

RESEARCH ARTICLE

WATER CYCLE AND CIRCULAR ECONOMY WITH NETZERO: PROSPECTIVE ROLE OF THE GEOGRAPHERS

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Manuscript Info

Abstract

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..... In the coming future, the World War will be fought over the shortage of water, is not a joke. Today the point of concern is water security.Even as the world is struggling for everything increasing scarcity of water is most dangerous. With the rapid development of technologies and industries, global warming and climate change has caused serious threats to every element of the environment. Among these threats, the most evident impacts are the increasing and widespread water stresses experienced bycities globally. The emission of CO2 has worsened the situation further. As the COP 26 Conference led the world to believe that NetZero or CO2 less planet must be attained, a water cycle and circular economy leading to NetZero are inevitable for all nations to be achieved by 2075. The need to preserve, conserve, recycle and reproduce water for energy, domestic and industrial usage cannot be overemphasized. Against this backdrop of the global scenario that is dismal at best, NetZero is only the escape route. The present paper is an attempt to analyze the prospective rolegeographers across the world can play in adopting a water cycle, analyzing, a systemic approach to deliver water reuse at multiple scales, how cities can articulate and lead a system-wide transformation agenda, how urban households use water and establish a circular economy in attaining NetZero locally and globally.

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Introduction:-

The Circular Economy aims to bring back the negatively affected resources by the linear pattern of Economic Growth. Largely, distressed water is still finding its position in this evolving concept of Circular Economy. Water systems interact with all sections of society, industry and opportunities exist in these interfaces to create additional value by application of circular economy principles. If we have a look atthe Global Water System 70% of all freshwater withdrawals are used by agricultural sector and 15% of freshwater withdrawals globally are used for the production of electricity. There is to be a 55% increase in the global water demand of cities by 2050and a \$20 trillion loss per year in ecosystem services due to pollution and change in landuse. It has been estimated that by 2050 an increase of 60% in food production will also be needed to keep up with the growing population. Presentlythere is enough water to meet the world's growing needs but the facts and figures above clearly indicate that if this continues, undoubtedlyWorld War III will be fought due to the shortage of water.

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Study Area

Here, a shloka which represents India; हिमालयंसमारभ्ययावत्इंदुसरावरम् तंदेवनिर्मितंदेशंहिंदुस्थानंप्रचक्षते

Meaning -

Beginning from the Himalayan Mountains and spreading across the Indian Ocean, the God-created country is "Hindustan". It is the country where God takes birth from time to time and establishes social civilization.

India is a great and unique country in south Asia which is famous for its unity in diversity. It spreads over an area of about **3.28 million sq. km** which **is 2.4% of the total world area**. The mainland of India extends between **8°4'** Nto37°6'N latitude and 68°7' Eto 97°25' E longitude. The Tropic of Cancer (23°30' N) divides India into almost two halves and the total length of the coastline is 7,517 km. The Indian peninsula tapers southwards resulting in the division of the Indian Ocean into two water bodies which are the Bay of Bengal and the Arabian Sea. India is divided into 28 States and 9 UTs including the National capital territory, after the formation of two new UTs Jammu and Kashmir and Ladakh. India's border runs a total length of 15,200 km (9,400 miles). The current population of **India** is **1,378,492,893** as of Friday, May 22, 2020, based on Worldometer elaboration of the latest United Nations data. India's population is equivalent to **17.7%** of the total world population. India is mainly an agricultural economy. Recently several large-scale and small-scale industries have been set up in the country which have a positive impact on the Indian economy.



Aims And Objectives:-

The significant aims and objectives of the present study are to analyze the current scenario of water resources and the prospective role geographers across the world can play in adopting the water cycle, establishing a circular economy and attaining NetZero locally and globally.

- 1. To analyze the COP 26 Conference, leading the world to believe that NetZero or CO2 less planet has to be attained. Whywater cycle and circular economy leading to NetZero are inevitable for all nations to be achieved by 2075.
- 2. To analyze the methods ofwater conservation for future needs.
- 3. Habitat conservation and minimizing human water usage
- 4. Water substitution and reuse
- 5. Improving water management practices that reduce wastage or enhance the beneficial use of water.
- 6. Last but notleast, to analyze the prospective role of geographers in adopting the water cycle, establishing a circular economy and attaining NetZero locally and globally.

Methodology:-

The study aims to analyze the water resource challenges in the world with special reference to India. In this regard, the following methodology has been adopted:

1. The first step of the research is identifying and understanding the research problem.

2. The second step is to design research strategy

The research strategy has been designed in the following way-

(a)	Type of Research Design	Descriptive
(b)	Data Sources	(i) Primary Data
		(ii) Secondary Data
(c)	Research Approach	Survey method
(d)	Research Instrument	Questionnaire
(e)	Type of Questions	Close-ended questions
(f)	Sampling Procedure	Simple random sampling
(g)	Contact Method	Online Mode of submitting the Questionnaire
(h)	Modes of Collecting data	We recorded 374 responses through the online
		questionnaire.
		We collected secondary datafrom various books,
		Journals, reports (both) published and unpublished, etc.
(i)	Data Processing	(i) A number of tables were prepared to bring
		out the main characteristics of the
		collected data.
		(ii) Inferences were drawn from the data
		collected.

The third step was the synthesis of available primary and secondary data.

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INDIA'S LOCATION IN WORLD

COP 26 & India's Declaration Of Net Zero

As the COP26held in Glasgow (U.K.) on 1^{st} and 2^{nd} November 2021, a climate change conference led the world to believe that NetZero or CO₂ less planet must be attained. A transformational change in the functioning of new enterprise models may be necessary to maximise the resources, minimisewaste externalities, regenerate natural capital.

Water cycle and circular economy leading to NetZero is inevitable for all nations to be achieved by 2075. Adopting a circular economy approach, based on the three principles of circular economy is beneficial as:

- 1. It presentstremendous opportunities for businesses.
- 2. Helps governments and cities to minimize structural waste
- 3. Assists in realizing greater value from industry and agriculture while regenerating the environment.

Prime Minister Modi's vision for India in achieving Net Zero at the COP 26

- 1. India will bring its non-fossil fuel energy capacity to 500GW by 2030.
- 2. By 2030, India will fulfill 50% of its energy requirement through renewable energy.
- 3. India will cut down its net projected carbon emissions by 1 billion tons from now until 2030.
- 4. By 2030, India will bring down carbon intensity of its economy by more than 45%.
- 5. By 2070, India will achieve the target of 'net zero' carbon emissions.

Findings

Will Third World War happen possibly due to Water?

In 2015, NASA's satellite data revealed that 21 of the world's largest aquifers are severely water-stressed because of climate change or overuse from human consumption. Many of these correlates with conflict regions or areas of high tension, such as the border between India and China or Bhutan, where the Ganges-Brahmaputra Basin is currently mapped as "severely overstressed". With the growth of population and increasing demand for agriculture, industries, urbanization and industrialization researchers have suggested that the problem may be exacerbated. In fact, the 20th century's world water use has grown twice as fast as world population. We have already seen the soaring prices of water across the globe. Hence, there is a possibility that WWIII is going to be fought over the scarcity of water if things don't change soon. In the public opinion, a considerable portion verifies this fact.



Do you regard that the ThirdWorld War will be for water?

Primary Data Collected through online Survey

Greenhouse Gas Emissions, Climate Change And Water Cycle

The emission of greenhouse gases at an alarming rate is the major factor that has contributed to the surge in global temperatures and ultimately climate change. Put simply, the water cycle is when water evaporates from the land and sea, which eventually returns to the Earth as rain and snow. Climate change intensifies this cycle because as air temperature rises, more water evaporates into the air. Warm air can trap water vapor which can lead to severe storms, causing major problems such as severe flooding in coastal communities around the world. At the same time some areas are experiencing more dry air and even drought.

Scenario Of Net Zero Emissions

With climate change intensifying and scientists warning that humanity is running out of time to limit global warning to 1.5° C over pre-industrial levels, 2021 has been a tense year for the planet. The number of countries announcing pledges to achieve net-zero emissions over the coming decades continues to grow. But the pledges by governments till date – even if fully achieved – fall well short of what is required to bring down global energy-related carbon dioxide emissions to net zero by 2050 and give the world an even chance of limiting the global temperature rise to 1.5 °C.

Despite many pledges and efforts by governments to tackle the causes of global warming, CO2 emissions from energy and industry have increased by 60% since the United Nations Framework Convention on Climate Change was signed in 1992. To reach net zero emissions by 2050, annual clean energy investment worldwide is required to be more thantriple by 2030 reaching around \$4 trillion.

When asked from the public, whether the Net Zero Emissions are possible to achieve, majority of them said maybe!





Primary Data Collected through online Survey



How much do you feel that the government is doing to achieve Net Zero?

Primary Data Collected through online Survey

When asked to rate the activities of government in achieving Net Zero from very less (1) to a great extent (5), most of the people rated 3, which means people are moderately satisfied with the government's efforts.

Water Management In Urban Areas

Urban water management takes into account the overall water cycle, facilitates the integration of water features at the beginning of the land planning process, encourages all levels of government and industry to implement water management. It also considers urban planning processes that benefit society, the economy and the environment.

The aim of urban water management is to create cities and towns that are resilient, livable, productive and sustainable. It also interacts with the urban hydrological cycle in ways that:

- 1. Provide water security through efficient use of the diverse water sources available.
- 2. Protect and restore the health of waterways and wetlands.
- 3. Mitigate flood risk and damage.
- 4. Create public and private places that harvest, clean and recycle water, resulting in water resource, environmental and social livability benefits.
- 5. Provide water for productive, sustainable, livable and resilient communities.

What can be the possible methods of conserving water in urban areas?



Primary Data Collected through online Survey

Water Management In Agriculture Sector

According to the comprehensive assessment on water management in agriculture (2007), improving rainfed farming could double or quadruple yield. One main reason why yield gaps exist is that farmers do not have sufficient economic incentives to adopt yield enhancing seeds or cropping techniques.

To meet the requirements of this target, productivity of rainfed farming systems will have to be increased. The efforts under this target will focus on the opportunities for improving rain fed farming potential to boost yields and income, especially in areas of low productivity.

Measures to improve land and water productivity may include:

- 1. Making more rainwater available to crops when most needed (capture water -rainwater harvesting, soil and water conservationand using it -deficit irrigation, supplementary irrigation etc.)
- 2. On-farm water management to minimize water losses by evaporation.
- 3. Use of improved crop varieties.
- 4. Use of improved cropping systems and agronomics, such as conservation tillage.
- 5. Development of financial frameworks to provide incentives for the adoption of best practices and new technology.
- 6. Use of low-quality water in non-conventional (not for direct human consumption) applications such as forestry.
- 7. Evaluation of rainfall patterns to determine quantity and quality of water available for agricultural use and rethinking crop scheduling.

What measures can be taken to minimize the wastage of water in agricultural sector?



Primary Data Collected through online Survey

Waste Water Management From Urban Households

About 40% of the wastewater generated in a household is greywater containing contaminants like soap, detergent, dead skin, hair and oil. Each member of a household generates about 90 litres of greywater daily. Once treated, this water can be used for gardening and toilet-flushing. It can meet up to 40% of household water needs. However, it is important to remember that this water is not suitable for drinking. Therefore, the water should be further treated using methods like ozonation to make it potable. Greywater does not include the wastewater from toilets, urinals or bidets. The discharges from these fixtures are classified as wastewater (sometimes referred to as black water) because they contain high levels of pathogenic organisms and solids.

In larger urban sewage systems, the effluent from at least secondary treated community sewage treatment plants can be reclaimed by filtration, disinfection and other more advanced treatments (e.g. membranes) and sold for industrial processes of cooling or used for irrigation of community sports grounds and gardens or even for indirect potable reuse.



Where do you think treated waste water from households can be utilized?

Primary Data Collected through online Survey

Water Conservation At Individual Level

Water is a finite commodity which, if not managed properly, will result in shortages in the near future. Water conservation at individual levels can go a long way to help alleviate these impending shortages. Few practices include:

- 1. Useing broom instead of a hose to sweep sidewalks and driveways.
- 2. Washing the car with a hose having an on/ off nozzle or using buckets of rinse water.
- 3. Washing dishes by hand, using a sink full of rinse water rather than letting the water run.
- 4. Fixingleaks.
- 5. Limiting shower time to 5 minutes or less.
- 6. Installing a low-flow showerhead.
- 7. Turning off the water when not in use

Contribution Of 3R's Towards Water Conservation

The 3R's of water conservation are Reduce, Reuse and Recycle the water which are the heart of the global water conservation. The first and most effective component ofwater conservation is reducing water consumption. Consumers are encouraged to reduce their water consumption by inducing a little-changes in their practices of water utilization. Despite efforts to reduce the amount of water consumption, some wastewater is still generated. Upon looking at the quality of wastewater in detail, wefound that the quality of wastewater from some application or some area is good enough to be used in other application or area. Therefore, we can reuse that wastewater immediately to minimize the strain on the environment and wastewater management. After minimized water consumption by reducing and reusing concept, somewastewater is eventually discarded. Areas which have limited water resources must adopt wastewater polishing and recycle as theyare important methods for reducing water supply consumption and minimizing wastewater discharge.

The above is also widely accepted by the public because when asked to scale contribution of 3R's towards water conservation from very less(1) to great extent(5), majority of the answers were to a great extent.



To what scale, the 3R's(Reuse, Recycle, Reduce) can be beneficial in contributing to circular economy?

Primary Data Collected through online Survey

Role Of Geoinformatics In Water Resource Management

Geographic Information System (GIS) is an effective tool for storing, managingand displaying spatial data often encountered in water resource management. The application of GIS in water resource management is constantly rising. In order to stress the importance of GIS in water resource management, applications related to this area are addressed and evaluated for efficient future research and development. Few of the applications of GIS are listed below:

- 1. Storage and management of geospatial data about water resources
- 2. Hydrologic Management
- 3. Modelling of Ground Water
- 4. Quality Analysis of Water
- 5. Water Supply Management
- 6. Sewage Water Management
- 7. Stormwater Control and Floodwater Management

Role Of Government InWater Resource Management

Water resource management is the activity of planning, developing, distributing and managing the optimum use of water resources. Government policies and people's participation in conserving water is much needed. The government should take various initiatives for water conservation like:

- 1. Integrated Water Resource Management
- 2. Watershed Management
- 3. Subsidising Rainwater Harvesting
- 4. Awareness Programs
- 5. Paid Water Supply
- 6. Strict Rules and Regulations

What according to you must be prioritized by the government in achieving the Circular Economy?



Primary Data Collected through online Survey

Conclusion:-

To address water circularity, fundamental changes are needed in the way water is managed and valued. Care should be taken in the way data is shared among practitioners, policies, regulations and assessment frameworks. In order to achieve the Net Zero targetsby the scheduled time, it's the collective responsibility of the governments, organizations, groups and individuals to contribute their respective parts. Water is one of the most precious resources that needs to be conserved and managed sustainably at the immediate moment. But if it is not done, we will not be surprised to see World War among the nations for water.

Bibliography:-

- 1. Nika C.E., Vasilaki V., Expósito A., Katsou E, Water Cycle and Circular Economy: Developing a Circularity Assessment Framework for Complex Water Systems.
- 2. Vyas, Jitesh Narottam; Nath, Supriya ; The Role of Government and the Public in Water Resource Management in India,
- 3. Use of Geographic Information Systems (GIS) in water resources: A review, Vassilios A. Tsihrintzis, Rizwan Hamid & Hector R. Fuentes
- 4. https://www.fao.org/land-water/water/water-management/agriculture-water-management/en/
- 5. WeigendRodrÃguez, Ricardo; Pomponi, Francesco; Webster, Ken; D'Amico, Bernardino: The future of the circular economy and the circular economy of the future
- 6. Rodriguez-Anton, J. M.; Rubio-Andrada, L.; Celemín-Pedroche, M. S.; Alonso-Almeida, M. D. M. : Analysis of the relations between circular economy and sustainable development goals
- 7. Sariatli, Furkan: Linear Economy Versus Circular Economy: A Comparative and Analyzer Study for Optimization of Economy for Sustainability
- 8. Conlon, Katie; Jayasinghe, Randika; Dasanayake, Ranahansa : Circular economy: waste-to-wealth, jobs creation, and innovation in the global south
- 9. Gupta, Amrita: The Third World War will be about Water, Carnegie Council for Ethics in International Affairs
- 10. https://www.unep.org/resources/emissions-gap-report-2021
- 11. https://www.water.wa.gov.au/urban-water/urban-development/urban-water-management
- 12. https://www.iea.org/reports/net-zero-by-2050.