Water, a scarce resource!

Water is the liquid gold of our planet. Today, water has become a scarce resource for human consumption and adequate clean water for the rest of the ecosystem and other natural inhabitants, including the aquatic fauna and flora is also becoming a struggle.

As per the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Water Development Report, India is a bigger extractor of ground water (not only in Asia , which means bigger than China but in the world i.e. bigger than USA as well). Data shows that even though India contains 18% of the planet's population, it is home to only 4% of the world's freshwater. Our unpredictable weather and intermittent droughts, have led to a natural burden on groundwater table water. India's over dependence has made us one of the most water-stressed countries in the world. Impending fury of climate change is also bound to worsen the situation by increasing this frequency of simultaneous or alternate droughts and floods cycle.

Few alarming statistics of ground water and shortage / crisis of the water situation in India are as follows:

- 21 major cities of India may run out of adequate groundwater by 2025, affecting more than 100 million people
- Currently > 75% homes in India do not have safe potable water at home
- Approximately 84% rural households do not have piped water
- 70% of India's water is contaminated.
- India is ranked 120 among 122 amongst the world in the water quality index
- Acute and severe water scarcity for millions and resultant loss of 6% of the country's GDP is possible by as early as 2030
- Statistical data from 2021 shows that 90 percent of groundwater in India is used for agricultural purposes

- Remaining 24 billion cubic meters is used for 85 percent of the country's drinking water supply
- A study published in Science.org stated that large belts of north-western and southern India are projected to have *critically low groundwater availability by 2025*
- The entire country is further predicted to *face severe water stress by 2050*.

Urban jungles and major metro cities of India have alarmingly densely populated areas along with an added industrial burden on them. As a result the groundwater (especially for landlocked cities like Delhi is the only source of water which is exploited heavily). Illegal boring of tube wells and unauthorized ground water pumping has dried up the water table of Delhi NCR. Following is the list of metro cities and their declining water table in a survey done few years ago.

Metro cities with declining water tables (courtesy; article 6th June 2022 issue of Down to earth, editor Charu Gupta)

City	Decline in water table (in meter)	Since
Kolkata	7 to 20	2000
Ghaziabad	12	2016
Gurgaon	5	2018
Noida	17	2016
Greater Noida	6	2016
Delhi	0.5-2	Per year

Image : courtesy 6th June 2022 issue of Down to earth, editor Charu Gupta

In a survey done in 2019, 17% of the 191 million households in rural India had access to tap water connection. Central Groundwater Board reported in 2017 that almost 40% of 700 districts in India are in the zone of 'critical' or 'overexploited' groundwater level.

Reasons for Depletion of ground water

1. **Increased demand** to satisfy the teeming population of billions for domestic, industrial and farming needs with limited surface water inadvertently leads to over-exploitation of groundwater.
2. **Ground water recharge and storage facilities are limited due to** hard and rocky landscape, in addition to small quantities of rainfall, in western, north and central India.

3. **Mismanaged farming:** ***The Green Revolution*** could allow farmers to grow crops with increased water demands in water deficit regions, which led to leading to over use of groundwater.
4. **Increased Frequency of pumping out water** from the ground without allowing it to recharge can cause quick depletion.
5. **Government provisions for subsidies on electricity and high MSP for water intensive crops** leads to mismanaged farming practices and water depletion.
6. **Water contamination** by sewage contamination from septic tanks, seepage and leaching industrial or plastic waste from landfills, gas tanks, pesticides- fertilizers causes damage of groundwater resources.
7. **Inadequate regulation** of groundwater laws allows illegal water pumping and boring
8. **Deforestation,** unscientific agriculture, industrial effluents, inadequate sanitation lead to pollution of groundwater unfit for drinking etc.

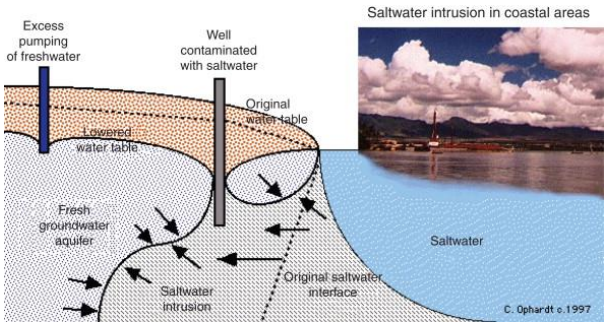
Impact

- A shocking 2,00,000 people die each year due to contaminated water.
- Droughts are becoming more frequent in landlocked cities and villages with inadequate ground water recharge.

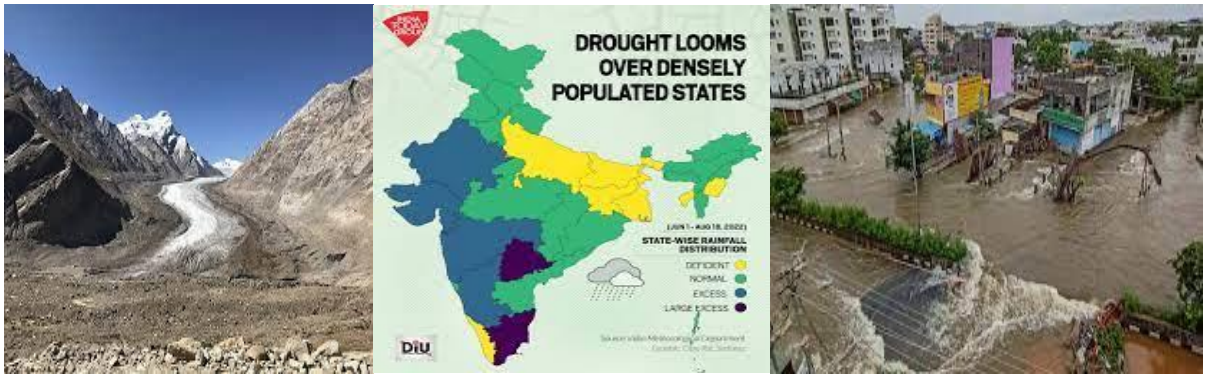
How is climate change responsible for India's water problems: (as per National water mission overview and statistics)

- There is a palpable reduction in mass and number of glaciers in the Himalayas
- A drought like environment has been created in the country due to shortage in rainfall
- Climate change is driving flash floods and sudden bouts of increased high intensity rains and resultant floods

- The detrimental effect is on quality and quantity of groundwater
- There is also increase in salinization of water bodes close to the coastal areas due to global warming and rising sea levels



Salinization of coastal areas of ground water



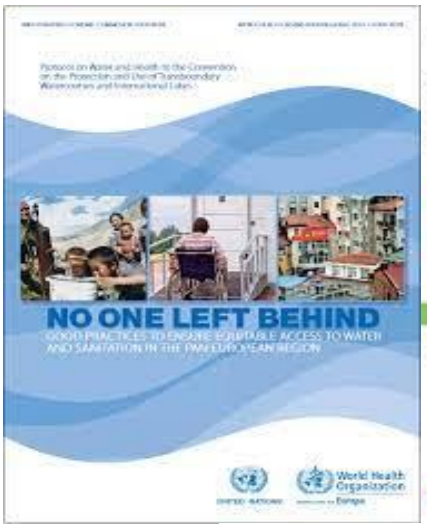
Melting glaciers of Himalayas , Map of India depicting drought areas, flash floods in Bangalore

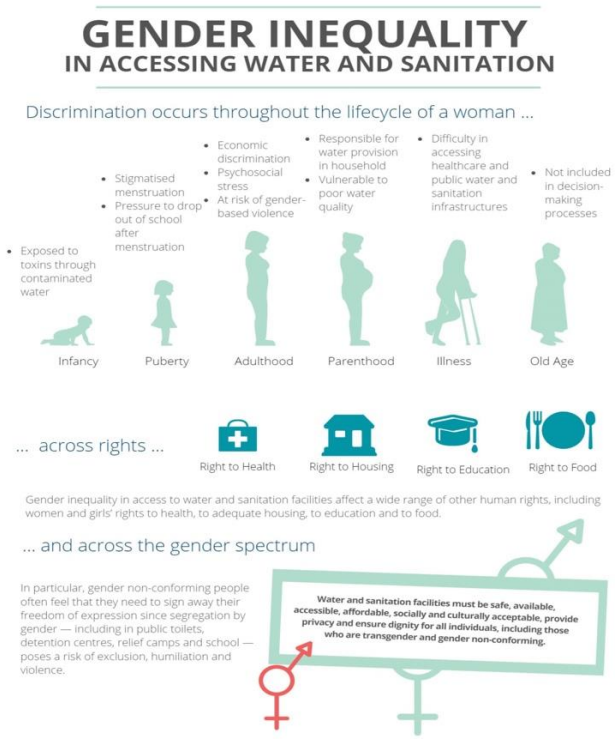
What are the solutions to our water problems?

- Strict policies to implement restrictions by law-police enforcement, national green tribunal and water managing civil board to ***Stop*** *access to groundwater in critical areas* (i.e. where water table is declared critically low or overused)

Image :Courtesy; Times of India

- Water is a common resource and not a private property or privilege for the rich and enabled class of society and it should be equitably distributed with access to all





- Policies and stringent laws should be formed to address issues such as surface water logging, ground water salinity, pesticide and fertilizer induced leaching of toxins into ground water, mixing of industrial effluents into surface and ground water

- Research and scientific evaluations should be done before forming any policy

Organizations involved in Water Quality Monitoring in INDIA

- Central Pollution Control Boards
- State Pollution Control Boards
- National Environmental Engineering Research Institute (NEERI), Nagpur
- Central Groundwater Board
- State Groundwater Departments
- Universities, colleges, and other academic / technical institutes
- State Public Health Engineering Department
- State Irrigation Department
- National Institute of Hydrology
- Indian Council of Agriculture Research
- Central Inland Fisheries Research Institute
- Central Water Commission (since 1972)

- Ground Water depletion can be controlled by reducing electricity subsidy
- Better farming practices by adopting micro-irrigation techniques; drip irrigation, micro-sprinklers should be implemented as laws and strict adherence to the same should be done

Drip irrigation and micro-irrigation system

- Various government schemes like DRIP programme, more drop per crop, Krishi Sinchai Yojana for economical water practices in agriculture should be widely advertised and taught to grass root workers and farmers.

- Farmers and field workers must work together with bottom-up approach by involving the local community to become active participants in managing groundwater.
- Community level involvement by local panchayats to engage farmers

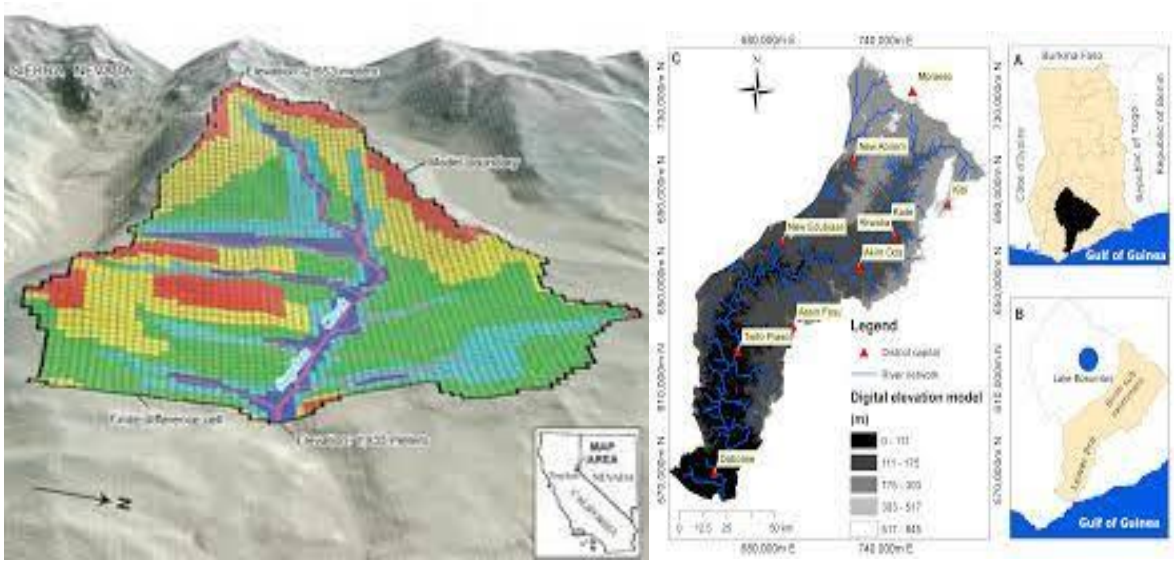
Developing a Panchayat level agricultural plan

- Traditional methods of water conservation should be encouraged to minimize the depletion of water resources.

Bawdi in Rajasthan-Gujarat- , Baolis/ Dighis in Delhi water collects in rainy season and then used in rest of the year as well as source for ground water recharge

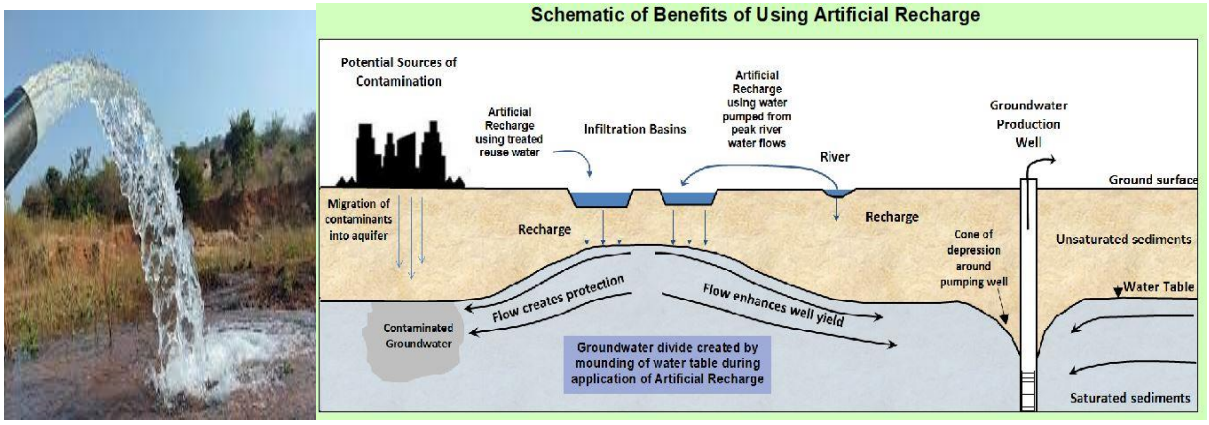
Traditional rain water harvesting practices, created like mini-dams for filtering of rainwater and groundwater

- Technology should be used to determine the relationship between surface/ ground hydrological units, identification of groundwater recharge areas, mapping of groundwater etc.



Surface water flow models and characterization of surface water

- Artificial recharge of tube wells, water reuse, afforestation, scientific methods of agriculture

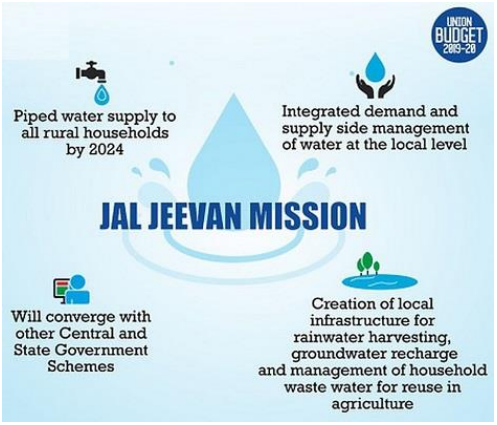


- Imparting key hydrogeological skills to non-profits and rural practitioners to improve decentralised water management in India.

Agha Khan foundation helps rural women to conserve water & Veolia foundation provides water for 5 villages in Tamil Nadu

Government Led programs for water conservation and Management

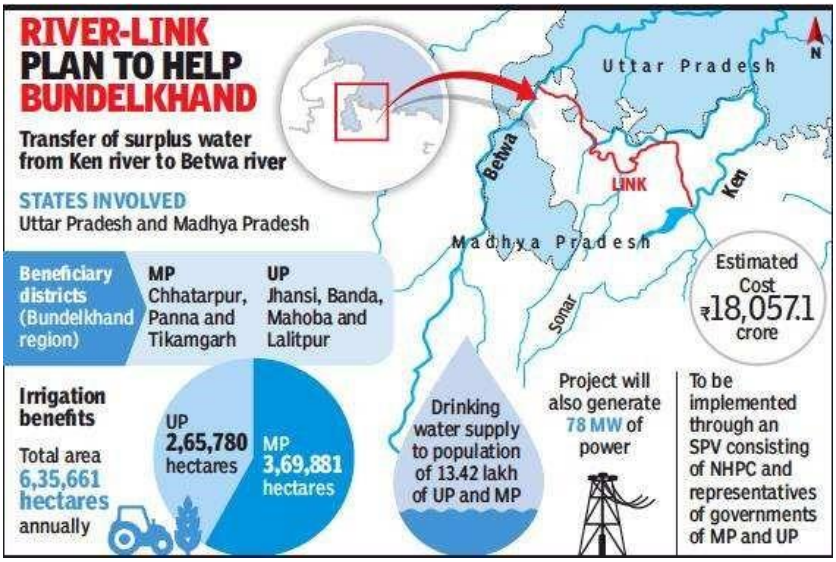
1. **Jal Jeevan Mission** : Tap water to every rural household by 2024



2. **National Perspective Plan** for water transfer from surplus basins to water-deficit ones (1980). The National Water Development Agency, which had identified 30 such river links. **Ken-Betwa river-interlinking project** under Jal Shakti ministry, the project will be of immense benefit to the water-starved region, especially the districts of Panna, Tikamgarh, Chhatarpur, Sagar, Damoh, Datia, Vidisha, Shivpuri and Raisen of Madhya Pradesh, and Banda, Mahoba, Jhansi and Lalitpur of Uttar Pradesh.

It will transfer water from the Ken river to the Betwa river, both tributaries of the Yamuna. The Ken-Betwa Link Canal will be 221 km long, including a 2-km long tunnel.

According to the Jal Shakti Ministry, the project is expected to provide annual irrigation of 10.62 lakh hectares, supply drinking water to about 62 lakh people, and generate 103 MW of hydropower and 27 MW of solar power.

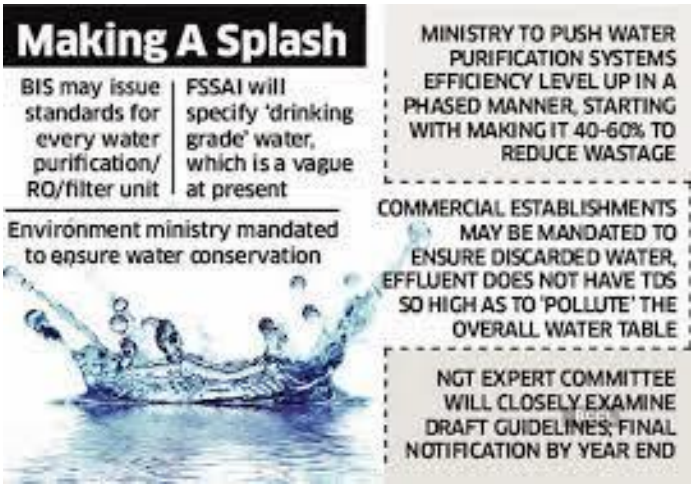


3. **Piped water supply** to homes in Bundelkhand and Vindhya regions of the Atal Bhujal Yojana, (2019) participatory ground-water management in 78 districts of seven states, including the Bundelkhand region of Uttar Pradesh and Madhya Pradesh. The World Bank is funding this project.

4. "Jal Shakti Abhiyan - Catch the Rain" (JSA:CTR) with the theme "**Catch the rain, where it falls, when it falls" :** rainwater harvesting structures, with people's active participation

March 22 is celebrated as 'World Water Day' every year

5. **Bureau of Water Use Efficiency**



6. **Sahi Fasal Campaign**

Launched by National Water Mission on 14.11.2019, to encourage farmers in water stressed areas to grow crops which are water efficient and economically remunerative, healthy and nutritious, suited to the agro-climatic-hydro characteristics of the area are environmentally friendly. Creating awareness among farmers on appropriate crops, micro-irrigation, soil moisture conservation etc; weaning them away from water intensive crops like paddy, sugarcane etc to ***crops like corn, maize etc***

7. **Water talks:** launched 2019 to start a dialogue on water conservation and discuss each month. Since then many lectures and talks have been delivered .

Our Water Pledge

"I take an oath to conserve water and to use water wisely.

I pledge to consume water judiciously and not waste even a drop of water.

I will treat water as a most precious treasure that I possess and consume it accordingly.

I pledge to motivate my family, friends, and neighbours to use water wisely and not waste it.

It is our planet. Only we can save it and thus save our future!!"

Individual Efforts for Water conservation

Water scarcity is a reality in Delhi, especially in the area where I live, since its terrain is supposedly hard and rocky. The sewage pipeline running outside our house is incompletely connected to the main pipeline so every rainfall leads to collected rainwater on roads without proper drainage system and mixing of these precious water.

The water supply is frequently hit and is received at small intervals for few hours.

To conserve ample water in the house-hold activities and for our daily needs we follow a strict water conservation policy with ' Every drop counts policy and 'save every drop' as our motto.

Below are few of the personal efforts (both big and small) that I and my family make to contribute our bit to the community, for conserving water; a scarce resource :

1. Never run the tap while brushing teeth
2. Use water from a bucket instead of a shower (saves gallons of water)
3. Never allow a tap to be leaky (it can run out litres of water with each drop in just a day!)
4. Use home-made or non-toxic toilet-floor cleaners / natural cleaning agents instead of chemicals to prevent leaching of chemicals into the sewage system
5. Sewage water recycling plants in homes with gardens or a common plant for a housing community to be used for greenery – plantations, parks etc.

6. Rain water harvesting system installation in our homes/ communities/ housing colony
7. Use of RO wastewater for mopping and cleaning , followed by use of same water for watering the plants.
8. Mop floors only on alternate days / only when necessary, to save water , also use very little water for soaking the mop before changing it
9. Laundry with bucket (soak and rinse together) , reduce use of washing machines
10. Washing machines to be used with the smallest wash cycle / semi-automatic models are more water friendly/ front load machines are better to save water compared to top-load machines.
11. Cook lentils/ dals /rice in the same water in which they are soaked, this helps preserves nutrients and saves water
12. While washing dishes , soak all dirty dishes together in a tub-sink and then rinse together in a common basin. Avoid *running water* to wash dishes. Avoid dishwashers as much as possible to avoid excess water consumption.
13. Wash vegetables and fruits in a big pan with vinegar/ home-made cleanser/ non-toxic non-chemical solution
14. Always carry your own water bottles, avoid carrying plastic bottles and buying packaged water (prevents waste and plastic use)
15. Whenever in a restaurant or wherever water is served, only take half or less in a glass at one time. Do not leave behind water in a serving glass to be thrown away later.
16. Use / Grown only those potted plants in the house/ lawn which are water friendly and non -water exhaustive. E.g cacti, Tongue plant etc.

Conclusion

The most reliant and effective answer to the water crisis in India and the world is for each person to contribute their bit as individuals, families, communities and nations.

Starting from extraction of underground-surface water to its proper and sensitive management – at all levels, would eventually lead us to water prosperity and success.

Water, being a basic need of humanity is the lifeline of earth. It only needs to get the respect as the most naturally provided gift to us by this planet, a blessing and a unique reason for life!

'Each one save a drop !'