A Review on the Agricultural Issues Related to Water Resources

Mahesh Singh, Department Of Agriculture
Galgotias University, Yamuna Expressway Greater Noida, Uttar Pradesh
E-mail id - mahesh.singh@galgotiasuiversity.edu.in

***ABSTRACT:**Water is important for maintaining an adequate level of water, Provision of food and a productive atmosphere for the human population and globally for other animals, plants, and microbes. Global freshwater demand has been growing increasingly as human populations and economies expand. Biodiversity and the availability of water for food production and other critical human needs are threatened by the growing demands imposed on the global supply of water. In several countries, water shortages still occur, with more than one billion people lacking adequate drinking water. Moreover, 90 percent of infectious diseases are spread from contaminated water in developed countries. Agriculture absorbs about 70 percent of fresh water worldwide; for example, 1 kilogram (kg) of cereal grain requires about 1000 liters (L) of water and 1 kg of beef requires 43,000 L of water.Instead of major construction projects, new water sources are likely to result from conservation, recycling, and enhanced water-use efficiency.*

***KEYWORDS:**Agriculture, Environmental policy,Water resources, Cultivation, Planet Earth.*

INTRODUCTION

Water is important for maintaining an adequate level of water, Provision of food and a productive atmosphere for the human population and globally for other animals, plants, and microbes. Global freshwater demand has been growing increasingly as human populations and economies expand [1]. Water shortages greatly reduce biodiversity in both marine and terrestrial environments, in addition to threatening the availability of human food. Ecosystems, whereas the contamination of water promotes the spreading severe human diseases and decreasing the quality of water.

The vast majority of nutrients are obtained by humans from crops and livestock, and these sources of nutrients require water, land and energy for processing (Pimentel et al. 2004). Over the past 20 years, food stocks (cereal grains) per capita have dropped by 17 percent, partially due to a rise in the human population.Fresh water and cropland shortages and overlapping shortages(1961–2002 FAO). Food supply shortages have partially led to the global issue of over 3 billion malnourished people worldwide[2].Iron deficiency affects 2 billion people and protein or calorie deficiency affects almost 800 million people, two of the most severe malnutrition issues. Iron and protein or calorie deficiency deficiencies each result in around 8 million deaths each year (WHO 2002).At present, the world population is 6.3 billion, with more than a quarter of a million people added each day (PRB 2003). The United Nations (UN 2001) predicts that by 2050, the world population will grow to about 9.4 billion people. In addition to growing water usage, population growth would not only severely reduce the supply of water per human, but also create stress on biodiversity in the entire global ecosystem [3]. Rainfall, temperature, evaporation rates, soil quality, form of vegetation, and water runoff are other major factors that restrict the availability of water.In addition, there are also significant difficulties in allocating the world's freshwater resources equally between countries and within them. These tensions between the modern manufacturing, agricultural, and urban sectors are escalating. In this paper, we discuss the use of water by individuals and, in particular, by agricultural systems, reporting the interrelationships between population growth, water use and distribution, biodiversity status, the natural environment, and the effects of human waterborne diseases [4].

Hydrological Cycle:

More than 97 percent of the total 1.4 x 1018 cubic meters (m3) of water on Earth is in the oceans [7]. Fresh water is approximately 35 x 1015 m3 of Earth's water, of which about 0.3 percent is kept in rivers, lakes, and reservoirs. In ice, permanent snow, and the rest of the fresh water is processed aquifers for groundwater. The atmosphere of the Planet comprises about 13 x 1012m3 of water which is the cause of all the rain falling on Earth. Approximately 151,000 quads (159,300 exajoules) of solar energy annually cause evaporation that moves about 577 x 1012 m3 of water into the atmosphere from the earth's surface.86 percent of this evaporation comes from the seas. While only 14% of water evaporation comes from land, about 20% of the world's precipitation occurs on land (115 ?? 1012 m3 per year), with the surplus water returning via rivers to the oceans[4]. Thus, a large portion of water from the oceans to land areas is transferred each year by solar energy. This aspect of the hydrological cycle is important not only for farming, but also for human life and natural ecosystems [5].

Water Availability:

While water is considered a renewable resource since it is replenished by rainfall, in terms of the amount available per unit of time in any one area, its supply is finite. On most continents, the average precipitation is approximately 700 millimeters (mm) per year (7 million liters [L] per hectare [ha] per year), although this varies across continents and within them. Water is usually considered scarce in a nation when its supply falls below 1 million L per capita per year. Despite its average rainfall of 640 mm per year, Africa is still relatively arid because its high temperatures and winds encourage rapid evaporation (Pimentel et al. 2004). Regions that receive low rainfall (less than 500 mm per year) experience extreme water shortages and insufficient crop yields. Nine of the 14 countries in the Middle East (including Egypt, Jordan, Saudi Arabia, Israel, Syria, Iraq and Iran) have inadequate fresh water, for instance[6].The overall agricultural, social, and environmental structure must be addressed when managing water resources. Major withdrawals from streams, rivers, groundwater, and reservoirs in the United States that are used to meet the needs of people, towns, farms, and industries have already stressed the availability of water in some parts of the world[9]. To ensure a fair distribution of water, legislation is often required. Legislation, for example, specifies the amount of water that must be left in New Mexico's Pecos River to ensure adequate water flow to Texas.

Water Use and Consumption:

In diverse human activities, water from various resources is withdrawn both for use and for consumption. The word use extends to all human activities for which some of the removed water is returned for reuse (e.g., cooking water, wash water, and wastewater). Consumption, by comparison, means that the water removed is non-recoverable. For example, water evapotranspiration is released into the atmosphere from plants and is considered non-recoverable.The water content of living organisms varies from 60 to 95 percent; humans are around 60 percent water. Human beings can consume 1.5 to 2.5 L of water per person per day in order to preserve health. In addition to drinking water, about 400 L per person per day is used by Americans for cooking, washing, waste disposal, and other personal uses. On the other hand, 83 other countries record an average of less than 100 L per person per day for personal use of water[7].Current freshwater withdrawals from the United States, including those for irrigation, exceed approximately 1600 billion L a day, or around 5500 L a day per person. Of this number, about 80% comes from surface water and 20% is withdrawn from groundwater supplies. The average withdrawal worldwide for all purposes is 1970 L per person per day. Around 70 percent of the world's removed water is consumed and non-recoverable.

Agriculture and Water:

For photosynthesis, development, and reproduction, plants demand water. The water used by plants is non-recoverable, since some water becomes part of the plant's chemical composition and the rest is released into the atmosphere. The Carbon dioxide fixation and temperature regulation processes involve the transpiration of vast quantities of water by plants. Different crops use water at the rate of 300 to 2000 litres per kilogram (kg) of dry matter produced by the crops [8]. The average global transfer of water by vegetation into the atmosphere. It is estimated that transpiration from terrestrial ecosystems is around 64% of all rainfall on Earth.The minimum soil moisture required for the growth of crops. It fluctuates. US potatoes, for instance, require soil moisture levels of 25 to 50 percent; alfalfa, 30 to 50 percent; and maize, 50 to 70 percent. In

China, rice is recorded to require soil moisture of at least 80 percent. The percolation of rainfall into the soil, where it is used by plants, is all influenced by rainfall patterns, temperature, vegetative cover, high levels of soil organic matter, active soil biota, and water runoff.Water needed for food and forage crops varies between approximately 300 and 2000 L per kg of dry crop yield [9]. For example, during the growing season, in the United States, 1 ha of maize with a yield of approximately 9000 kg per ha transpires about 6 million L of water per ha, while an additional 1 million to 2.5 million L of soil moisture per ha evaporates into the atmosphere [10]. This means that the growing season needs about 800 mm of rainfall for maize production (8 million L per ha). Even with annual rainfall of 800 to 1000 mm in the US Corn Belt, during the crucial summer growing season, maize often suffers from inadequate water.

CONCLUSION

A major challenge worldwide appears to be ensuring sufficient amounts of clean, fresh water for humans and their diverse activities. If more competition for water supplies continues to intensify within regions and between countries, this, too, will have a negative effect on the vital supply of fresh water for personal and agricultural use. Due to rising demand and being absolutely scarce in arid regions, food production and other human needs are decreasing.Particularly in those regions where groundwater supplies are the primary source of water, the future use of agricultural, industrial and urban water must be carefully regulated in order to avoid aquifer depletion.The goals recommended are:

- Since agriculture absorbs 70 percent of the fresh water in the world, farmers should be the primary priority for water conservation incentives.
- To reduce water pollution, farmers should adopt water-conserving irrigation methods, such as drip irrigation.
- Similarly, farmers should use water and soilconservation methods, such as crop and crop coverage to mitigate rapid water runoff related to soil erosion, rotations.
- Governments should reduce or abolish water subsidies that allow farmers, industry, and the public to waste water.
- Governments and private industries should enforce
- Policies of the World Bank (2003) for the equal pricing of fresh water.
- To improve water protection, policymakers and managers should conserve forests, wetlands, and natural habitats.
- To protect public health, farming, and the atmosphere, governments and private industry should regulate water pollution.

REFERENCES

[1] “Solutions for a water-short world.,” *Population reports. Series M. Special topics*. 1998.

[2] S. L. Postel, G. C. Daily, and P. R. Ehrlich, “Human appropriation of renewable fresh water,” *Science (80-.).*, 1996, doi: 10.1126/science.271.5250.785.

[3] M. W. Rosegrant, X. Cai, and S. Cline, *World Water and Food to 2025: Dealing with Scarcity*. 2002.

[4] I. Shiklomanov, “World fresh water resources,” *Water in crisis a guide to the world’s fresh water resources*. 1993.

[5] WHO, *Mental Health Status of Adolescents in South-East Asia : Evidence for Action*. 2017.

[6] D. Pimentel *et al.*, “Water Resources: Agriculture, the Environment, and Society,” *Bioscience*, 1997, doi: 10.2307/1313020.

[7] “World Water Resources at the Beginning of the 21st Century,” *Geosci. Canada*, 2004.

[8] S. Ehui and J. Pender, “Kent, N.M.J., 2001. Perverse subsidies: how tax dollars can undercut the

environment and the economy. Island Press.," *Agric. Econ.*, 2005.

[9] T. Gleeson *et al.*, "Towards sustainable groundwater use: Setting long-term goals, backcasting, and managing adaptively," *Ground Water*, 2012, doi: 10.1111/j.1745-6584.2011.00825.x.

[10] C. Thomas, "Water in crisis: a guide to the world's fresh water resources," *Int. Aff.*, 1994, doi: 10.2307/2623756.

• Vishal Assija, Anupam Baliyan and Vishal Jain, "Effective & Efficient Digital Advertisement Algorithms", CSI-2015; 50th Golden Jubilee Annual Convention on "Digital Life", held on 02nd to 05th December, 2015 at New Delhi, published by the Springer under ICT Based Innovations, Advances in Intelligent Systems and Computing having ISBN 978-981-10-6602-3 from page no. 83 to 91.

• Vishal Jain and Dr. S. V. A. V. Prasad, "Analysis of RDBMS and Semantic Web Search in University System", International Journal of Engineering Sciences & Emerging Technologies (IJESET), Volume 7, Issue 2, October 2014, page no. 604-621 having ISSN No. 2231-6604.

• Vishal Jain and Dr. S. V. A. V. Prasad, "Evaluation and Validation of Ontology Using Protégé Tool", International Journal of Research in Engineering & Technology, Vol. 4, No. 5, May, 2016, page no. 1-12 having ISSN No. 2321-8843.

• J Ganeshkumar, N Rajesh, J Elavarasan, M Sarmila, S Balamurugan, "A Survey on Decentralized Access Control Strategies for Data Stored in Clouds", International Journal of Innovative Research in Computer and Communication Engineering, 2015

• J Ganeshkumar, N Rajesh, J Elavarasan, M Sarmila, S Balamurugan, "Investigations on Decentralized Access Control Strategies for Anonymous Authentication of Data Stored In Clouds", International Journal of Innovative Research in Computer and Communication Engineering, 2015

• VM Prabhakaran, S Balamurugan, S Charanyaa, "Sequence Flow Modelling for Efficient Protection of Personal Health Records (PHRs) in Cloud", International Journal of Innovative Research in Computer and Communication Engineering, 2015