

Forum: Environmental Committee

Issue: Developing measures to forestall the global water crisis and prevent water scarcity

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Introduction



Figure 1: Dried-up marshland in northern Iraq (Getty Image)

Water, the lifeblood of our planet, sustains ecosystems, fuels economies, and is indispensable for human survival. However, the delicate balance that has maintained water availability is under threat. The global water crisis is multifaceted, extending beyond a mere shortage of resources to encompass issues regarding accessibility, quality, and sustainable development. Rapid population growth, urbanization, industrialization, and the impacts of climate change collectively exert immense pressure on global water resources. Presently, over 2 billion of the global population face water scarcity, with many regions grappling with the immediate impacts of drought, pollution, and inadequate infrastructure. Alarming statistics reveal that more than 80% of wastewater in developing

countries is discharged without treatment into surface water bodies, affecting 254,000 km² of marine ecosystems globally. The consequences of such crises reverberate across sectors, affecting agriculture, and the entire ecosystem, thereby necessitating urgent and effective measures.

Fortunately, the issue gained international recognition during the 1992 Rio Earth Summit, marking a pivotal moment when the world acknowledged the need for sustainable water development. The roots of the global water crisis can be traced back to a confluence of factors. Rapid industrialization and population burst during the 20th century strained the water supply. Aside from the exterior factors, the inadequacies of the previous development framework also contribute to the current situation. The Millennium Development Goals (MDGs), particularly Target 7C, sought to halve the proportion of people without access to safe drinking water and basic sanitation by 2015. While progress was made, significant shortcomings in the MDGs became apparent, prompting the post-2015 water-related Sustainable Development Goals (SDGs). These new pursuits, building on the lessons learned, expanded the scope to include hygiene and non-domestic settings, reflecting a broader understanding of the challenges at hand.

Over the years, various initiatives and organizations made strides in improving water access. Formed in 2001, the Sanitation and Water for All Partnership emerged as a beacon of collaboration, aiming to address the obstacles hindering global progress in the drinking water and sanitation sector. The concept of Integrated Water Resources Management (IWRM) emphasizes coordinating various water uses to align its demand and supply with overall available resources and has gained prominence. Efforts to improve water governance have been instrumental in addressing the global water crisis. Establishing an effective regulatory framework, enhancing transparency, and involving stakeholders in decision-making processes contribute to sustainable water management. With such measures and initiatives, however, substantial challenges persist, particularly in regions such as South Asia and Sub-Saharan Africa, where both water source and sanitation accessibility remain low.

Achieving universal access to basic safe water services requires substantial financial commitment. The World Bank estimates that extending such services would cost around USD 200 billion, with an additional USD 100 billion for basic sanitation. Public finance in 77% of countries is deemed insufficient to meet WASH targets. Disparities in water and sanitation services perpetuate inequalities, with 46 countries having over 50% of their population without improved sanitation, bearing the brunt of water-related diseases, further entrenching poverty. The specter of climate change compounds water challenges, leading to prolonged droughts, more frequent floods, and altered precipitation patterns. Some developing countries, still in the transition to water-decoupled development, face increased vulnerability, hampering their capacity to adapt. Past solutions focused on achieving specific targets, yet often fell short of reaching the most vulnerable groups and ensuring sustained services, demanding a paradigm shift in our approach.

Definition of Key Terms

Global Water Crisis

The critical issue surrounding water scarcity, quality, and accessibility, poses significant risks to ecosystems, human well-being, and global development.

Millennium Development Goals (MDGs)

Eight international development goals were established following the Millennium Summit of the United Nations in 2000. MDG 7 particularly focused on ensuring environmental sustainability, to halve the proportion of people without access to safe drinking water and sanitation by 2015.

Integrated Water Resources Management (IWRM)

A holistic approach to managing water resources that considers the interconnectedness of social, economic, and environmental factors.

Sustainable Development Goals (SDGs)

A set of 17 global goals was adopted by United Nations member states in 2015 as part of the 2030 Agenda for Sustainable Development. SDG 6 specifically addresses clean water and sanitation.

Water Governance

The range of political, social, economic, and administrative systems that guide water management.

WASH

The collective efforts and interventions related to safe water access, adequate sanitation, and hygiene practices for individuals and communities.

Background

The BLUE Planet

Water is life – and life on Earth is linked to water. Our existence is dependent on water, or the lack of it, in many ways, and one could say that our whole civilization is built on the use of water. The problem that mankind faces today, led by the development of settlement and agriculture, is how to get drinkable water and proper sanitation. The need for large quantities of accessible water has always been a crucial part of civilization throughout the different periods.

Early Times and Settlements

Approximately 10,000 years ago, when mankind adopted the lifestyle of relying on agriculture, people began setting up permanent settlements, fostering rapid population growth. This shift, giving rise to villages, cities, and states, fundamentally tied human civilizations to water. Guaranteeing access to pure water emerged as a prerequisite for successful urbanization and the formation of organized city-states. Groundwater, from springs and wells, played a crucial role in sustaining early agricultural societies, with the condition of water sanitation directly impacting public health and environmental risks.



Figure 2: 2000-year-old water supply system uncovered in Jerusalem (Image credit: Assaf Peretz, courtesy of the Israel Antiquities Authority)

The recognition of clean water is evidenced in the myths of ancient cultures, where religious purity and water held significance in various ancient civilizations. Ideas about the healthfulness of water reflect the scientific understanding of societies at the time.

Ancient Greece and Rome

Water quality in ancient times was assessed based on sensory attributes such as taste, smell, appearance, and temperature. Preferred qualities include cool, odorless, and colorless water, with a strong aversion to stagnant or marshy water. Despite the emphasis on obtaining pure drinking water, ancient urban centers faced significant public health challenges due to inadequate waste management. Water was a critical consideration for military purposes in the Roman Empire, and planning operations depended on the availability of water.

The indirect effects of water, such as its impact on agriculture and disease transmission, were more significant during antiquity. Various methods were employed to enhance water quality, including settling tanks, sieves, filters, and boiling. However, among the solutions, some are proven ecologically and economically unfeasible in extensive use; water supply differences among social classes in Roman towns are another major factor of health and sanitation.

Droughts and floods influenced food/water shortages, and water facilitated the movement of people, goods, and pathogens, contributing to the spread of diseases. Maintaining water systems was crucial for efficiency, with factors like calcium carbonate incrustation requiring constant removal to prevent disruptions in water flow. While aqueducts and baths in Italy were maintained into late antiquity, the Middle Ages saw a shift towards more limited water supplies and Christian water patronage, marking a transition from luxury to necessity.



Figure 3: Ancient Roman Water System-aqueducts (Peter Unger/Getty Image)

Period of steady development

Following the decline of the Roman Empire, Europe witnessed significant shifts in water supply and sewage systems. Medieval urban centers, castles, and monasteries created their wells and fountains to collect and properly store water. While some towns constructed modest latrines, these were often insufficient for the growing population, exacerbating epidemic impacts during the medieval period. The institutionalization of science in the 13th century and the industrialization from the 18th century onwards led to greater population growth and further development of water supply and proper sanitation. In the 19th century, Great Britain pioneered a modern water supply and waste disposal system, catalyzing the global sanitary movement.

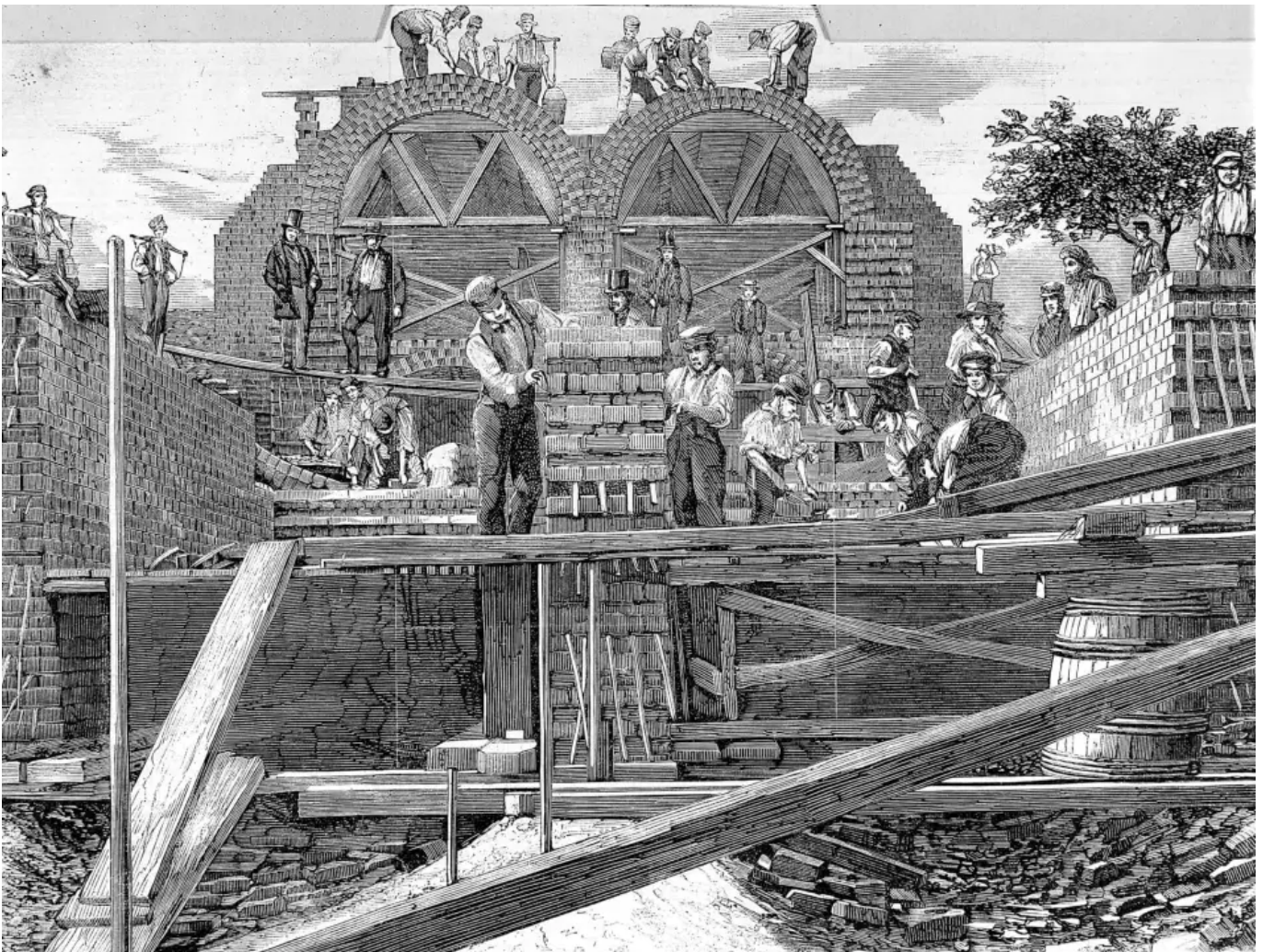


Figure 4: The construction of sewage tunnels near Old Ford in Bow, East London (Wellcome Images)

The 19th century also witnessed a shift from sensory evaluations of water quality to comprehensive chemical and microbiological examinations. Whole-town water filtering was introduced, and systematic chlorination of drinking water commenced in the early 20th century. The discovery of microbes and the implementation of efficient water treatment methods signaled an era where public health issues linked to contaminated water appeared to be relegated to history.

Urbanization Period

The 20th century witnessed an unparalleled surge in global population, quadrupling overall and experiencing a 13-fold increase in urban population (Figure 5). By the year 2000, more than half of the world's population resided in urban areas. This century-long period also marked a 40-fold rise in industrial production and a tenfold surge in energy consumption. The provision of water and sanitation services played a crucial role in steering this rapid socio-economic transformation across the globe.

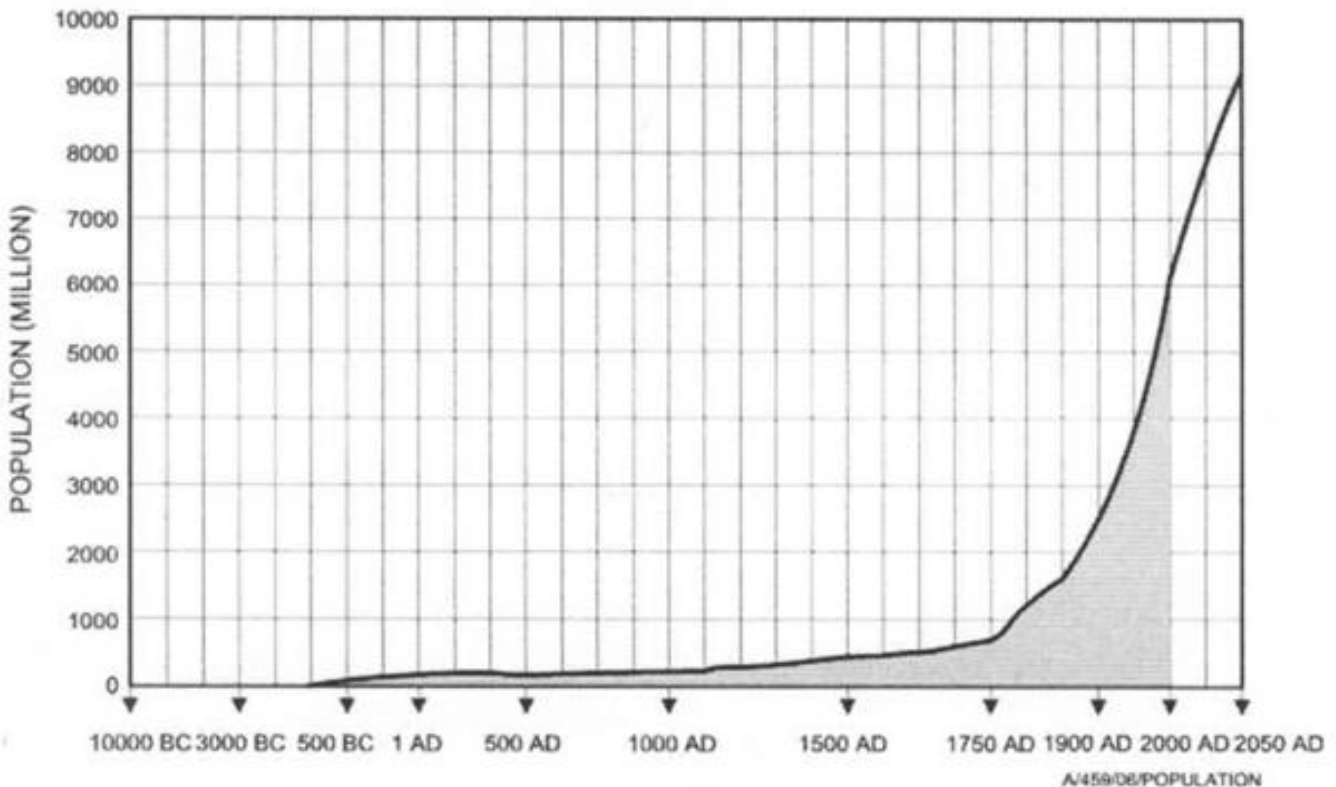


Figure 5: Estimated population growth until 2050 (Juuti et al 2006: 13)

In the early 1900s, industrialized nations seemingly resolved health issues linked to water pollution with the widespread adoption of chlorination and other water treatment methods. Microbiological concerns associated with water were primarily viewed as challenges in the developing world. However, as the 20th century progressed, biological hazards transmitted through water resurfaced, even in the post-modern Western world. The 1960s saw escalating apprehension regarding chemical and radioactive environmental threats and their potential impact on human health. Over the latter half of the century, the number of recognized biological and chemical health risks transmitted through water witnessed a manifold increase.

In the contemporary world, approximately 10,000 people succumb daily to diseases such as dysentery, cholera, and various diarrheal illnesses, stemming from inadequate access to safe water and sanitation. Unfortunately, the majority of these casualties involve children and elderly individuals, whose deaths are often

deemed "natural" or occur within marginalized segments of society (e.g., refugees, the impoverished) residing in areas less central to the global economy. Regrettably, mortality attributed to waterborne diseases is frequently considered unavoidable due to the circumstances of the affected populations.

Current Status

The declaration of the human right to water and sanitation by the United Nations General Assembly in 2010 marked a significant milestone, emphasizing access to safe, acceptable, and affordable water within specific criteria. However, the global water crisis still remains a pressing issue, with 2.2 billion people lacking access to safe drinking water services, and almost 2 billion people relying on healthcare facilities without basic water services. Moreover, over half of the global population, about 4.2 billion people, lacks proper sanitation. Tragically, 297,000 children under the age of five experience diarrheal diseases annually due to poor sanitation, hygiene, or unsafe drinking water. Adding to the challenge, 2 billion people inhabit countries facing high water stress, including floods and droughts.

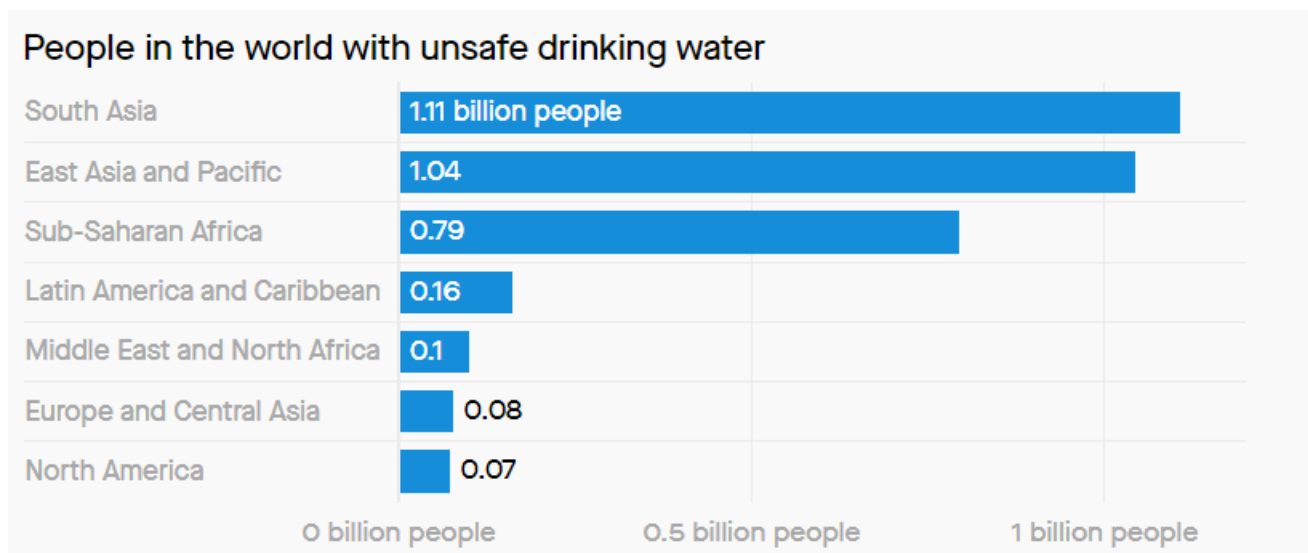


Figure 6: Unsafe Drinking Water Globally (Quartz, 2020)

Compounding the crisis, 80% of wastewater flows back into the ecosystem untreated, and around two-thirds of the world's transboundary rivers lack a cooperative management framework. Agriculture, accounting for 70% of global water withdrawal, intensifies the strain on water resources. Unclean water and poor sanitation, closely linked to childhood diarrhea, contribute to 1.5 million child deaths annually, particularly affecting children under five in developing countries. Despite these challenges, known and cost-effective solutions exist, highlighting the importance of improved sanitation. A WHO study from 2012 reveals that every US \$1 invested in improved sanitation yields an average global economic return of US \$5.5, with tangible benefits felt by poor children and disadvantaged communities. Addressing the global water crisis not only enhances public health but also aligns with broader development goals.

Importance of Proper Water Supply and Sanitation

Access to safe and reliable water is fundamental for good health. It has been estimated that a minimum of 7.5 liters of water per person per day is for basic needs, while at least 50 liters are needed for overall personal and domestic requirements. This water demand is overshadowed by agricultural and ecosystem demands. The Millennium Development Goal 7 aimed to halve the proportion of people without sustainable access to safe drinking water by 2015. The WHO/UNICEF Joint Monitoring Programme classifies drinking water supply into three categories: piped water, improved sources (public taps, protected springs, pumps), and unimproved sources (unprotected from contamination), emphasizing the significance of improved water not only for drinking but also for hygiene.

Inadequate water supply adversely affects health directly and indirectly. It hinders sanitation and hygiene, impacting public health significantly. Water-related diseases, categorized by transmission mechanisms, include **waterborne**: Enteric infections spread through fecal contamination of drinking water (*Typhoid, Campylobacter, giardiasis, Cryptosporidium, cholera, enterohemorrhagic and enterotoxigenic E. coli, norovirus, etc.*); **water-washed**: Infections that spread in communities that have insufficient water for personal hygiene (*Trachoma, scabies, Shigella*); **water-based**: Diseases where the causative organism requires part of its lifecycle to be spent in water (*Schistosomiasis, dracunculiasis*); and **vector-borne**: the insect vector requires access to water (*Malaria, onchocerciasis, trypanosomiasis*). The focus on improving the drinking water supply in low-income countries primarily centers on reducing the incidence of acute infectious diarrhea, a major contributor to disease burden, particularly in young children. However, the emphasis on acute diarrhea may underestimate the broader health impact, as chronic effects can lead to malnutrition and hinder overall child development.

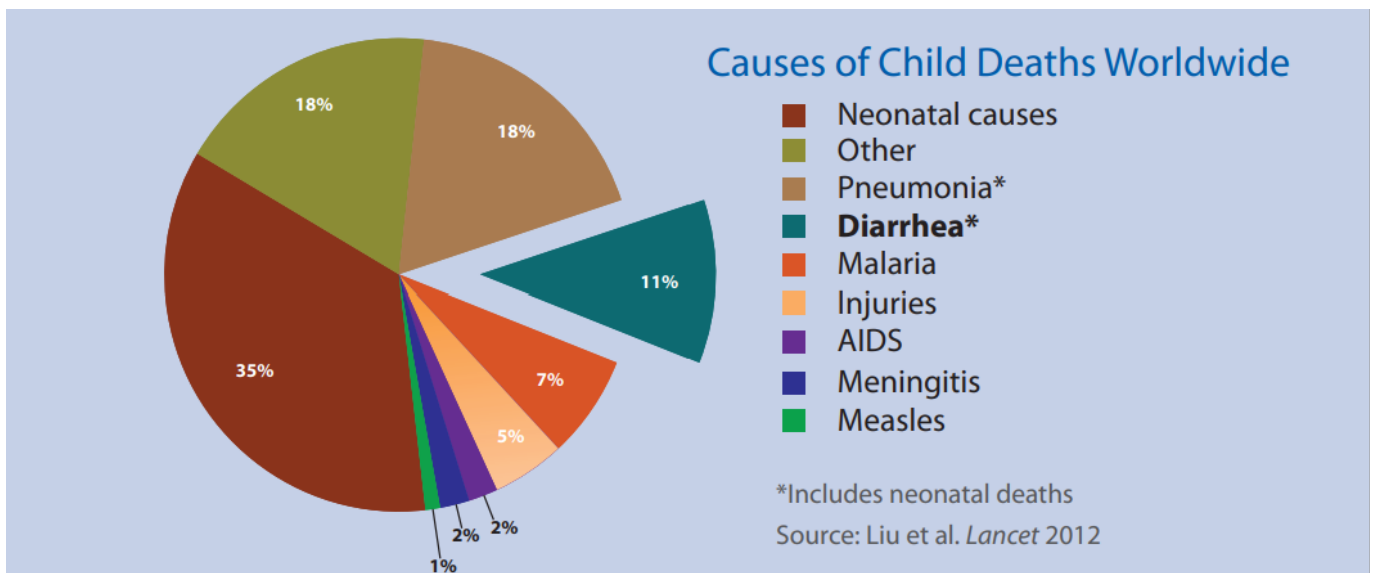


Figure 7: Causes of Child Deaths Worldwide (Liu et al. *Lancet* 2012)

Beyond diarrhoeal diseases, inadequate access to safe drinking water is associated with various nondiarrhoeal diseases caused by exposure to chemical agents. The arsenic crisis in Bangladesh serves as a dramatic example. Indirectly, water supply affects livelihoods, influencing economic returns and contributing to poverty alleviation. Investments in water harvesting and clean water provision are proposed to enhance food production and reduce

infectious disease burdens. Improved water supply is also essential for maintaining cleanliness in sanitation facilities. Economic studies suggest that investments in water supply and sanitation yield substantial returns, highlighting the interconnectedness of water access with health, livelihoods, and economic development.

Causes of Global Water Crisis



Figure 8: After fleeing the 2021 volcanic eruption in DRC, 10-year-old Alphonsine carries a water can to Sake (Esdras Tsongo/Concern Worldwide)

The global water crisis is a complex and interconnected dilemma, with various factors converging to amplify its impact. Climate change, a primary catalyst, compounds water scarcity in regions already vulnerable to environmental threats; instances such as the protracted droughts in Somalia and the escalating monsoons in Bangladesh underscore the severity of the issue. Deforestation, a significant contributor to climate change, creates “heat islands”, negatively influencing the surrounding land. Simultaneously, rising sea levels further jeopardize freshwater sources by inducing salination, making them unsuitable for consumption. Natural disasters, with 75% of all events between 2001 and 2018 are water-related, including droughts and floods, disrupting and contaminating water sources. The impacts extend beyond hindering immediate access to clean water, increasing the risks of waterborne disease such as diarrhea. War and conflicts around the globe amplify the water crisis through the destruction of infrastructures and the intentional targeting of vital water points.

Aside from insufficient water supply, the impact of wastewater is a key factor in the issue. Inadequate systems for treating wastewater lead to its reuse without proper sanitation, exposing a staggering 1.8 billion people to potential contamination by feces, chemicals, and other harmful substances. Meanwhile, water waste, stemming from seemingly minor inefficiencies like dripping faucets and overwatering lawns, collectively accounts for substantial losses. The lack of international cooperation on shared water sources, with only 24 countries reporting all internationally shared bodies of water are under cooperative management, hinders further progress in dealing with the global water crisis. Moreover, insufficient infrastructure stemming from both mismanagement and inadequate investment decreases the distribution of clean water. As the UN notes in its High-Level Panel on Water, water *“is typically capital intensive, long-lived with high sunk costs. It calls for a high initial investment followed by a very long payback period.”*

Major Challenges

Despite notable progress, substantial gaps persist in achieving universal access to safe drinking water and sanitation. Inequalities are pronounced, particularly when comparing medium-income countries to low-income regions, with Sub-Saharan Africa experiencing limited improvements. Urban-rural divides, disparities between slums and formal urban settlements, and gender-based discrepancies persist, with women and girls often bearing a disproportionate burden in accessing water resources. The water crisis extends beyond mere access concerns to encompass water quality, ecosystem preservation, and the imperative of sustainable water development. Recognizing the need for a more expansive water agenda, the post-2015 development framework addresses wastewater management, water quality, and the protection of ecosystems. Wastewater management, when integrated with sanitation and hygiene measures, emerges as a cost-effective solution with multifaceted benefits, including improvements in health, food security, production, income, and job opportunities. However, the realization of such benefits often hinges on political will, as the advantages of wastewater infrastructure may only become apparent beyond a politician's immediate term.

Effective water resources management becomes crucial in navigating the challenges posed by increasing urbanization, growing demands for water-intensive activities such as agriculture and energy production, and the impact of climate change. As the global population approaches eight billion, the demands for water for food production and energy needs are set to increase significantly. Climate change further compounds these challenges, affecting the hydrological cycle, precipitation patterns, and the overall availability of water resources. Sustainable human development necessitates the decoupling of population growth and development from increased water use, urging a departure from traditional, single-goal-focused water management approaches toward more integrated strategies that coordinate all water uses. Water risks, exacerbated by the unpredictable impacts of climate change, present an imminent threat to global water security. Even without accounting for climate change, the world is already heading towards increased water insecurity, particularly in developing countries. The implications of climate change on water resources include heightened risks of longer and more severe droughts, more frequent

floods, alterations in snow and glacier patterns, rising sea levels, and changes in river flows. Developing countries, while transitioning to a water-decoupled development path, may find their opportunities for economic growth and poverty reduction impaired by the challenges introduced by climate change. This vulnerability underscores the need for proactive measures to enhance adaptive capacity, reduce vulnerability, and foster resilience in both infrastructure and economic activities.

Major Parties Involved

Lebanon

Lebanon's water crisis, teetering on the brink of catastrophe, has deep historical roots exacerbated by recent socio-economic and geopolitical challenges. Prior to the 2019 economic crash, the mismanagement of the water sector in Lebanon set the stage for a looming disaster. The arrival of 1.5 million Syrian refugees in 2011 further strained the country's water supply and services, adding to the pre-existing challenges. Compounded by the economic crisis, which the World Bank identifies as one of the worst globally since the 1850s, Lebanon's water infrastructure is now in dire straits. The four regional establishments responsible for vital public water services are facing a perilous situation, unable to sustain their operations due to the dramatic devaluation of the local currency, as highlighted by the World Resources Institute. As of 2021, more than 71% of Lebanon's population was already grappling with critical water shortages, according to UNICEF. The situation has only worsened since, with ongoing drought in the Middle East, economic collapse, and poorly managed water systems compounding the challenges. The economic crisis has led to astronomical price increases, rendering water an increasingly scarce commodity. In just two years, the price of one gallon of bottled water skyrocketed from 1,000 Lebanese pounds in 2019 to approximately 8,000 pounds today. This economic turmoil has profound implications for public health, particularly affecting Lebanon's large refugee communities that lack reliable access to basic sanitation services, as underscored by the World Resources Institute.



Figure 9: Polluted water in the Lebanese capital, Beirut, with garbage piling up along the riverbank (Getty Images)

International aid organizations, recognizing the urgency, are actively engaged in responding to Lebanon's water crisis. Concern, present in Lebanon since 2013, works closely with the Lebanese government and municipalities to address water, sanitation, and hygiene challenges. However, the situation demands innovative and sustainable solutions, cautioning against Band-Aid measures that could impede the state's ability to provide essential water services in the long run. Enlisting municipalities as allies is proposed as a crucial strategy in tackling the crisis. The international community must continue collaborating to support comprehensive strategies, considering Lebanon's status as the third-most vulnerable country worldwide to water scarcity.

Pakistan

In 2021, the Sindh province of Pakistan experienced a significant decline in its irrigated water allocation, receiving 5.38 million acre-feet (MAF), reflecting a 35% reduction from its provincial share. This decrease, impacting crops like red chili, cotton, and rice, was attributed by the Pakistan Meteorologist Department to climate change, although it was perceived as a political maneuver. The historical roots of Pakistan's water crisis can be traced to the 1960 Indus Waters Treaty with India, where Pakistan ceded control over three eastern tributaries of the Indus River, reducing its water inflow from 117 MAF to 80 MAF. The treaty lacked considerations for water quality and regional variations, contributing to the current challenges. Currently, the agriculture sector in Pakistan consumes 97% of the country's fresh water, constituting 18% of its GDP. Inefficient agricultural practices, including flood irrigation

and poor water management, strain water resources. Compounded by issues such as saline land (13% of cultivable land) and waterlogged agricultural areas (30% of land), Pakistan faces a complex water crisis. Challenges extend to inadequate policies for mangroves, essential for preventing sea incursion, and the absence of glacier melting for the past two years. The rising frequency of storms has led to severe flooding, notably in coastal areas like Karachi and Keti Bunder, aggravating an already dire situation.

Critical to the crisis is ineffective water management, exacerbated by unequal distribution, population growth, urbanization, and limited storage capacity. Privatization in domestic water supply and irrigation management since the 1980s has favored economic and political elites, leaving poor farmers marginalized. Pakistan's storage capacity, at 10% of the average annual flow, falls well below the global average of 40%. The country, once water-abundant, has become water-stressed, with per capita availability dropping from nearly 6000 cubic meters in 1960 to 1017 cubic meters. The 2018 National Water Policy falls short in addressing crucial aspects like water-sensitive urban designs, risk management, and trade in water-intensive crops.

Syria

Syria's water crisis unfolds against a backdrop of historical challenges and recent exacerbations, creating a complex and dire situation for its population. The nation, once boasting a middle-income economy and well-developed infrastructure, has been ravaged by over a decade of brutal conflict, leading to poverty, disease, and a drastic decline in essential services. Prior to 2010, Syrians enjoyed reliable access to safe water, with 98% in cities and 92% in rural communities. However, this access has plummeted by over 40%, and only half of the water and sanitation systems currently function. The International Committee of the Red Cross attributes this dire state of affairs to both direct and indirect consequences of the prolonged conflict, which have contributed to the layered and complex triggers of the water crisis.

As of the end of 2021, northern Syria faced its worst drought in nearly 70 years, primarily driven by low water levels in the Euphrates River. The protracted conflict, coupled with climate change-related weather events, has intensified the severity of the water crisis. Water scarcity is intricately linked to both the origins of the ongoing conflict and historical conflicts in Syria. Despite these challenges, humanitarian efforts persist. In 2019, Concern initiated a multi-sectoral response funded by ECHO, which included Water, Sanitation, and Hygiene (WASH) services. Over 85,000 people were reached through initiatives such as water trucking to camps for internally displaced peoples, water station rehabilitation, and emergency assistance for camps requiring water points and latrines. Plans were also underway to rehabilitate and enhance various water stations and networks, with the goal of reaching an additional 262,000 people. The situation remains critical, emphasizing the urgent need for sustained humanitarian interventions to address the complex and layered issues contributing to Syria's water crisis.



Figure 10: Syrian girl carrying drinking water for the family (DW)

Nepal

Nepal grapples with a profound water crisis, intricately linked to its socio-economic challenges and environmental vulnerabilities. With a population exceeding 27 million and an estimated GDP per capita of US\$470, Nepal ranks among the world's poorest nations, with 42% living below the poverty line. Water pollution and scarcity pose significant hurdles, compounded by a staggering 27% having access to improved sanitation. Historically, the Department of Water Supply and Sewerage notes that while approximately 80% of the population has access to drinking water, it is often unsafe, especially for marginalized rural communities. Surface and groundwater in the Kathmandu Valley face degradation from both natural and anthropogenic sources, with domestic sewage emerging as a leading cause of pollution. The capital, Kathmandu, alone generates 150 tons of waste daily, with nearly half dumped into rivers, significantly impacting primary drinking water sources.

Rural areas, particularly in the Terai region, encounter groundwater contamination from arsenic, posing a critical health concern. Limited access to basic sanitation, with only 27% of the population covered, further exacerbates the water crisis. Inadequate water treatment facilities, particularly in urban and rural areas, contribute to a prevalence of water-borne diseases, including diarrhea, dysentery, typhoid, gastroenteritis, and cholera. Children under five are particularly vulnerable, with an estimated 44,000 succumbing to waterborne diseases annually. Despite being home to 2.7% of the earth's freshwater, Nepal faces a severe water scarcity crisis, highlighted by its inability to meet demand in rapidly urbanizing regions like Kathmandu. Infrastructural setbacks, exacerbated by the 2015 earthquake, have further strained water resources, making access to safe and adequate drinking water a critical

challenge for the nation. Addressing this crisis necessitates heightened awareness, education on sanitation, and widespread implementation of domestic and industrial wastewater treatment solutions to ensure healthier lives for Nepal's citizens.

Iraq

The water crisis in Iraq has deep historical roots, with the country traditionally relying on the Tigris and Euphrates rivers, as well as ancient aqueducts known as "karez," to sustain its population for thousands of years. However, the onset of the crisis is largely attributed to human conflicts, particularly the First Gulf War in 1991 and the subsequent UN sanctions imposed on Iraq. The deliberate targeting of water treatment plants during the war, coupled with the sanctions preventing the importation of crucial equipment, led to a severe deterioration of Iraq's advanced water infrastructure. Shockingly, almost 60% of Iraqi children lack access to safely managed water services, and fewer than half of the country's schools have basic water access, posing serious risks to health, nutrition, cognitive development, and future livelihoods. The Middle East and North Africa (MENA) region, including Iraq, are reported as the most water-scarce areas globally, with approximately 66 million people in the region lacking basic sanitation.

Key drivers behind water scarcity in Iraq and the broader region include rising agricultural demand and the expansion of irrigated land using aquifers. In Iraq, more than 80% of water use is attributed to agriculture, exceeding the global average of 70%. The alarming level of water scarcity in Iraq is exacerbated by climate change, which results in reduced rainfall for agriculture and the deterioration of freshwater reserves. The backflow of saline water from the Arabian Gulf into freshwater aquifers and increased pollution concentrations further deteriorate water quality. The impact of these factors is exemplified by the 2020-2021 rainfall season in Iraq, ranking as the second driest in the last 40 years. This resulted in a significant reduction in water flow in the Tigris and Euphrates rivers by 29% and 73%, respectively. UNICEF Representative in Iraq, Sheema SenGupta, emphasizes the alarming level of water scarcity, stating that children cannot develop and thrive without water. Urgent action is called for, addressing climate change and ensuring access to safe water for every child to safeguard their well-being and future prospects. The combined threats of rising food demand, urbanization, poor water management, and climate change pose a significant risk to children, particularly those who are vulnerable and marginalized.

Qatar

Qatar, situated on the Arabian Peninsula, has undergone a remarkable transformation in its water resilience over the past two decades. Historically, the country heavily relied on groundwater aquifers for its freshwater needs. However, the depletion of these aquifers, exacerbated by a low number of storms in the region, posed significant water security challenges in the second half of the 20th century. To address this, Qatar shifted its focus to desalination plants, which now supply an astounding 99% of the country's water. This transition led to a population shift from transient to permanent settlements, particularly in the capital city of Doha, contributing to increased water consumption challenges.

Despite the success of desalination in meeting water demands, Qatar faces significant water security challenges in the domestic and industrial sectors. Rapid population growth and economic development have doubled domestic water consumption between 2010 and 2020, reaching over 450 liters per person per day, one of the highest rates globally. The industrial sector's massive water consumption and the overuse of groundwater for irrigation further strain water resources. Additionally, the country's reliance on desalination is not without drawbacks, as the process is energy-intensive and environmentally questionable.

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The United Nations

The United Nations has been at the forefront of addressing the global water crisis through a series of significant conferences and initiatives. The United Nations Water Conference in 1977 marked an early acknowledgment of the challenges posed by insufficient water supply to meet basic human needs and the increasing demands on global water resources. Subsequently, the International Drinking Water Supply and Sanitation Decade (1981-1990) and the International Conference on Water and the Environment in 1992 continued to focus on this critical resource.

The Earth Summit in 1992 played a pivotal role in highlighting water-related issues on the international agenda. This summit addressed environmental concerns, including water management, emphasizing the need for sustainable approaches. The 'Water for Life' International Decade for Action from 2005 to 2015 made substantial strides, benefiting approximately 1.3 billion people in developing countries by improving access to safe drinking water and advancing sanitation, aligning with the Millennium Development Goals.

Notable recent milestones include the 2030 Agenda for Sustainable Development, which includes Sustainable Development Goal (SDG) 6: "Ensure availability and sustainable management of water and sanitation for all." This goal encompasses various targets covering all aspects of the water cycle and sanitation systems, recognizing the interconnected nature

of water issues and their impact on health, education, economics, and the environment.



Figure 11: United Nations Sustainable Development Goal 6

Previous Attempts to Resolve the Issue

The United Nations General Assembly's recognition in July 2010 of the human right to water and sanitation stands out as a crucial advancement. This recognition establishes the right of every individual to access a sufficient quantity of safe, acceptable, and affordable water, with specific criteria ensuring proximity to water sources and reasonable collection times. Additionally, agreements such as the 2015-2030 Sendai Framework for Disaster Risk Reduction, the 2015 Addis Ababa Action Agenda on Financing for Development, and the 2015 Paris Agreement on Climate Change further underscore the comprehensive global commitment to addressing the challenges posed by the water crisis. The UN's continuous efforts and multifaceted approach reflect the organization's commitment to finding sustainable solutions to ensure water security worldwide.

The United Nations has been actively addressing the global water crisis through a series of pivotal conferences and initiatives. In December 2016, the UN General Assembly unanimously adopted a resolution, establishing the "International Decade (2018–2028) for Action – Water for Sustainable Development." Recognizing water's critical role in sustainable development, poverty eradication, and hunger elimination, member states expressed deep concern about issues such as the lack of access to safe drinking water, sanitation, and hygiene, exacerbated by urbanization, population growth, and climate change.

The International Decade focuses on sustainable development and integrated water resource management to achieve social, economic, and environmental objectives. It aims to implement and promote related programs, projects, and cooperation at all levels, aligning with internationally agreed water-related goals in the 2030 Agenda for Sustainable Development. Commencing on World Water Day in 2018, the Decade strives to

address the escalating water crisis, emphasizing equitable water access for all. The World Economic Forum consistently ranks the water crisis among the top global risks.

In the context of these efforts, the UN 2023 Water Conference, held in New York from March 22 to 24, 2023, marked a significant milestone. Co-hosted by Tajikistan and the Netherlands, the conference gathered diverse participants, including governments, businesses, civil society, and scientists. The conference aimed to accelerate action on the water crisis, focusing on achieving Sustainable Development Goal 6 – Clean Water and Sanitation. The outcome featured groundbreaking commitments from governments, businesses, and civil society, amounting to billions of dollars to advance the global water agenda.

UN Secretary-General António Guterres emphasized key game-changers, including reinforcing water as a fundamental human right, reducing pressures on hydrological systems, developing alternative food systems, and implementing a global water information system by 2030. He urged the integration of approaches on water, ecosystems, and climate to mitigate greenhouse gas emissions and enhance community resilience. The conference marked a watershed moment, with over 700 commitments outlined in the Water Action Agenda to transition from a global water crisis to a water-secure world. The commitments address urgent financing needs, innovative funding schemes, and transformative actions to secure a sustainable future for all. The outcomes of the conference will have concrete follow-up in upcoming UN Summits, underscoring the global commitment to resolving the water crisis and achieving sustainable development goals.

Possible Solutions

Addressing the global water crisis demands a comprehensive and collaborative approach that spans education, innovation, and policy reform. A crucial aspect involves increasing financial investments, as highlighted by the United Nations' efforts in conferences like the 'Water for Sustainable Development' Decade (2018–2028). The UN, through its 2030 Agenda for Sustainable Development and Sustainable Development Goal (SDG) 6, emphasizes the importance of ensuring the availability and sustainable management of water and sanitation for all. Key milestones, such as the 2023 UN Water Conference, underscore the urgency to scale up action, with governments, businesses, and civil society committing billions of dollars to advance the water agenda.

Financial mobilization can be expedited by showcasing the benefits of water development upfront, as evidenced by the Water Action Agenda resulting from the 2023 UN Water Conference. This agenda, capturing over 700 commitments, aims to transform the global water crisis into a water-secure world. Implementing transformative actions requires not only increased funding but also improved efficiency in resource utilization. The World Economic Forum's recognition of the water crisis among the top global risks for consecutive years emphasizes the need for innovative financing mechanisms and enhanced cooperation.

Moreover, technology, science, and innovation play a pivotal role in overcoming the water crisis. Goal 17 of the post-2015 agenda emphasizes international cooperation in technology access, environmentally sound technology transfer, and innovation capacity-building. Leveraging low-cost, locally adapted technologies and incorporating mobile-to-web platforms can significantly enhance water access and sustainability. The integration of

innovative technologies, including those piloted in countries like Nigeria, should be guided by local knowledge and capacities.

Education is a key driver for changing consumption patterns and fostering water-conscious behaviors. Efforts to overhaul consumption must be global and inclusive, with regions facing freshwater crises, like India, Australia, and the U.S. Southwest, leading the way. Beyond consumption changes, improving irrigation practices, recycling wastewater, and appropriately pricing water are essential strategies. Infrastructure improvement, community-based governance, and effective policies are vital components of a holistic water management strategy. Internationally, cooperation through binding agreements and frameworks is challenging but necessary. Regional accords like the Great Lakes Compact in the U.S. and the Nile River basin agreement in Africa demonstrate the potential for comprehensive global strategies. Addressing pollution and ensuring equitable access to water, as emphasized by the United Nations' Millennium Development Goals, are paramount for sustainable water management.

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