



Sustainable Water Management: Global and Regional Challenges and Opportunities

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ABSTRACT

Across the globe, people are facing droughts, extreme weather events, water quality issues, contaminants of emerging concern, and lack of access to clean water. Global and regional water challenges stem from a dynamic combination of climate change, anthropogenic activities, population growth, and unsustainable water use. The three main challenges involved with addressing water issues are related to geographic location, water resources, and agriculture. Geographically different regions across the world are struggling with two vastly different sides of a spectrum: an excess of water and an absence water. Climate change has contributed to some regions experiencing severe droughts and water scarcity, while other regions are hit with devastating floods resulting from increased rainfall and frequent extreme weather events. Freshwater resources are distributed unequally across the globe, and this can lead to physical water scarcity and economic water scarcity issues depending on the location. Freshwater resources, both surface and groundwater, are threatened by pollution including nutrients, sediments, biological substances, contaminants of emerging concern, and other toxic compounds. Agriculture is a major challenge because about 70% of global water use is for agricultural activities. The challenge with water use in the agricultural sector does not come from the amount of water needed to grow crops, but it comes from the inefficiency of irrigation systems and excess water use. This inefficient water use contributes to water scarcity and runoff containing nutrient and sediment pollution. This presentation aims to analyze the water challenges in regions across the world and highlight opportunities for sustainable water use to ensure widespread access to water resources in the future. Due to the heterogeneity of conditions across the world, it is necessary to develop a synergistic plan with collaboration across borders to address water challenges. Collaborative management and utilization of surface water, groundwater, and non-traditional water sources have the potential to progress sustainable water use past previous independent efforts to solve localized water issues. This presentation also includes a discussion on the opportunities for utilization of groundwater and non-traditional water sources. With about 99% of all Earth's freshwater being groundwater, The United Nations World Water Development Report 2022 highlights the need for sustainable management and utilization of groundwater sources [1]. This largely untapped resource could provide a water source in areas that have struggled with consistent access to water. Additionally, non-traditional water sources like brackish, sea, unconventional produced, conventional produced, municipal, agricultural, power, industrial, and mining water make up a large volume of water across the world. Treatment and reuse of these non-traditional water sources can supplement traditional water sources and reduce the environmental impact of streams that are typically considered waste products. Ultimately, research, action, management, and investment in sustainable use of water is critical for addressing current water scarcity and ensuring future access to water.

REFERENCES

[1] United Nations, The United Nations World Water Development Report 2022: Groundwater: Making the invisible visible. UNESCO, Paris.