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RESEARCH ARTICLE

WATER- THE ELIXIR OF LIFE: SAVE WATER, SAVE LIFE

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Abstract

Water is the most important part of day to day life. It is responsible for overall sustainable development. Water crisis directly and indirectly affect human life and have deep impact on economic development. Hence, management of water resources is a need of an hour. Integration of water management needed to takes place at national, regional and local level. Emphasis should be given to behavioural changes regarding adoption of various water conservation techniques. It is not only the responsibility of Government but also the responsibility of stake holders like hydrologist, ecologist, planners and individuals in community through a collective approach for better water management and to equitably distribute clean water and tackle related issues.

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Introduction:-

Water is a precious natural resource for sustaining life and environment. Effective and sustainable management of water resources is significant for ensuring sustainable development. In sight of the vital importance of water for human and animal life, for creating ecological balance and for economic and developmental activities of all types, and considering its increasing scarcity, the planning and management of water resource and its optimum, economical and equitable use has become matter of the utmost urgency (Khadse, et al., 2012). The lack of adequate clean water to met human drinking water and sanitation needs is indeed constrain on human health and productivity and hence on economic development as well as on the maintenance of a clean environment and healthy ecosystems (Cosgrove and Loucks, 2015).

Water availability and use:

The earth's surface consists of 71% water, 29% is land. 3% of all water on earth is fresh-water, 2.5% of this is unavailable: locked up in the form of ice caps and glaciers etc, and 0.5% is accessible surface fresh water (CCAO ARWEC, 2020). We needed water in all the walks of life from morning till night. The World Health Organization (WHO) states that an individual requires around 25 litres of water daily for meeting his/her basic hygiene and food needs. The rest is used for non-potable purposes like mopping and cleaning (Reed and Reed, 2013). People working in several fields need water for various purposes such as farmers need water to grow crops, gardeners to water plants, industrialist for industry work, electricity plants to generate hydro electricity etc. So, we should always save water for the wellness of the future generations, healthy life and wild life (Agrawal, 2018).

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Human ambition and earth's limit:

We humans have become principal driver of environmental change. Our actions are impacting our global environment, including our climate. This in turn impacts the amounts and spatial and temporal distribution of precipitations that falls on water sheds and the timing of its runoff. The movements of people in urban centre are altering quantity and quality of our fresh water not only for life itself, but indeed for our economic well being as well. Water plays an important role in the creation of everything we produce. There is no substitute and while it is renewable there is only a finite amount of it (Cosgrove and Loucks, 2015).

Water crises:

Water crisis results from an imbalance between water use and water resources. The water crises indicator is the proportion of water withdrawal with respect to total renewable resources. It is the critically ratio, which implies that water crisis depend on the variability of resources. Water crisis causes the deterioration of fresh water resources in terms of quality and quantity. The value of critically ratio ranges between 20% for basins with highly variable runoff and 60% for temperate zone basins.

While the world's population triple in 21st century the use of renewable water resource has grown six fold. Within the next 50 years, the world population will increase by another 40 to 50%. This population growth-coupled with industrialization and urbanization will results in increasing demand of water and have serious consequences in environment (World Water Council, 2020).

The Indian civilization (world's oldest civilization), grew around the Indus and the Ganges and is still thriving, but not for long. Post independence, due importance was given to harnessing the facility of water by way of controlling and storing of water through large dams, that was the necessity for the hour. However, our cities and towns have subsequently grown without planning for water need v/s water availability. In 1951, the per capita water availability was about 5177 m³, this is often now reduce to about 1545 m³ in 2011 (Debu, 2019). Although India has made improvements over the past decades to both the availability and quality of municipal drinking water systems, its large population has stressed planned water resources and rural areas are left out. Regardless of improvements to drinking water, many other water sources are contaminated with both bio and chemical pollutants, and over 21% of the country's diseases are water-related. Furthermore, only 33% of the country has access to traditional sanitation. India's water crisis is often attributed to lack of government planning, increased corporate privatization, industrial and human waste and government corruption. In addition, water scarcity in India is expected to worsen as the overall population is expected to increase to 1.6 billion by year 2050 (Synder, 2020). According to the Composite Water Management Index (CWMI) report released by the Niti Aayog in 2018, 21 major cities (Delhi, Bengaluru, Chennai, Hyderabad and others) are racing to reach zero groundwater levels by 2020, affecting access for 100 million people (Motto, M., 2018). The CWMI report also states that by 2030, the country's water demand is projected to be twice the available supply, implying severe water scarcity for hundreds of millions of people and an eventual six per cent loss in the country's GDP (Kant, 2018).

Reasons for Water Crisis In India:

1. Change in Climate
2. River Pollution
3. Groundwater extraction & irrigation
4. Wastage of water (Wikipedia, 2020).

Consequences of global water shortage:**Increase global conflicts:**

Fresh water resources are often shared by two or more countries which may lead to more international conflicts as fresh water become more scare.

Lack of access to clean water:

Currently 1.1 billion people in the world lack access to clean fresh water, these vulnerable populations are exposed to deadly water bourne illness and water gathering can limit educational and economic development. As the global population grows, and water resources shrink, greater number will face the challenges of inadequate water accessibility, which often leads to water pollution

Food Shortages:

As the global population reached 9.6 billion by 2015, shrinking water resources had made it difficult to for food production to keep up with rising demand. Agriculture already accounts for about 70% of global freshwater withdrawal to keep up with the current food demand. Increased farm water conservation through water saving irrigation techniques are needed to slow the unsustainable withdrawals from good water sources (Seametrics, 2018). e.g. Food security in the Middle East and North Africa Region (Nouri, 2019).

Energy Shortages:

Energy production is one of the world's greatest consumers of fresh water resources. World energy requirements are rapidly increasing with modernisation and population growth. Global electricity demand projected to grow 70% by the year 2035 with the India and China accounting for half of the growth.

Economic Slowdown:

The UN estimates that the half of the world's population will live in the area of high water stress by the year 2030. It is difficult to have a thriving economy when fresh water is not easily accessible for industrial, farming and individual use (Seametrics, 2018).

Overuse and pollution of water resources harming biodiversity (Wikipedia, 2020).

Management:

In the past, we made decisions regarding the management of water resources that have not always helped us becoming more secure and sustainable. We have disrupted and over allocated river flow regimes sometimes to the point of drying them of, along with their downstream lakes. We have over drowned ground water aquifers; polluted many, if not most of our water bodies including estuaries, coastal zones and even oceans; and degraded ecosystems. We have done this mainly to satisfy short term economic goals, often goals that may not have included the long term environmental or even economic sustainability of region or basin, and indeed our own health (Cosgrove and Loucks, 2015).

Management of water resources is of paramount importance to sustain billions of population. Water management is a composite area with linkage to various sectors of the world economy. The water resources management practices should be based on increasing the water supply and managing the water demand under the stressed water availability conditions (Khadse et al., 2012).

Integration in water resource management needs to takes place at different levels:**At national level:**

where the national water management plants and agencies give water resources management a place in national policies enabling the integration of water management with policies in other fields, e.g. River Development and Ganga Rejuvenation (National Water Mission), Jai Shakti Abhiyan, Mahatma Gandhi National Rural Employment Guarantee Act for water conservation.

At regional level:

where the integrated water resource management concerns main operational hydrologic units: river basins, lake catchments and aquifers. Here, the most challenge are going be to balance the interest and policies of various stake holders and to bring water management as administered by different water users and operators together under a common umbrella, e.g. Meri Dilli Meri Yamuna Campaign (Art of Living).

At local level:

where important games and win-win situations are possible, e.g. by integrating irrigation management, water supply, ground water recharge and strong water management, or by bringing together irrigation, drainage, and reuse management, or by taking joint account of water quality and quantity, or by improving management of main water operators- such as water supply companies, irrigation agencies and farmers groups (Prassana, 2020).

Efforts to combat water crisis:

The Government of India has reformed several of its departments and initiated several water supply projects in the last 3 years to respond to the country's growing water needs (Dutta, 2019). The reforms include the establishment of a new ministry for water known as the Jal Shakti Ministry.

In June 2019, Indian Prime Minister Narendra Modi launched a new plan, “Piped Water for All by 2024” in order to integrate different water resources management departments together to take charge of the ground and surface water depletion (Dutta, 2019). The new ministry combines the Ministry of Water Resources, River Development and Ganga Rejuvenation with the former Ministry of Drinking Water and Sanitation. The Jal Shakti Ministry is responsible for managing the financial and technical resources, policy support and the pollution regulation deployment regarding the water resources throughout the country (Sen and Verma 2019).

The first Ganga river cleaning program (Ganga Action Plan) was started in 1985 with an aim to tackle the problem of excessive water pollution in the river (TOI, 2010). However, the Ganga Action Plan has not shown any significant results over the years. The Modi government announced that it will be launching new projects with more investment along with formulating new policies to manage the pollution in Ganga and other rivers in India (The World Bank, 2020) (PTI Deccan Herald, 2020).

The Non-Government organizations such as 'FORCE' and 'Safe Water Network' are actively involved in dealing with the water crisis in India. International organisations such as 'We are Water' and UNICEF are also very active in alleviating the problems of basic water supply and sanitation in villages (Wayback Machine, 2015) (Chung, 2016).

The Jal Bhagirathi Foundation is one of the most prominent non profit organisations in India dealing with the issues of water scarcity in the desert terrains of Rajasthan. The foundation has covered over 550 villages and revived more than 2000 water harvesting structures in the region (JBF, 2020). The organisation claims to harvest over 4000 million litres of water every year along with reclamation of 100+ hectares of barren land (JBF, 2020).

Possible Solutions:

Rainwater harvesting (RWH) is the collection and storage of rain, rather than allowing it to run off. Rainwater is collected from a roof-like surface and redirected to a tank, cistern, deep pit (well, shaft, or borehole), aquifer or a reservoir with percolation. Rainwater harvesting is one of the simplest and oldest methods of self-supply of water for households, and residential and household scale projects usually financed by the user (Rural Water Supply Network 2019). Tamil Nadu was the first state to make rainwater harvesting compulsory for every building to avoid groundwater depletion. The scheme was launched in 2001 and has been implemented in all rural areas of Tamil Nadu. Since its implementation, Chennai had a 50% rise in water level in five years and the water quality significantly improved (The Hindu, 2011).

Desalination is a potential advanced technique to solve the problem of water shortage, especially in coastal regions. Desalination involves treating sea water to remove its salt content, making it fit for drinking.

The Indian Agriculture Institute has been promoting the drip irrigation technology to relieve the water scarcity in India for decades. The technology has the advantage of being applicable to all kinds of terrains in the country. Currently, almost 351,000 hectares of irrigated land is under drip irrigation, compared to just 40 hectares in 1960s (IARI 2019).

Research needs and directions:

We have the knowledge, the technology, and the economic resources to manage our water resources much more efficiently and effectively than we do today. Scientific research through systematic study of the structure and the behaviour of the physical and natural world is continuously adding to our knowledge and tools. Through research we are learning more about how to preserve ecosystem and their need for water. We know that change in our behaviour and diets can also have substantial impact on our water consumption. We know we can reduce the waste of water to produce food from field to fork. We know how to use less energy, and hence less water is needed to create that energy, we have options, we have to make choices (Cosgrove and Loucks, 2015).

In large part, the water resources and environmental fields have not been as supportive of more innovative research aimed at long range solutions, products or methodologies as we believe they should be (Grayman et al., 2012).

Recommendations:-

We should focus on Water Conservation by reduction in water loss, use and waste of resources, by avoiding any damage to water quality and improving water management practice. All this can be achieved by raise in public awareness through; Water Campaign, direct use of public media, protect fresh water resources at social level, at

homes we can adopt water saving technologies by use of low flush toilets, reuse of gray water, low flow taps, waterless car washes, rain water harvesting, avoid use of showers while bathing, turn off the tap while brushing, drip irrigation etc. At commercial level we can use waterless urinals, waterless car washes, water saving stem sterilizer etc.

Conclusion:-

Water is the most important part of day to day life. It is responsible for overall sustainable development. Water crisis directly and indirectly affect human life and have deep impact on economic development. Hence, management of water resources is a need of an hour. Emphasis should be given to behavioural changes regarding adoption of various water conservation techniques. It is not only the responsibility of Government but also the responsibility of stake holders like hydrologist, ecologist, planners and individuals in community through a collective approach for better water management and also to equitably distribute clean water and tackle related issues.

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