

# INTERNATIONAL JOURNAL OF LAW MANAGEMENT & HUMANITIES

[ISSN 2581-5369]

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Volume 6 | Issue 1

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2023

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# Steps taken to Combat Water Scarcity in India

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## ABSTRACT

*India is experiencing water scarcity as it becomes the most populous nation and struggles to meet the needs of millions of people living in cities and villages. India has only around 4% of the world's share of freshwater resources, even though it accommodates a huge population of more than 1.39 billion individuals. Freshwater resources are distributed inequitably, and numerous rivers and water ponds dry up in the summer. Climate change has caused the monsoons to be delayed, which has caused the reservoirs to dry up in some areas of the country, making the situation much worse. Other elements contributing to the severe water shortage are inefficient infrastructure, uncontrollable water pollution, and unequipped systems. The severe water unavailability to meet basic human needs has pressured the government and non-government organisations to tackle this problem seriously. To address this issue, the Government of India created a new ministry for water Jal Shakti Ministry to address all water-related problems; several schemes and programs have been started. The government has also encouraged people to adopt several techniques like efficient irrigation, water conservation and rainwater harvesting. The World Bank is taking on various engagements connected to various aspects of water resource management, drinking water facilities, and sanitation services. In addition to discussing virtual water trade, this research study will cover the various areas where the World Bank assists state governments in addressing the country's water shortage.*

**Keywords:** *water scarcity, virtual water trade, groundwater depletion, government schemes, World Bank.*

## I. INTRODUCTION

Water scarcity can be physical or economic. When the available water is insufficient to meet the needs of that region, it is physical water “scarcity” as 1000 m<sup>3</sup> of fresh water or less is available to each person per year. When due to a lack of infrastructure development, water resources are not being managed well, causing people water shortage it is economic water scarcity. The definition of ‘water stress’ is between 1000 and 1700 m<sup>3</sup> of available freshwater per capita. Experts believe that by the year 2025, over 30 countries will be unable to provide

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1000 m<sup>3</sup> per person per year due to rate of population growth [1]. The major consumption of water goes into agriculture around 80% of the available freshwater. Water scarcity has recently been observed in several major Indian cities, with Chennai being the most notable in 2019. The water deficit is substantially hurting the lives of people living in rural and cities, as evidenced in cities like Bangalore and Chennai.

## **II. EFFORTS ARE BEING MADE TO SLOW DOWN THE GROUNDWATER DEPLETION**

Groundwater is a vital source of water supply to the agricultural needs and other industrial and domestic requirements for the people residing in villages and cities. The ever-rising demand and limited groundwater resources have led to the overexploitation of valuable resources and caused the depletion of the groundwater table.

The World Bank is working in support of the national groundwater program called as the Atal Bhujal Yojana, started by the government of India towards the management of the ground water. This program has been implemented in nearly 9000-gram panchayats throughout the country in seven states; it is a community-led groundwater management program, the world's largest program relating to this kind of activity. [2] The common man uses groundwater, including millions of individuals and communities, so it becomes essential that they understand their role in conserving the water. This program enables people to understand their area's water availability and usage patterns to use water efficiently.

The World Bank has helped the Punjab government pilot a new scheme to conserve groundwater. Punjab uses tube well water for irrigation purposes, which resulted in a drastic fall in the water table.

The scheme incentivises farmers to focus on the reduction in the usage of groundwater (Save Water, Earn Water) "Paani Bachao, Paisa Kamao". Under this scheme, 300 farmers who had enrolled were provided with cash encouragements to conserve electricity required for irrigation purposes, which has helped in saving water between 6 to 20 percent without causing any negative impact on the yield. [2]

## **III. THE REMOTE VILLAGES' NEED FOR WATER BEING ADDRESSED**

Over the last decade, several projects have benefitted around 20 million people that were initiated with the government's efforts with the support of the World Bank to provide clean potable water to the people of rural societies with a total financing of \$1.2 billion. [2]

The people living in the villages of the mountain state of Uttarakhand experience great difficulty in getting daily water supply for domestic purposes due to the lack of sufficient infrastructure

in the mountain area which made the lives of village women tough as they have to travel distances over 1.6 kms.

The World Bank funded the Uttarakhand Rural Water Supply and Sanitation Project during the time of 2006—2015 that helped more than 1.57 million people of the state throughout the underserved areas by improving services relating to sanitation and sustainable rural water supply. This project addressed other issues also like infrastructure development, institutional capacity and village community which are resilient from any kind of natural disaster like the flash floods, earthquakes, and landslides. [2]

Though the state of Kerala receives good rainfall but still suffers from depleting water resources due to the growing built up area across the state as the rainwater drains into the sea. The World Bank is already aiding the rural families in getting tap water in their houses at a low cost which is affordable by poor people since the early 2000s through the state government. The projects have helped village people get water at their households by making them in-charge of their own water supply schemes through Jala Nidhi I (2000—2008) and Jala Nidhi II (2012 –2017).

#### **IV. CITIES ARE GETTING WATER SUPPLY**

The piped water supply in the urban cities receive water for limited hours on a few days of week effecting the lives of poor, women, and children who invest time and resources in order to meet their basic necessities. In metropolitan areas, Karnataka offers a continuous supply of water that is feasible, economical, and sustainable. World Bank-sponsored The Hubli Dharwad, Belagavi, and Kalaburagi water-stressed cities are the focus of the global bank-funded Karnataka Water Supply Improvement Project. The three cities' whole population is the target of the Karnataka Urban Water Supply Modernization Project. The benefits of a water facility can be accessed by the poor through subsidized water connections to homes. [2]

The “Shimla Water Supply and Sewerage Service Delivery Reform Project” improvements have guaranteed that Shimla now gets at least three to four hours of water supply each day, and attempts are being made to transition to a twenty-four-hour supply. A professionally administered water service that is directly answerable to the public was established with the help of a World Bank initiative.

The “Punjab Municipal Services Improvement Project” is assisting two sizable cities in Punjab transition to surface water sources, such as local canals, as groundwater levels in the province reach critical levels. By 2025, more than 3 million people are anticipated to benefit from the water supply improvements, and by 2055, an estimated 5 million people are forecast to live in the country. The southern city of Chennai experienced a serious water emergency in 2019, and

it had to be transport water by train from a distance of almost 200 kilometers to save the city. [2]

In order to supply its industries with non-drinking water, today, Chennai is the first Indian city to widely recycle wastewater. When two Tertiary Treatment Reverse Osmosis (TTRO) plants are finished, they'll have the ability to recycle around 20% of the sewage of Chennai, allowing the city to use less fresh water. The World Bank is involved in many facets of managing water resources, including the provision of clean potable water and sanitary facilities throughout the nation. Few of the methods are listed below.

## **V. RESTORATION OF THE MOST DIVINE RIVER**

Numerous people revere the Ganga as a living goddess because it is India's most significant and renowned river. With more than 100 towns and cities discharging local waste into the river water, the Ganga is currently under tremendous pressure from the increasing urbanization that is occurring along its banks. Since 2011, the World Bank is assisting the Government of India in its attempts to restore the Ganga River. In order to handle the river and provide the means to maintain cleanliness, two World Bank initiatives totaling \$1 billion are working to establish the necessary organizations. The main organic pollutant in the Ganga is sewage from cities. Sewage water from homes is now cleansed before entering the river in some of these communities thanks to the construction and upkeep of sewage treatment plants and a system of drains. [2]

## **VI. IMPROVING IRRIGATION FACILITIES**

India has made significant infrastructure investments over the past 50 years that have allowed irrigated agriculture to spread throughout a large portion of the nation. 2.7 million farmers in West Bengal are receiving improved irrigation facilities and flood protection thanks to a significant irrigation and flood control project.

## **VII. TRACKING FLOODS AND DROUGHT**

India is still susceptible towards both droughts and floods even though climate change makes weather patterns less foreseeable and increased frequency of severe weather events. Reservoirs can lessen the intensity of these catastrophic occurrences by storing water and discharging it as needed. Reservoir managers, however, usually lack the technological resources required to assist them in making crucial decisions that can stop floods.

Two hydrology projects funded by the World Bank have developed new technologies and methods that give reservoir supervisors an accurate view of the water situation growing in their region. They have laid the groundwork for a vast body of knowledge that will improve how the

country manages its water resources as a whole. Additionally, these systems can lessen the worst effects of droughts. The country's whole territory, including the basins of the Indus, Ganga, and Brahmaputra-Barak rivers, is currently being covered by a monitoring system for water resources.

### **VIII. THE VIRTUAL WATER TRADING**

The meaning of virtual water is “the water used to produce agricultural commodities”. The term “virtual water trade” describes the water export and import that is concealed in the shape of goods like cattle, machinery, textiles, and crop products, all of which need water to be produced. China has historically imported more virtual water than it has exported. Whereas India, on the opposite hand, loses water due to its massive agriculture exports and jeopardizes long-term sustainability of water. India is projected to have a water shortage in the future.

Researchers from Chennai's Anna University recently calculated the size of the virtual water trade in India. The study, which was written up in the journal “Groundwater for Sustainable Development”, concentrated on the trading of well-known livestock and crop goods from 2006 to 2016. The work was supported by the Department of Science and Technology. By closely observing the virtual water trade of the traded items, the results could assist the legislators and water administrators in the nation in developing an effective conservation plan for the resources that are currently accessible.

The Food and Agricultural Organization (FAO), the Directorate General of Commerce Intelligence and Statistics (DGCIS), the Agricultural and Processed Food Products Export Development Authority (APEDA), the Tea Board of India, the Coffee Board of India, the Rubber Board, and the Department of Food and Public Distribution (DFPD) provided researchers the details on 16 different food and livestock items' imports and exports.

According to the study, which compared sum of imports and exports during the period 2006 - 2016, our country on an average had exported 26,000 million liters of virtual water annually. The top exporting food item was rice, which was followed by maize and buffalo meat.

A kilogram of paddy needs roughly 15,000 liters of water to grow, and farmers in India mainly rely on groundwater for this purpose. The amount of virtual water required to produce one kilogram of buffalo meat was five to twenty times greater compared to agricultural output because the nation is one among the leading exporters and producers of beef. Cashew, legumes, and wheat were the imported goods with the largest virtual water content. Compared to rice, these crops use less water for production.

Given that nations all over the globe are dealing from the effects of climate change, the idea of virtual water trade is one that is pertinent to all of humanity. Groundwater reduction, irregular rainfall, natural calamities, drought, and floods are having a detrimental effect on trade relations globally. Key river basins, including the Narmada, Indus, and Ganga have water shortages for the majority of the year since India is a country with a water shortage. A rise in the of virtual water trade is due to the overutilization of water for the additional production of export-oriented commodities such as wheat, rice.

Given that 80 percent of our agricultural activities depend on groundwater, the study offers important insights for developing strategies to manage groundwater sustainably. In the year 2014-15, our country had exported 37.1 lakh tons of basmati rice, that required 10 trillion liters of water to produce, from preparing the field to processing it after the yield. Nearly 1/5<sup>th</sup> of this water was from surface and groundwater, which made it harder to get water for home use.

The study offers advice on water-saving practices for farmers so they can grow crops more efficiently. Reducing the amount of groundwater used for irrigation could be accomplished through efficient irrigation methods, irrigation scheduling, appropriate crop choice depending on climatic factors, soil type, availability of water, and the use of alternate water sources. A significant portion of India's earnings in 2019 came from agriculture exports, which totaled 1.29 lakh crore. With the effects of climate change taken into account, these exports must be monitored for sustainability. [3]

## **IX. CONCLUSION**

To face the challenges of water scarcity, the people and the governments working together can make it possible. Water is the most essential component for the survival of life on the planet and freshwater is a fraction of all the available water, so these freshwater resources have to be conserved and managed in the best possible manner to look forward to a sustainable development and better world for the coming generations. The conscious efforts by the people towards using water in the best possible way and avoiding water pollution in addition to managing the available efficiently can only be the way to find a solution prudently. The reviving of step wells and restoring the lakes and ponds by stopping people from polluting them can make a difference. The pollution of rivers must be dealt very strongly and putting check on the industries can make a difference. Villagers' knowledge of the water resources available to them and adoption of water-saving methods will be helpful in water management. The wastewater treatment plants also must be installed by the industries to treat the waste before releasing it. Proper education to the farmers about the crop selection in accordance with soil, climate and

water availability can be very helpful in reducing ground water depletion. The water requirement is going to increase as the population grows so we must adopt better practices in using our limited freshwater resources.

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