Medical Research, Nursing, Health and Midwife Participation
https://medalionjournal.com| E-ISSN: 2986-7754

SCARCITY OF WATER IN THE TWENTY-FIRST CENTURY: PROBLEMS AND POTENTIAL REMEDIES

Faisal Abass Padder, [1]Research Scholar Department of Earth Sciences, Annamalai University.
Email: faisalabas049@gmail.com
Asif Bashir, [2] Research Scholar Department of Earth Sciences University of Kashmir.
Email: geoasif01@gmail.com

ABSTRACT

Scantiness of water is a pressing global riddle that pertains to the inadequate availability of enough safe and clean water resources to fulfil human and ecological requirements. It emerges as a result of various factors such as population growth, climate change, pollution, ineffective water management, and unsustainable water usage practices. This summary offers an overview of the issue and highlights possible remedies. These solutions encompass actions like conserving water, collecting rainwater, improving irrigation methods, treating and reusing wastewater, employing desalination techniques, investing in water infrastructure, managing groundwater resources, establishing fair water pricing and governance, fostering public awareness and education, and fostering international cooperation. By implementing these strategies, we can address water scarcity and advance sustainable water management for the benefit of present and future generations.

Keywords: Scantiness, collecting rainwater, inadequate availability, collecting rainwater

INTRODUCTION

For millennia, water has been abundant and freely available, supporting human development. However, the world is undergoing a rapid transformation, leading to a critical problem of water scarcity that poses a significant threat to food security, human health, and natural ecosystems. This issue is particularly acute in arid regions. Recent research conducted by IWMI (Seckler et al., 1998) indicates that approximately 1.4 billion people, constituting 25 percent of the global population or 33 percent of the population in developing nations, currently reside in areas expected to face severe water scarcity in the first decade of the twenty-first century. By 2025, over one billion people living in dry regions will experience a complete lack of water supply. Even with highly efficient irrigation practices, these regions will not have sufficient water resources to meet the basic water needs for households, industries, and the environment, let alone sustain the levels of per capita food production achieved through irrigated agriculture in 1990. Projections suggest that around 1.8 billion people worldwide will face moderate water stress by 2050, with 80 percent of them residing in developing countries (Adaawen, 2021). Consequently, people in these areas will be required to reduce their overall water consumption and divert it away from agriculture, resulting in decreased local food production and increased reliance on food imports. Additionally, approximately 348 million individuals will face severe economic water scarcity, meaning that although potential water resources exist to meet their reasonable water needs by 2025, massive and costly water development projects, with potential environmental consequences, will be necessary to achieve this objective.

This paper provides a concise overview and analysis of the aforementioned estimates, while also examining the research and information requirements essential for the efficient

and productive management of water resources in the twenty-first century. Given that water resource initiatives typically demand at least two decades to come to fruition, it is crucial to anticipate issues and take proactive measures well in advance to prevent them from escalating into crisis situations (Calder, I. R., 2005). Although water encompasses 70 percent of our planet's surface, it is easy to assume that it will always be abundant. However, freshwater, which is the type of water we rely on for drinking, bathing, and irrigating our crops, is remarkably scarce. Merely 3 percent of the world's water is freshwater, and two-thirds of that is inaccessible as it is trapped in frozen glaciers or otherwise unavailable for our use (Malik, S et al, 2018). The two primary consequences of this scarcity are the disappearance of wetlands and the degradation of ecosystems.

DISAPPEARING WETLANDS

Since 1900, roughly 50 percent of the Earth's wetlands have been lost. These ecosystems, which are highly productive, harbor a diverse array of animals such as mammals, birds, fish, and invertebrates. Wetlands serve as crucial breeding grounds for many of these species. Additionally, they play a vital role in facilitating the cultivation of rice, a staple food for half of the global population. Furthermore, wetlands provide various ecosystem services that are beneficial to humanity, including water purification, protection against storms, flood mitigation, and opportunities for recreation.

DAMAGED ECOSYSTEMS

In situations of water scarcity, natural environments frequently suffer significant consequences. A striking example is the Aral Sea located in central Asia, which used to be the fourth largest freshwater lake globally. However, within a mere three decades, the sea has shrunk to the extent that it has lost an area equivalent to the size of Lake Michigan. The Aral Sea has become as saline as an ocean due to extensive pollution and the diversion of water for irrigation and power generation. As the sea receded, it left behind contaminated land. This ecological disaster has led to food shortages, increased infant mortality rates, and a decrease in life expectancy among the nearby population.

STRATEGIES TO COMBAT WATER SCARCITY

Water scarcity is a major global concern that impacts millions of individuals in diverse regions worldwide. As a result, addressing water scarcity has become increasingly urgent. Furthermore, water scarcity has emerged as a significant impediment to economic progress, leading to intense competition among different sectors reliant on limited water resources (Pérez et al., 2020).

There are ways to save water and prevent water scarcity by the following points viz

DEVELOPING WATER FILTRATION SYSTEMS

Having access to water is one matter, while having access to potable water is another. Reliable water filtration systems play a crucial role in guaranteeing the safety of freshwater. This is why companies globally are dedicated to creating advanced water filtration systems that effectively eliminate bacteria, microbes, and other impurities, thus providing purified water. The objective is to make this clean drinking water accessible in numerous settings, including schools, hospitals, workplaces, and households.

PROTECTING WETLANDS

The loss of wetlands is occurring rapidly, posing a concerning situation. However, the conservation of wetlands can yield significant benefits. Presently, the Ramsar Convention, a treaty dedicated to wetland conservation, has been instrumental in safeguarding over 2,000 wetland areas. Nonetheless, more proactive conservation measures are necessary if we desire wetlands to play a substantial role in our endeavours to mitigate water scarcity.

IMPROVING IRRIGATION EFFICIENCY

Industrial agriculture stands out as a prominent factor depleting water resources. A straightforward solution to mitigate this issue is transitioning from flood irrigation methods to sprinklers or drip irrigation systems. Such a switch has the potential to result in substantial water savings within the agricultural sector. Additionally, when coupled with effective soil practices like limited tillage or no-till approaches and the use of mulching to minimize soil evaporation, the adoption of more efficient irrigation systems can significantly decrease water consumption.

Water scarcity is a pressing global issue that requires a combination of short-term and long-term solutions. Some potential solutions to address water scarcity are:

WATER CONSERVATION:

Encouraging and implementing water conservation practices can significantly reduce water consumption. This can include promoting efficient irrigation techniques, fixing leaky pipes and faucets, using water-saving appliances, and raising awareness about responsible water usage.

RAINWATER HARVESTING:

Capturing and storing rainwater can be an effective way to supplement water supply. Rainwater can be collected from rooftops and channelled into storage tanks for later use in non-potable applications like irrigation, toilet flushing, and industrial processes. Improved Irrigation Practices: Implementing efficient irrigation methods such as drip irrigation, precision sprinklers, and moisture sensors can minimize water wastage in agriculture. It is also essential to promote crop rotation and crop varieties that require less water.

WASTEWATER TREATMENT AND REUSE:

Developing and investing in wastewater treatment infrastructure enables the safe treatment of domestic and industrial wastewater for reuse in various applications such as agriculture, landscaping, and industrial processes.

DESALINATION:

Desalination involves the removal of salt and other impurities from seawater or brackish water to produce freshwater. Advancements in desalination technologies, such as reverse osmosis and multi-stage flash distillation, have made it a viable option for increasing water supply in coastal regions.

WATER INFRASTRUCTURE INVESTMENTS:

Developing and upgrading water infrastructure, including dams, reservoirs, and pipelines, can help with water storage, transportation, and distribution. These investments can enhance water availability and reduce losses due to leakages.

GROUNDWATER MANAGEMENT:

Implementing sustainable groundwater management practices is crucial to prevent overexploitation of aquifers. This includes monitoring and regulating groundwater extraction, promoting recharge methods, and raising awareness about the importance of preserving groundwater resources.

WATER PRICING AND GOVERNANCE:

Implementing appropriate pricing mechanisms can incentivize water conservation and efficient use. Additionally, effective governance and policies that prioritize sustainable water management are essential to ensure equitable access, enforcement of regulations, and long-term planning.

PUBLIC AWARENESS AND EDUCATION:

Educating communities about the value of water, the importance of conservation, and individual responsibility can lead to behavioural changes that reduce water consumption and wastage.

INTERNATIONAL COOPERATION:

Water scarcity is a global challenge that requires international collaboration. Sharing best practices, technology transfer, and joint efforts in managing transboundary water resources can help alleviate water scarcity in regions facing severe water stress.

CONCLUSION

In conclusion, the scarcity of water in the twenty-first century is a critical global issue that poses significant problems and challenges. The growing demand for water, coupled with factors such as population growth, urbanization, climate change, and pollution, has resulted in limited water availability. This scarcity of water has far-reaching implications for ecosystems, human well-being, and sustainable development.

One of the key problems associated with water scarcity is the impact on ecosystems. Aquatic habitats are being degraded, biodiversity is being lost, and the delicate ecological balance is being disrupted.

To address these problems, potential remedies and solutions have been identified. These measures involve promoting the efficient use of water in households, industries, and agriculture. Specifically, households can reduce their water consumption by fixing leaks and using low-flush toilets. Water-efficient technologies, such as low-flow showerheads and faucets, can also be installed to conserve water. Industries can reduce their water usage by recycling and reusing water in production processes. In agriculture, adopting precision irrigation methods, such as drip irrigation instead of flood irrigation, can also significantly reduce water consumption. Another effective solution to the problem of water scarcity is the treatment and reuse of wastewater. These also integrated water resource management, stakeholder participation, and effective policies that prioritize sustainable water use and allocation. Additionally, embracing innovative technologies and practices such as water-efficient irrigation, rainwater harvesting, wastewater treatment and reuse, and desalination can enhance water availability and reduce stress on existing water sources. . It is also important that stakeholders and decision makers at industrial, government and international policy levels come up with stringent and workable means of cutting down on water pollution, which has produced devastating impacts especially among poorer nations. Further, there should be increased funding of adaptation and coping programs and projects in affected areas to minimize the impacts on water bodies.

Collaboration and cooperation among governments, organizations, and communities are crucial in tackling water scarcity effectively. International partnerships, knowledge sharing, and policy interventions are essential for implementing sustainable water management strategies, promoting equitable access to water resources, and mitigating the adverse impacts of water scarcity.

REFERENCES

- Adaawen, S.. (2021, May 3). Understanding Climate Change and Drought Perceptions, Impact and Responses in the Rural Savannah, West Africa. Atmosphere, 12(5), 594. https://doi.org/10.3390/atmos12050594
- Biswas, A. K., & Tortajada, C. (Eds.). (2018). "Water Scarcity in the Mediterranean: Perspectives Under Global Change." Springer.
- Calder, I. R. (2005). Blue revolution: Integrated land and water resource management. Routledge.
- Chartres, C., & Varma, S. (2010). Out of water: from abundance to scarcity and how to solve the world's water problems. FT Press.
- Falkenmark, M., & Rockström, J. (2004). "Balancing Water for Humans and Nature: The New Approach in Ecohydrology." Earthscan.
- Gleick, P. H. (2019). "Water Scarcity." Annual Review of Environment and Resources, 44, 275-299.
- Gray, N. F. (2014). "Water scarcity: impacts on western agriculture." CRC Press.
- Hoekstra, A. Y., & Mekonnen, M. M. (2012). "The water footprint of humanity." Proceedings of the National Academy of Sciences, 109(9), 3232-3237.
- International Water Management Institute (IWMI). (2019). "Water scarcity atlas." Retrieved from https://www.iwmi.cgiar.org/water-scarcity/atlas/
- Malik, S., Bano, H., Rather, R. A., & Ahmad, S. (2018). Cloud seeding; its prospects and concerns in the modern world-A review. Int. J. Pure App. Biosci, 6(5), 791-796.
- Mir, I. A., & Dar, S. A. (2019, December). MANAGEMENT OF WASTE FROM HEALTH CARE FACILITIES. In *International Conference on Health Science, Green Economics, Educational Review and Technology* (pp. 126-132).
- Pérez, D. M. G., Martín, J. M., Martínez, J. M. G., & Sáez-Fernández, F. J.. (2020, July 15). An Analysis of the Cost of Water Supply Linked to the Tourism Industry. An Application to the Case of the Island of Ibiza in Spain. https://doi.org/10.3390/w12072006
- Savenije, H. H. G., & Van der Zaag, P. (2018). "Water scarcity in the twenty-first century." Water Resources Management, 32(9), 2973-2976.
- Seckler, D., Barker, R., & Amerasinghe, U. (1999). Water scarcity in the twenty-first century. International Journal of Water Resources Development, 15(1-2), 29-42. 11
- Shah, T., & van Koppen, B. (2006). "Groundwater and human development: challenges and opportunities in livelihoods and environment." Water Science and Technology Library, Springer.
- United Nations. (2018). "World Water Development Report 2018: Nature-based Solutions for Water." United Nations World Water Assessment Programme.