

# A Parched Reality: Delving into the Depths of Water Scarcity and its Socioeconomic Ramifications

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## Abstract:

Water scarcity presents a multifaceted challenge with profound implications for human development, especially in regions where water access is already constrained. Particularly concerning for India, given its status as the nation with the highest population at risk, water scarcity reverberates across various sectors, influencing not only the economic trajectory of nations but also significantly impacting dimensions such as health, education, empowerment, migration, geopolitics, and planetary sustainability. By comprehending the intricate nexus between water scarcity and socioeconomic development, we can strive towards implementing solutions that not only address immediate exigencies but also empower communities to transcend the cycle of deprivation and foster a more sustainable and equitable future.

**Keywords:** Water scarcity, India, socio-economic issues, Sustainable Development Goals

## Introduction

Water has been referred to as the modern-day equivalent of "liquid gold" in the 21st century (Mehta, 2014). Its importance goes beyond basic sustenance, playing a crucial role in the progress of societies globally and impacting social, economic, and ecological dimensions (NITI-Aayog, 2023; Roy & Pramanick, 2019). Given the significance, access to water has been declared as a universal human right (UNGA, 2010).

The importance of water is also highlighted in the Sustainable Development Goals (SDGs) for 2030, particularly in Goal 6, which seeks "access to water and sanitation for all" by the year 2030 (UN-Water, 2015). This focus on water accessibility is intricately connected to various other SDG Goals as well particularly the goal 1, 2, 3, 5, 12 which aim to eliminate poverty, achieve food security, ensure good health, gender equality, sustainable consumption and production (UNICEF, 2021).

The growing global population and improved living standards have heightened the demand for water, resulting in water scarcity. But one might wonder about the emphasis on access to water when over seventy percent of the Earth's surface is water-covered. However, this situation arises from the fact that only three percent of this water is available as freshwater (NOAA, 2023) and rest as ocean water. That is "if a bucket contained all the world's water, one teacup of that would be freshwater, and just one teaspoon of that

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would be available for us to use, from lakes, rivers and underwater reservoirs as groundwater” (WaterAid, 2019). Consequently, communities often contend with shortages of freshwater. Approximately 4 billion individuals, which accounts for almost two-thirds of the world's population, endure severe water scarcity for at least one month annually (Mekonnen & Hoekstra, 2016).

Water scarcity is not just an environmental issue; it's a crisis that profoundly affects human well-being, particularly in impoverished regions. In this essay, we delve into the intricate relationship between water scarcity and its socioeconomic implications, exploring how the scarcity of this essential resource exacerbates the cycle of deprivation and perpetuates socioeconomic inequalities.

### **Water Scarcity: A Global Challenge**

Water scarcity, defined as the lack of sufficient available water resources to meet the demands of water usage within a region, is a pressing global challenge. While some regions face physical water scarcity due to inadequate rainfall or geographical limitations, others experience economic scarcity due to poor infrastructure or mismanagement of water resources. Regardless of the cause, the consequences are dire, especially for the impoverished communities that bear the brunt of this crisis.

In 2019 a report by the World Resources Institute (WRI), 17 countries, accounting for roughly a quarter of the global population, were identified as facing extreme water stress (WRI, 2019). India was ranked thirteenth among these nations with extremely high-water risk. Additionally, India has the largest population facing the threat of a water crisis.

### **Water stress in India**

India, with a population of approximately 1.4 billion people, holds a significant role in achieving global goals (Roy & Pramanick, 2019; Sarkar & Bharat, 2021). However, India's per capita water availability is under threat due to population growth, with the annual average availability decreasing from 1816 to 1545 cubic meters between 2001 and 2011 (PIB, 2020). The situation is anticipated to worsen, possibly reaching 1367 cubic meters by 2031, leading to what has been described as the "worst water crisis in history" in India (Niti Aayog, 2018). On top of this, water deficit is on the rise due to climate change, with extreme weather events like recurrent droughts, and floods playing a significant role in exacerbating the situation (Goyal, 2023).

### **Socioeconomic ramifications**

Water scarcity is not just a quantitative phenomenon, which can be measure by just the presence or absence of water resources alone, rather it is a qualitative phenomenon, which is affected by various socioeconomic factors as well (Cohen & Sullivan, 2010). Even when accessibility of water and sanitation has improved recently, there exists still a problem of sustainability of these services, particularly for the poor (García-López et al., 2023).

Providing safe water not only positively impacts individual health (H. M. M. Ali, 2008; Mulenga et al., 2017) but also serves as an empowering force for those in poverty, fostering improved productivity and learning outcomes (Choudhuri & Desai, 2021; Tarrass & Benjelloun, 2012). In essence, water emerges as a linchpin in the pursuit of sustainable development, acting as a catalyst for positive change across various aspects of human life and well-being (H. M. M. Ali, 2008; Jiménez Cisneros et al., 2014; Lawrence et al., 2003; C. Sullivan et al., 2010).

### 1. Impact on Livelihoods

Water plays a crucial role in economic growth as it is essential for various sectors such as agriculture, industry, and energy production (Khanji, 2017; OECD, 2016). The ratio of jobs worldwide dependent on water is 3:4; water stress can “cost certain regions up to six percent of their GDP” in the years to come, according to the 2016 United Nations World Water Development Report, Water and Jobs, (WWAP, 2016). For impoverished communities heavily reliant on agriculture, water scarcity poses a significant threat to their livelihoods. Limited access to water for irrigation leads to decreased crop yields, food insecurity, and loss of income. Without reliable access to water, farmers struggle to cultivate their lands, perpetuating the cycle of poverty as they become increasingly dependent on external aid for survival.

As reported by (Cai, 2008) water scarcity and degradation can impact income-generating activities, particularly in agriculture-dependent economies, leading to their further impoverishment. This is particularly of interest in case of India as, structural transformation in labour market has been slow, post Covid-19, and share of agriculture in employment rose (The Wire, 2023). The loop comes full circle when poverty causes lack of access to proper water and sanitation facilities, leading to over extraction of resources catalysed by climatic changes, which results in reduced or polluted resource base hence, scarcity of freshwater resources, again hitting the poorest the hardest. The link between water scarcity and poverty underscores how the inability to access water can hinder households from seeking employment or education, perpetuating a vicious cycle where poverty and restricted water access mutually exacerbate each other (García-López et al., 2023).

### 2. Bearing on women

Water scarcity significantly affects women, particularly upon their entry into the workforce. Activities such as fetching water, often a female-dominated task, involve carrying heavy loads over long distances (Arku, 2010; ILO, 2019; Koolwal & Van De Walle, 2013). This adds to their workload and contributes to "time poverty," a result of unequal distribution of unpaid domestic responsibilities based on gender (Hyde et al., 2020). Consequently, women must juggle multiple roles, leaving them with limited free time and perpetuating gender disparities, hindering their full participation in social and economic spheres (Duflo, 2012). This situation further exacerbates poverty among women as water scarcity impedes their empowerment, limiting opportunities for education and income generation (Leahy et al., 2017; UN-Water, 2015).

### 3. Health and Sanitation Challenges

Water scarcity also exacerbates health and sanitation challenges, particularly in impoverished areas where access to clean water and sanitation facilities is already limited. Inadequate water supply increases the risk of waterborne diseases, such as cholera and diarrhoea, leading to widespread illness and even death, particularly among vulnerable populations. Research suggests that the impacts of water-related health hazards stresses fall disproportionately on marginalized groups of society (Jaren et al., 2022; Redhu & Jain, 2023) but interventions in the water sector can improve public health and safety.

Rapid urbanization, leading to proliferation of slums and illegal settlements exert tremendous pressure on the resources. The inadequate infrastructure for water supply and sanitation make the population, especially women and children, highly vulnerable to infections and diseases (Kher et al., 2015; Rana et al., 2023). Therefore, in impoverished areas and poor supply side services, water resources often get contaminated, which exacerbates water stress (Winkler, 2017). Furthermore, diminished water quality, and faecal pollution causes higher incidence of diarrhoea, which impairs the body's capacity to absorb vital nutrients leads to malnutrition (Andrés et al., 2017).

#### 4. Conflict and Migration

In regions where water resources are scarce, competition for access to water often sparks conflicts, exacerbating political instability and driving displacement and migration. These “water migrants”, unable to sustain themselves in water-stressed environments, are forced to abandon their homes in search of better livelihood prospects as well as for more hospitable conditions, further deepening the cycle of poverty and displacement.

Over 1 billion people worldwide are classified as migrants, with around 10% of the increase in global migration being attributed to water shortages. The World Bank's report (2021) on water, migration and development underscores that migration patterns are more significantly influenced by water scarcity rather than excess, highlighting the crucial role water availability plays in human mobility.

#### Catalyst to Poverty

Eminent economist Amartya Sen suggests that being poor means not having the basic abilities or opportunities that every person should have. Sen believes that poverty is not just about having a lack of money or material possessions; it's about not having access to basic necessities such as clean water and sanitation that allow people to live a dignified life (Anand & Sen, 2000). The struggle for water doesn't just end at availability but becomes real when it comes to accessibility and affordability. When the water source is unfit for use or is cut off from use of certain section of society; people have to then pay high prices to buy water from informal vendors.

Low incomes and limited access to water entails making a decision between paying for water, food, school fees or medicines (UN-Water, 2015). Research has found that inadequate access to water increases households' vulnerability to falling into poverty by affecting their economic productivity through the channel of deteriorating health (Pandey et al., 2022; Tirumala & Tiwari, 2022). Therefore, making water is a scarce commodity for lower sections of society, often leading to higher costs and rendering water relatively unaffordable for them.

#### Breaking the Cycle

Addressing water scarcity and its socioeconomic implication on the society requires a multifaceted approach that combines short-term interventions which includes the focusing on improving the accessibility of water resources with long-term sustainable solutions dealing with wastewater treatment and conservation. Investments in water infrastructure, such as reservoirs, irrigation systems, and water treatment facilities, are essential for improving water access and management. Moreover, promoting water conservation practices and implementing efficient water governance mechanisms are crucial for ensuring the equitable distribution of water resources and mitigating the impacts of scarcity.

Adequate water availability and quality are necessary for agricultural productivity, which directly impacts food security and rural livelihoods, in addition affecting manufacturing, mining, and power generation. However, insufficient supply or poor quality can lead to disruptions in production, as well as increased costs. To sustain economically viable ventures, it's essential that the availability and quality of water supply meet the user's needs consistently and predictably (UN-Water, 2015). Above and beyond when investments are made in water, agriculture have benefited rural livelihoods, food security, and poverty reduction.

Investments in irrigation have significant impact on livelihoods and poverty alleviation for the poor (Rijsberman, 2003). However, in India over-extraction of groundwater for agriculture supported by

subsidies and improvements in the supply of diesel and electricity, HYV seeds, fertilisers, etc., have resulted in dramatic increase in growth of groundwater extraction structures over the past few decades (Suhag, 2016). Therefore, for conservation and sustainable water management in overexploited regions schemes aimed at improving groundwater tables, like “*Atal Bhujal Yojana*”, can help change the picture. Such policies will aid the states in both the environmental and economic domains; however, the key lies in Seffective implementation to witness tangible impacts on the ground.

The absence of awareness and education also contributes to water scarcity by promoting inefficient usage, impeding community involvement, and fostering inadequate water management practices ((Shah, 2009). However, by improving “water literacy” wherein communities and individuals are made aware of the significance of using water efficiently. These targeted campaigns at generating awareness can help the sustainability of water resources also enhance the overall integrity of the environment.

Moving towards universal access to water and sanitation services will not only empower women by freeing up their time for income-generating activities but also contribute to disease reduction. While initiatives like the “Har Ghar Jal” under the “Jal Jeevan Mission” scheme by the government are commendable steps, it's crucial to acknowledge that approximately thirty percent of rural households still lack access to tap water. Hence, urgent and concerted efforts are needed to achieve universal accessibility to water.

The situation of water stress is certain to worsen without action since India is expected to develop and grow rapidly in the next decades, surpassing China to become the world's most populated country (UN DESA, 2023). Despite the implementation of the National Water Policy in 2002, with subsequent revisions in 2012 aimed at promoting integrated water resource management, the decentralized nature of water governance poses challenges in ensuring effective implementation. Therefore, it is imperative for states to acknowledge the impending crisis and take proactive measures not only for water conservation but also for efficient utilization across various sectors. This is essential to ensure the sustainability of dwindling water resources.

## Conclusion

Developing and effectively managing water resources is crucial for fostering growth, sustainable development, and improving the socioeconomic conditions . In most industrialized nations, early investments in water infrastructure, institutions, and management capabilities were made. However, in developing countries, there is an urgent need to prioritize investments in water infrastructure and management; as the intricate relationship between water and poverty underscores the critical importance of understanding and addressing the nexus for sustainable development efforts.

As discussed above, inadequate access to clean water perpetuates poverty by compromising health, education, and economic opportunities. Waterborne diseases disproportionately affect the poor, leading to increased healthcare expenses and lost productivity. Additionally, the time and effort spent on fetching water, particularly by women and children, detract from education and income-generating activities, perpetuating the cycle of poverty.

Furthermore, poverty exacerbates challenges in water management and access, creating a vicious cycle of deprivation and environmental degradation. Firstly, poverty perpetuates unsustainable practices in water use and management. Desperation for survival can drive individuals and communities to exploit water resources beyond their capacity, leading to depletion, and degradation. Moreover, the lack of financial resources hinders investments in infrastructure and maintenance, further exacerbating water scarcity and inefficiency.

Water scarcity is a complex challenge with far-reaching implications for human development, particularly in impoverished regions where access to water is already limited. By understanding the intricate relationship between water scarcity and socioeconomic development of societies, and implementing solutions that not only address immediate needs but also empower communities to break free from the cycle of deprivation, we can build a more sustainable and equitable future.

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