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# Reuse Of Water

**D**o we have enough water in India? Yes, if we manage it well! Water is going to be the most precious resource and even be a critical factor in our dream to be a Viksit Bharat!

Statistically speaking, India is now water stressed. Per capita water availability has come down from 5177 m<sup>3</sup>/year in 1950 to 1341 m<sup>3</sup>/year in 2021. If this statistical trend continues, we may soon run out of water to cater to world's largest population of human and bovines residing here. Statistics, is like bikini- it reveals the suggestive, but conceals the vital! So is the massive reduction in per capita is because we get reduced rains? Not necessarily! Per capita water availability is a ratio of total water available and the population.

Despite being home to 18% of global population and close to 19 crore cattle, India holds just 4% of the world's freshwater resources. Major chunk of water comes from monsoons. On an annual average, monsoons bring approximately 1,070 mm of rain in ~100 hours each year, with wide spatial and temporal variation. Lately, climate change is driving erratic monsoon behavior -with fewer rainy days but more concentrated, intense rainfall. Rainfall has decreased from around 1070 mm in 1970 to about 1034 mm by 2010- a noticeable downward trend over ~40 years, but in the early 2020s, the annual average rose again to about 1095 mm, indicating a possible shift back toward higher rainfall. So, annual water availability due to precipitation,

more or less remains the same.

Even if the numerator remains constant, if the denominator increases, the ratio comes down. Over the years it is seen that the numerator, mainly contributed by the rain during the monsoons has relatively been constant, (slight dip in two decades, but has picked up now), but the denominator has increased over 4 fold from 36 crores in 1951 to 142 crores now! This is a major reason for the reduction of the per-capita availability.

To ensure water security, we need to manage the supply side and demand side of water. The 5 Rs for water conservation are -Reduce, Reuse, Recycle, Recharge and Respect. Among these, the Reuse part is the one which gets the least attention. Reducing water use by process re-engineering to increase Water Use Efficiency (WUE) saves water. Similarly, reusing and recycling water also effectively increases water availability, as they reduce the abstraction of fresh water. There is a subtle difference between the two.

Water reuse uses treated water for different, often less demanding purposes (like irrigation, toilet flushing, or groundwater recharge) than its original use, while water recycling treats wastewater for the same use (e.g., industrial cooling). Recycling is a specific type of reuse, though terms are often used interchangeably. Recycling involves extensive multi-stage treatment (preliminary, primary, secondary, tertiary) to meet specific quality standards, to meet strict standards for repeated use in a closed loop, often for a single, defined purpose. Reuse might involve simpler treatment for diverse beneficial purposes different from its initial use, often for non-potable needs, extending water's life before it re-enters the environment. Both practices

increase effective water supply, reduce pollution, and conserve freshwater resources, making them crucial for sustainable water management.

Reuse of water may mean multiple use of same water, with permissible quality deterioration. An often quoted example is the RO reject-water. RO filters used in home have an outlet through which "the rejected water" flows out. This is not "bad water" and may have higher TDS etc. This water which is generally drained out water basin can be collected in a vessel and can be used for washing the vegetables and fruits. This used water is good for mopping the floor. This can be used for the third time for water our plants in the pots or garden lawns. So, 1 water is used 3 times, which would have otherwise necessitated abstraction of fresh water each time. With thousands of ROs in operation in cities, imagine the quantity of water saved by simply re-using water. This does not involve any costly purification purposes at all!

Environmental Benefits of reuse of water includes - Retaining wastewater for reuse, saving energy otherwise required to extract or transport freshwater to the area, recharging groundwater, avoiding freshwater resource degradation and salinisation. Socio-economic benefits include increased water availability for potentially water stressed or arid areas, reduced cost of water to economic sectors such as industry and agriculture. It also diversifies water sources, which increases climate resilience.

To ensure sustainability of life on this planet, we need to ensure circularity of water. Encouraging reuse of water is a good beginning!

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