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Water Scarcity In Syria- A Concern For Sustainable Future

[1]Dr. Parveen Islam

[1]Assistant Professor
[1]Depratment of LAw,
[1]NEF Law College, Guwahati, India

Abstract: The mounting concerns for water scarcity pose specific threats to the WANA region in general and to Syria in particular. This region witnessed how every conflict has compounded due to lack of water. In such a scenario the major flaw lies with the government as it could neither stop the recurring conflict nor it could develop any sustainable water policy. WHO documents that almost 1/5th of the world's population (approx. 1.2 billion) people live in areas where water is physically scarce. Limited studies done in the area of water shortage and water resources portray a gloomy picture. A survey conducted by UNDP in Syria documents 1.7 billion cubic meters of water in 2010 which slipped to 1 billion cubic meters by 2019. Even after the war in 2022, it was reported that the production has been reduced to 600 million cubic meters. There are almost 37 water legislations and legal initiatives taken through resolution by the Syrian Arab Republic between 2005-2012, but the crucial question that persists is how far these initiatives can solve the alarming issue of water scarcity in Syria. It can also be understood that there was no comprehensive water law until 2005. In light of such a grim situation, it becomes pertinent to understand the causes contributing to water scarcity in Syria and to analyze the viable initiative undertaken to combat the challenge. This paper aims not only to study the water scarcity scenario in Syria but also to contribute to the literary resources available on this aspect of the study.

Index Terms **-** water scarcity, sustainability, conflict, climate change, risk.

I. INTRODUCTION

Development is always accompanied by significant and irreparable impacts on the environment, and ecology, thereby challenging the sustainability in present and in the future. The same stands true with regard to water availability. The world has witnessed instances like the wiping of civilizations, conflict over the use of water between nations, drying of water bodies due to overuse, drought, and flood due to climate change, waterborne diseases due to unhygienic use of water, etc.

Reflections of the devastating effect of water can also be found in *Moses 8: 19-30, Genesis 7:13-24)* when the entire earth was covered with water for 150 days as a wrath of Almighty.[1]

In such a scenario creating soft-paths in order to balance the need of development (urbanization, industrial growth, economic development) and the cost of development (adopting environment-friendly practices) would pave the way for sustainability.[2]

Water scarcity in Syria looms large amongst the already prevailing scenario and there is an urgent need to reserve the degradation of Syria's clean water resource. Moreover, the geographical positioning of Syria gives five agro-ecological zones dependent on rainfall. A research study highlights that water availability is deficient by 3348 million cubic meters. Rainwater harvesting through the implementation of modern techniques in agriculture has the potential to overcome water shortage by 2050.[3] An "End to Life care" initiative has been made that even if 1% of the rainwater is harvested, it would increase the water availability by about 460 MCM.[4] *Secondly*, peace agreements between countries could also bring solutions to water scarcity where Syria can have access to water available in neighbouring countries through lakes, rivers, springs, etc., which can balance the water needs of Syria. *Thirdly*, reclaimed water can also play a vital role in increasing water availability by producing more than 4000 MCM by 2050.[5] The industrial and population growth estimates the need for available water to be about 3150 MCM in 2050.[6]

II. Factors contributing to water scarcity in Syria

WANA is the region of the world that is mostly known for its abundance of oil, population growth, and economic development. But this region is suffering from a critical level of water shortage which is less than 1000 cubic meters. This has created an urgency either to use technology for the desalination of the seawater or to process the wastewater for consumption. Syria with more than 16000 illegally drilled wells abstracting its aquifers did not consider desalination.

The changing political scenario accompanied by the deterioration of climatic and economic health in the country has magnified the devastation the country is facing which includes water scarcity. History has witnessed that conflicts over water have resulted to devastating civil wars between nation-states (Gleick 1993; Yoffe et al. 2003; Tosset et al. 2000; Wolf 2007).

Research conducted to identify the chronology of water conflict by Pacific Institute, Oakland, California maintains that the conflict relating to water dates back to 4500 years.[7] Examples of such conflicts can be seen between Turkey and Egypt including Syria, Lebanon, Jordan, Israel, and Palestine (Gleick 1994;

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[1] Lesson 6, "Noah…Prepared an Ark to the Saving of his House", Moses 8:19-30; Genesis 6-9; 11: 1-9, https://www.churchofjesuschrist.org/study/manual/old-testament-gospel-doctrine-teachers-manual/lesson-6?long=eng.

[2] INECO, Institutional framework and decision making practices for water management in Syria, Towards the development of a strategy for water pollution prevention and control in the Barada River basin, Greater Damacus area, prepared by Studies and Integrated Consulting, March 2009,Https://environ.chemeng.ntua.gr/ineco/UserFiles/File/Deliverables/Published%20Report%20-%20Syria.pdf.

[3] Mourad, Khaldoon A. & Berndtson, Ronny, "Syrian Water Resources between the Present and the Future", Jan, 2020, https://bioone.org/journals/air-soil-and-water-research/volume-4/issue-1/ASWR.S8076/Syrian-Water-Resources-between-the-present-and-the-Future/10.1177/ASWR.S8076.full.

[4] Ibid.

[5] Ibid.

[6] Ibid.

[7] Gleick, Peter H., "Water, Draught, Climate Change and Conflict in Syria", Weather, Climate and Society, Vol.6, No.3, p.331- 340, July 2014, https://www.jstor.org/stable/24907379.

Kliot 1994; Lonergon 1997).[8] Such conflicts revolve around access and control over water. Syria stands as a recent example where the major and the direct cause of conflict was water which magnified the devastating civil war.[9] Syria has long standing water disputes with Jordan and Turkey.[10]

The population dynamics has also changed over a period of time from 3 million in 1950's to 23.79 million in 2024.[11] Syria being one of the driest region of the world water scarcity is a lurking threat to the region with less than 250mm (UNDP 2008) annual rainfall and around 16.8 cubic Km yr-1 renewal water availability (Frenken 2009).

The situation has been magnified by the natural hydrologic variations owing to drought specially between 2006-2011. Syria experienced a multiseason, multiyear period of extreme drought that contributed to agricultural failures, economic dislocations and population displacements (Warth, 2010).[12] Abdullah Bin Yehia described it as the "perfect storm" and a multiplier on the already existing social and economic pressure on Syria.[13] During the same period the Syrian Minister on Agriculture also made an official statement that the fallout from the persisitent drought was beyond the country's capacity to deal with.[14]

Between 2006-2009 around 1.3 million Syrian inhabitants were affected due to agricultural failures. The water management system, policy and planning errors has further worsen the situation for Syrian inhabitants.[15]

Another reason is the upstream water withdrawals by Turkey accompanied with the changes in the regional hydrology have further reduced the surface flows inside Syria.[16] This forced Syria to exploit groundwater resources which led to substantial drop in water levels, contamination of local wells by salts and nitrates making it unfit for human consumption.[17]

Saleeby (2012) through her scholarly writings tried to connect the political unrest in Syria with the economic and environmental conditions prevalent in the country. By arguing that the region failed to alleviate the effects of drought by putting in place effective measures which has mobilized the dissent.[18]

The severity of these complex factors was further escalated by privatization of agricultural land. It has been reported that during the political unrest the water distribution system in Syria was intentionally attacked owing to their strategic value. For e.g. in 2012, the major water pipelines in the city of Aleppo were badly damaged causing shortage od water scarcity (BBC, 2013a).[19] in the same year, the Anti-Assad rebels captured the Thshin Hydroelectric dam on the Euphrates river causing shortage of energy. In another instance, in 2013

[8] Ibid.
[9] Ibid.
[10] Ibid.
[11] Digital 2024: Syria-DataReportal-Global-Digital-Insights-2024-syria#:~:text=Population%20of%20syria%20%in%202024,of%20the%20population%20is%20male.
[12] *id,* 323.
[13] The Syrian Representative, FAO, 2008.
[14] *Supra* Note 10.
[15] Ibid.
[16] *Id* 335.
[17] *Id* 336.
[18] *Supra* Note 15.
[19] Ibid.

the Anti-Assad forces captured the Tabqa/al-Thawarah dam which provided electricity o the city of Aleppo (BBC, 2013b). Such attacks highlights the importance of water supply and its impact on shortage.[20]

Such human caused scarcity has increased the magnitude and frequency of drying in comparison to natural variability (NOAA, 2013)[21] accompanied with evapotranspiration due to increase in sea surface temperatures in the eastern Mediterranean region.

This arc of crisis was stressed by regional experts in the WANA Forum in 2010. This Forum warned that if effective ad timely measures or strategies are not adopted than most of the WANA countries would encounter water scarcity issues.[22]

Studies also found that Palestines water consumption is below WHO standards of 100 lts/day. U.N World Water Development Report (2003) finds that due to overexploitation, Jordan as facing extreme water scarcity situation. Similar, situation is faced by Israel and Lebanon would soon fall in the grip.[23]

According to the Water Poverty Index a country where the average per [24]capita share of water is below 1000-2000 cubic meters /year is suffering from water shortage.

In the backdrop of several factors certain challenges specific to Syria are summarized below:

i. Imbalance in the population-water resource equation.
ii. The region's groundwater is a victim of depletion. siltation, and overexploitation.
iii. Water management policies and institutions both at national and regional levels remain underdeveloped.
iv. The effectiveness of adopted policies to cope with the multifaceted dimensions of water scarcity in the WANA region is far below the anticipated goals to achieve sustainable water development.
v. Lack of integrated water resource management principles along with limited renewable water resources, further aggravates the situation.
vi. Rain-fed areas are dependent on low and extremely variable. Rainfall occurs in the form of intense and unpredictable storms, as a result, the crusting soils are unable to absorb the moisture, which rapidly becomes lost through evaporation or runoff.
vii. Water pollution has also decreased the availability of water for human consumption.
viii. Political unrest and economic dislocation and increasing risk of climate change has posed additional risk on the water scarcity scenario.

[20] Ibid.
[21] *Id* 337.
[22] Jauad El-Kharraz et. Al. "Water Scarcity and drought in WANA countries", Seiverse ScienceDirect, Procedia Engineering 33(2012) 14-29, ISWEE 11, Elsevier, researchgate.net.
[23] Khaliq, Rania Abdel, et al., "Regional solution for Water Scarcity in West Asia and North America(WANA)", A Policy Brief based on WANA Forum Consultation, "Towards Supranational Mechanism in Addressing the Challenges of Water Scarcity in WANA", Amman, Jordan, Feb. 2011, http://www.researchgate.net/publication304422259_Regional_Solution_for_Water_Scarcity_in_West_Asia_and_North_America_WANA.
[24] Ibid.

III. Way Forward

Studies has shown that this gap in water supplies and demand would further widen by 2025 which will require an estimated supply of 237 billion cubic meters to overcome the deficit. This can be achieved through an integrated approach for water resource management.[25] Such capacity building initiative can find further impetus with enhanced cooperation and coordination amongst leading U.N and regional organizations. In view of this, the Regional Coordination Mechanism and the United Nations Development Assistant Framework should be further expanded and strengthened including other regional organizations and funding institutions, in streamlining their activities, implement joint activities and increase funding.[26]

Member-states in U.N can further create pressing demand in prioritizing water management issues and propose joint programme initiatives.

U.N. reports that even the main source of water in Syria is highly polluted due to the untreated raw sewage discharge into the Euphrates river. This has also highly contaminated the drinking water, and water for basic hygiene and sanitation.[27] Another study conducted by the U.N. in 2022 states that the water infrastructure in Syria has rapidly crumbled over the years and presently nearly 52% of the Syrian population resort to unsafe alternatives due to lack of access to piped water. In 2019, UNICEF recorded 46 attacks on water facilities across Syria leading to a 30-40% loss of technical staff in Syria's water infrastructure during the war.[28]

There is heavy reliance on the water sector for the generation of electricity. To this, the Norwegian Refugee Council stated that *"the water supply in Syria needs to match the hours of electricity supply as a survey has revealed that 73% of the households in Syria get less than 8 hours of electricity per day."* Owing to these limited operating hours the Syrian water facilities now bypass the slow process of purification and quality control, so that water can reach the consumers within the allotted time.

The National Agenda for the Future of Syria (NAFS) was initiated under the United Nations Economic and Social Commission for Western Asia and recommended strategic directions to address the country's water challenge which includes:

i. Building solar pumps
ii. Greywater recycling system-washing dishes, laundering clothes, and bathing for domestic use as well as for watering plants and trees.
iii. Harvesting rainwater.

IV. Conclusion

Water scarcity has always been in knowledge but the lack of sensitization on this issue is alarming. The WANA region owns a major proportion of the world's dry areas, due to desertification. There has been anticipation that by 2025 19 WANA countries would be under the grip of severe water poverty. Allan (2002)

[25] Ibid.
[26] Ibid.
[27] Aron Lund, "Cholera in the Time of Assad: How Syria's Water Crisis caused an Avoidable Outbreak", Century International Report, 24 Jan, 2023, https://tcf.org/content/report/cholera-in-the-time-of-assad-how-syrias-water-crisis-caused-an-avoidable-outbreak/.
[28] Ibid.

in his research study stated that the region ran out of water in the 70's and is currently surviving on virtual water resources.

Water crisis in Syria is a major issue that urgently needs to reverse the degradation of Syria's clean water resources. Implementation of modern irrigation practices and reuse of domestic waste water, can save 400-800 MCM of water till 2050.

Lastly, SDG 6.1 highlights that water should be equitably, universally, accessible and affordable for all. Therefore, investments related to water must cover wide range of utilities such as water storage, conveyance, irrigation, flood protection, urban drainage, and water resource management.