019; Etteieb et al., 2017). This illustrates the need to treat SDG indicators with caution, as national indicators can mask major sub-national variations. Three major sources of contamination are threatening the quality of the water in the area. Next, household wastewater, of which more than 50% is

dumped unregulated into surface water bodies (WHO and UN Habitat, 2018). Second, the contamination of industrial sewage. While national figures are missing, Lebanon (Daou et al., 2018), Egypt (Abdel-Satar et al., 2017) and Morocco (Barakat et al., 2016) face extensive industrial contamination, among others. Oil spills and seepage from pipelines are also causes of water pollution, as observed in Iraq and Libya. Uncontrolled runoff from agricultural land degrades water quality. Nitrogen losses from manured agricultural lands to freshwater courses are about 25% of the applied fertilizer. High concentrations of nitrogen, phosphate, and other nutrients result in eutrophic lakes, reservoirs, and coastal waters along the Mediterranean coast (8). Salinization of floor freshwater our bodies due to human sports is an essential water best trouble with inside the Arab region (Damania et al., 2019), with unfavorable results for human health, ecosystems, and agriculture. Hot spots of floor water salinization consist of the Mesopotamian Marshes (Al-Mudaffar Fawzi et al, 2016), Shatt al-Arab River (Al-Mudaffar Fawzi & Mahdi, 2014), Jordan Valley (Farber et al., 2005). In addition, groundwater salinization because of overexploitation influences the coastal aquifer in Gaza (Dentoni et al., 2015), the Wadi Ham with inside the UAE (Sherif et al., 2012), the Nile Delta (Molle et al., 2018; Sefelnasr & Sherif, 2014), and the Sfax aquifer in Tunisia (Trabelsi et al., 2016), amongst others. The groundwater salinity state of affairs is in particular dire with inside the Comoros Islands, in which fewer than 30% of wells offer water of appropriate consuming water best (Comte et al., 2016)

2.3 Dealing with Water Stress and Variability

Most Arab international locations have excessive to very excessive water strain that means that water withdrawals exceed with the aid of using extra than 40% overall renewable freshwater availability. The wide variety of humans laid low with drought with inside the location from 1970 to 2019 is set 60 million, with as a minimum 20 million simply with inside the final decade. Floods additionally create ongoing

demanding situations throughout the location. The effect of water-associated screw ups and variability is better in international locations laid low by protracted armed battle situations, because the populations' adaptive capability is regularly overly strained in those contexts (Harris et al., 2013). The pinnacle 3 international locations maximum laid low with drought also are a few of the maximum fragile with inside. the location (Sudan, Syria and Somalia). A comparable sample is located for floods, wherein the biggest wide variety. of humans affected is focused in Sudan, Somalia, and Yemen. Arab countries have long invested in water storage. The region has the largest volume of water stored in reservoirs in the world. Few dam sites are suitable for surface water storage, and evaporation losses are high. Countries are increasingly resorting to aquifers to store water. The low levels of water storage are also reflected in the low hydropower generation, apart from Egypt (7–10% from the High Aswan Dam and declining), Morocco (5%), and Iraq (4%) (International Energy Agency, 2016) The region accounts for less than 2% of the world's total electricity generation. High-profits international locations have deployed desalination technology at scale to reinforce supplies. They now account for approximately 50% of the world's desalination capacity, even though they handiest host much less than 1% of the worldwide population (World Bank, 2018a). Reliance on nonrenewable electricity for desalination is a key characteristic of the region's water-electricity nexus, particularly with inside the high-profits international locations and Algeria, in which desalinated water is the principle deliver supply for home customers and its purification and distribution eat huge quantities of electricity (e.g., 10% of the full annual electricity intake in Saudi Arabia (Siddiqi 2011) and 20% with inside the UAE (Commander et al., 2015). Beyond high-electricity costs, desalination additionally brings greenhouse fuel line emissions and effects on marine ecosystems (Jones et al., 2018). Arab international locations also are increasing their wastewater reuse capacity. Although maximum international locations exercise a few reuses, the

dimensions vary notably with just a few international locations having efficiently carried out huge reuse programs (Kafoury et al., 2009). In fact, in a few middle- and low-profits Arab international locations, unplanned reuse is maximum prevalent, frequently due to the fact farmers haven't any opportunity supply of irrigation water, elevating worries for public fitness and safety of the environment (Qadir et al., 2010). In high-profits international locations, wastewater reuse is turning into an increasing number of vital factors of those international locations' water deliver portfolios, way to guidelines to mandate water reuse and the lifestyles of infrastructure structures for accumulating and treating wastewater (Jagland, 2015). The groundwater state of affairs is extraordinarily concerning, with worldwide and neighborhood research reporting systematic depletion throughout the region (Dwell et al., 2014). Satellite-primarily based totally estimates have recognized vast declines in general water garage with inside the Northwest Sahara Aquifer System (Famiglietti, 2014) and with inside the Tigris and Euphrates basin. In this latter aquifer system, as a minimum 60% of water garage loss is as a result of groundwater depletion (Joodaki et al., 2014; Voss et al., 2013). Local research advocate dramatic declines in aquifer tiers with inside the Paleogene and Cretaceous aquifers in Syria (Stadler et al., 2012), with inside the Amman Zarqa and Lower Jordan basin in Jordan (Al Naber & Mole, 2017; Goode et al., 2013) with inside the Sousse-Massa aquifer in Morocco (Hassoun et al., 2017), and the transboundary Nubian Aquifer (Ahmed & Abdel Mohsen, 2018), amongst others.

2.4 Water Use Efficiency

Water use in the Arab region is embedded in social, cultural, and geographical landscapes. Economic output per unit of water withdrawn and allocative efficiency is more important than water use. Water use-efficiency of urban water utilities varies and is low in most countries with a few notable exceptions. In the middle-income

countries of the Mashreq, urban water supply distribution systems lose in the range of 35–50% of water put into the supply system due to leakage and unregistered usage (UN Habitat, 2012). In the high-income countries, nonrevenue water ranges from 30% in Oman and Saudi Arabia to 24% in Bahrain, 20% in Qatar, 13% in the UAE, and 5% in Kuwait (World Bank, 2017). The water use efficiency of Urban water utilities (i.e., losses occurring in urban water distribution networks) varies, with low water use efficiency in many countries. To see the full report, visit the Arab Region and Europe Centre for Environment and Development.

3. Water Resources Management

The urgent need for comprehensive assessment of the world's freshwater has also been stressed. River systems and the underlying aquifers need to be analyzed in their entirety, says UNESCO. The WWAP aims to improve the assessment of the state of world water resources and their response to pressure posed by escalating human demands, as well as by factors related to global change. The overriding objectives will be to provide the appropriate scientific knowledge-base to perform freshwater assessments. A cornerstone of the strategy is joint action with the other international scientific endeavors of UNESCO. The Sixth Phase of the International Hydrological Program fully recognizes and incorporates these needs. The aim is to develop approaches that minimize the risk to vulnerable water resource systems. The strategy will be undertaken in close collaboration with MAB and other UN agencies, and with member states and with the private sector. Cross-cutting initiatives FRIEND and HELP aim to address water-related social vulnerability and improve water management at basin scale. They aim to gain a better under-standing of processes associated to the water cycle at different scales. Suitable urban and per urban water management strategies, institutional frame-works and participatory processes in the context of poverty alleviation will be explored. The increasingly critical relationship between water and tourism will be considered. The efficient use of energy/water interactions and the applicability of novel technologies for urban drainage and sanitation will be examined. The use of isotope methodologies and trace elements in water for better water resource management will be investigated. The application of bio-remediation to wastewater recycling and wastewater recycling will be discussed (9).

3.1 Capacity building water education and training

The idea of Water Education and Training(W-E-T) Vision Framework Paper turned into followed via way of means of the 14th IHP Intergovernmental Council in Paris, June 2000. Water schooling turned into considered as very crucial for IHP and specifically for UNESCO. The want for stakeholder education and schooling wishes evaluation had been emphasized. The schooling is directed toward the improvement of person and organization abilities as a way to be required via way of means of the implementation of assignment activities which are of excessive precedence with inside the precise countries. These embody water professional, managerial, institutional, and different abilities had to deliver out cooperative improvement programs throughout the basin.

4. Conclusions

This paper reviewed the popularity and potentialities for sustainable water control with inside the Arab area with inside the context of most important international and local traits. The evaluation has proven that the area isn't always on course to fulfill SDG 6 and that sustainable water control challenges, specifically at the call for side, and responses with inside the Arab area cannot be understood in isolation from broader local and worldwide political and socioeconomic traits. In order to border cap potential solutions, a broader view that is going past easy issues round growing water pressure beneath Neath weather alternate is needed. The manner wherein water is managed, developed, and shared with inside the context of unsure local and international traits has essential implications for the area's capacity to acquire sustainable development, reap resilience, and preserve political stability. Clearly now no longer all nations might be uncovered to the identical problems and traits with inside the identical manner, so we've tried to examine the dominant traits in every united states. We have now no longer tried to become aware of coverage

responses, as those might be context precise and could contain evaluation of interdependencies among SDGs (Weitz et al., 2018). Sustainable water management will likely require diversification of water supplies, including wastewater reuse, water conservation and aquifer storage, reductions in water use. In countries affected by protracted armed conflict, the scale, complexity, and duration of water challenges create unprecedented needs that require a more holistic response.

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