

THE AWARE CONSUMER

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THE PRESCRIPTION

Beyond the Tap: The Rise of Packaged Drinking Water

MY MARKET

Unlocking the
Path to Pure and
Non-Chemical
Healthy
Drinking Water

World Water Day
Should Be Observed Every Day!

INTERVIEW



Mr. VEERAMALLA PRAKASH RAO
CHAIRMAN OF
TELANGANA WATER RESOURCES DEVELOPMENT CORPORATION

IN FOCUS
Returning Water
by Recharging
the Ground!

PLUS

ROUND UP • RESEARCH FEATURE • MY MARKET



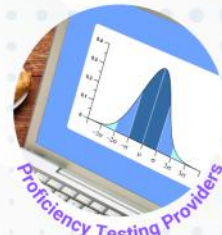
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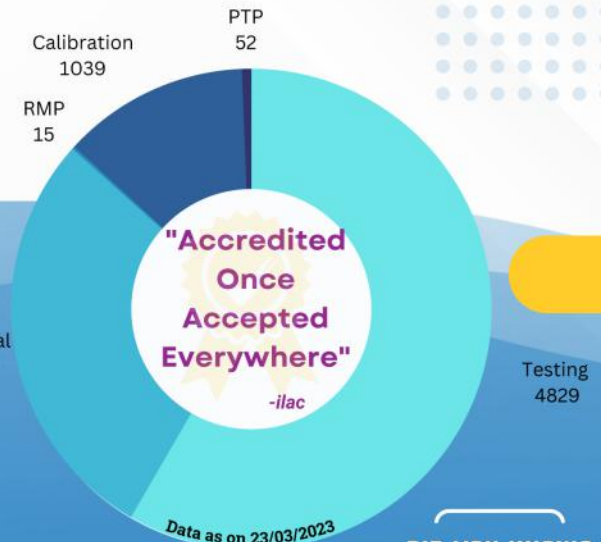
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-- Vivek Vardhan



VIEWPOINT

MESSAGE FROM PUBLISHER & EDITOR

RAISING A CRY FOR WATER!

WATER IS ONE of the most important resources of our planet. Any form of life cannot exist without water. Even our food, industry and electricity hinges on the precious compound called water. However, this is a limited resource and every day, people from all walks of life, face varied challenges regarding water.

Especially during the summer season, taps run dry, borewells fail to yield water and people end up fighting on the streets with empty buckets and cans in their hands! What else can we do when there is no water to drink, bathe, cook food, wash clothes or clean our houses?

But, why is it that, when there is sufficient fresh water on Earth for everyone, consumers still face the daily indignities of life without water? Why do about 600 million people worldwide lack access to safe drinking water? Why are almost 5 million people dying every year due to water-related diseases?

Both the availability and quality of water is under question here. India is grappling with myriad water woes – from dwindling water resources and inadequate infrastructure to inefficient water management practices which are making water scarcity and sustainability pressing issues across the country. These key challenges are amplified in the face of the growing population, abetted by the disruptions of climate change.

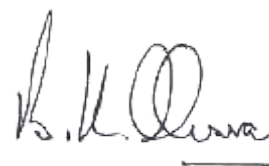
The key lies in committed and ongoing initiatives – a case in point is the purification plant set up by our Healthy You Foundation in a village in UP in 2020. We collected 60 random samples from hand pumps, ponds and wells in the village only to find that the water quality failed abysmally on all counts. We applied for a grant and used the donation to set up a purification plant and provided free drinking water to the villagers. Subsequent health

checks revealed a massive drop in waterborne diseases and the people ecstatically reported a substantial nosedive in their doctor visits and medical costs!

While we were afraid that the project would wither out once we withdrew the subsidy and the villagers were asked to purchase the drinking water, it came as a pleasant surprise that many of the households were keen to buy the pure water and actually demanded that the plant continue to operate. We have handed over the purification plant to the locals and it is actually flourishing as a self-sustainable project spreading good health and cheer among the population!

When such excellent results can be achieved in one village for which I was recognised by National Bank for Agriculture and Rural Development (NABARD) as a Rural Innovator on improving access to safe drinking water, why can't the authorities duplicate the achievements elsewhere and scale it up throughout the country?

Yet, while the authorities have to do their job, even on a personal level, we cannot afford to be careless with this vital resource. Only when we learn to save water and use it cautiously will we be able to have sufficient water for our daily needs and then some more!



Prof. Bejon Kumar Misra

Publisher & Editor

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Effective relief from constipation.



- Overnight action
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**Raho halke,
jiyo khulke.**

PRAFULL D. SHETH

Editorial Board Member

EXPLORING THE WATER CRISIS IN INDIA



WATER IS LIFE! Global health rests on the trinity of safe drinking water, hygienic sanitation and sound water management. So much so that, 'Clean Water and Sanitation for All' is one of the 17 Sustainable Development Goals formulated by the United Nations.

Alas, water scarcity is a man-made problem and we have to work hard towards achieving water security once again. Judicious management in terms of conserving the water resources, minimising wastage and ensuring a more equitable distribution across regions is crucial for meeting the growing requirements of our developing economy.

Indeed, everyone from international organisations and national governments to private organisations and individual water warriors are working towards conserving, preserving and cleaning this precious resource which sustains life on Earth.

India is not to be left behind – we have a robust framework of government initiatives for planning, developing, distributing and managing the optimum use of water resources.

Still, the fact remains that the quality of surface water is deteriorating by the day while the groundwater is drying up rapidly. Meanwhile, billions of litres of wastewater is discharged regularly without being treated or reclaimed.

Degrading quality and pollution of water bodies is another threatening issue that impacts the ecosystem, the public health and the economy. The problem gets exacerbated by irregular rainfall patterns, prolonged droughts, drying up of rivers and frequent extreme weather events. Not to mention the ongoing water politics with disputes over the sharing of river waters between states continuing unabated.

Drinking water either does not reach our homes or the water coming from the tap is too contaminated to be able to drink directly. To add to this, we have to pay huge bills for what is actually an essential commodity! Meanwhile, the packaged drinking water industry continues to flourish.....

The picture is clear – we need to pull out all the stops to be able to reach an acceptable quantity and quality of water for health, livelihoods and production. The focus has to be as much on providing adequate drinking water facilities and irrigation planning as on monitoring the water quality, conservation, groundwater development, flood control and drought management. Rain water harvesting and recycling of waste water is equally crucial.

Otherwise, as estimated by the World Economic Forum, the water supply may be outstripped by water demand by 40% by 2030 and many top cities will be heading for Day Zero - when they completely run out of water! ▶



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RESEARCH FEATURE

WATER: HOW MUCH WE HAVE AND
WHAT ARE WE DOING ABOUT IT!



Diving deep into the essence and
presence of water, we unveil
the status and importance of water
in our daily life.

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HORIZON

THE WATER POSITIVE
MOVEMENT
GAINS MOMENTUM



Top international companies are
leading the way to return more water
to nature than they consume.

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INTERVIEW



MR. VEERAMALLA PRAKASH RAO
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MY MARKET

UNLOCKING THE PATH TO
PURE AND NON-CHEMICAL HEALTHY
DRINKING WATER



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IN FOCUS

RETURNING WATER BY
RECHARGING THE GROUND!



Groundwater accounts for majority
of the liquid freshwater that is used
on the planet. Water that is drawn
from the ground forms the lifeline
of the people of India.

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OUT OF THE BOX

TREATING WASTEWATER
TO MAKE IT REUSABLE –
A REVOLUTIONARY
TECHNOLOGY COMES
INTO PLAY



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Published at:
B - 306, 1st Floor,
C.R. Park, New Delhi-110019

Printed at:
M/s. Swastika Creation
19, D.S.I.D.C. Shed, Scheme 3,
Okhla Phase II, New Delhi - 110020

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Total number of pages - 64, Including Covers

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Cities have to learn to live with rivers,
build with nature and make room for rivers.

ROUNDUP



Yamuna River on Death Bed: Community Survival at Stake



DESPITE OVER 50 million people depending on the water of the Yamuna river, it has developed into one of the most polluted rivers in the world. New Delhi dumps much of its waste into the river, generating almost 2 million litres per day, of which only 5% is treated. To top this, countless industries dotted along the banks of the river treat the waters like a personal dumping ground, discharging toxic pollution at will. India has spent almost \$500 million in clean-up efforts, but due to the magnitude at which untreated sewage, industrial waste and domestic waste is pumped into it, it remains one of the world's most polluted rivers.

A study was conducted to test the amount of metals present in soil and groundwater located near the textile and tannery industries in Haridwar, India. Results indicated all the metals like chromium, iron, manganese, copper, lead and cadmium were present in amounts larger than that prescribed as safe by World Health Organisation (WHO).

On March 20th 2017, the High Court of the State of Uttarakhand in India declared that "the Rivers Ganga and



Yamuna [are] legal persons... with all the corresponding rights, duties and liabilities of a living person". Judges Rajeev Sharma and Alok Singh said the Ganges and Yamuna rivers and their tributaries would be "legal and living entities having the status of a legal person with all corresponding rights, duties and liabilities".

Granting legal right to rivers may provide an opportunity for community and state to change

their attitude and value toward rivers as a living being rather than a commodity. However, in a corporate-driven hungry environment, to what extent this will be implemented on the ground in the long run remains a big challenge!

— **Bratindi Jena, Ph.D.**
Psychology, University of Delhi
Associate Director, ActionAid
Association, India

DATA BRIEFING

**Globally,
2 billion
people
(26% of the
population) do
not have safe
drinking water**



RESTORING THE RIVERINE ECOSYSTEM OF THE GANGA RIVER BASIN



Mr. G. Asok Kumar,
Director General,
National Mission for
Clean Ganga, NamamiGange

NAMAMIGANGE MISSION IS a holistic and integrated river rejuvenation programme not just to clean the Ganga river but restore its entire riverine ecosystem. NamamiGange is premised on the five important pillars of:

- **Nirmal Ganga** (unpolluted river)
- **Aviral Ganga** (unrestricted flow)
- **Jan Ganga** (people's participation)
- **Gyan Ganga** (knowledge and research based interventions)
- **Arth Ganga** (people-river connect through the bridge of economy)

The interventions under NamamiGange, over the past 8 to 9 years, have resulted in improved water quality in

the main stem of river Ganga. This is borne out by increased sightings of aquatic species such as Gangetic dolphins, turtles, otters etc.

It is a matter of great pride that the United Nations recognised NamamiGange as one of the top 10 World Restoration Flagships during the Conference for Biological Diversity (COP15) held at Montreal, Canada on 13th December, 2022. Led by the UNEP and FAO, the World Restoration Flagships represent the first, best or most promising examples of largescale and long-term ecosystem restoration, embodying the 10 Restoration Principles of the UN Decade.

This recognition for NamamiGange is a defining moment for the Government of India, which has left no stone unturned to restore the pristine glory of Maa Ganga. Let us look at some of the key endeavours undertaken to achieve this historic win.

Enhancement of the Treatment Capacity of the Basin

193 sewerage infrastructure projects worth Rs 32,797 crore are sanctioned to create/rehabilitate a cumulative treatment capacity of 6,029 MLD and lay 5,237 km sewer network. Introduction of innovative best practices such as Hybrid Annuity Based Public Private Partnership Model and One-City-One-Operator (OCCO) model have ushered in a paradigm shift in the Indian wastewater sector.



Close Monitoring for Industrial Pollution Abatement



Several initiatives are being rolled out to limit or reduce pollution discharge from the industries based in the Ganga basin. Inventorisation and annual inspection of Grossly Polluting

Industries is conducted to ensure compliance to set standards. Since 2015, sector specific charters are released for industrial sectors such as pulp and paper, distilleries, sugar, textiles, etc. Additionally, various Common Effluent Treatment Plants are also sanctioned for industrial sectors located in Jajmau, Unnao, Mathura and Gorakhpur; and they are under various stages of execution.

Reviving the River's Natural World

The Ganga river ecosystem supports more than 25,000 floral and faunal species. The Ecological Flow Notification 2018 is a landmark decision, recognising the right of the river over its own water. It also marks a defining moment for ensuring the Aviralta or unrestricted flow of the river. Other endeavours include the declaration of the Ganga riverbank and its foodplain as construction free zones.



Strengthening People River Connect

This has been at the helm of all activities undertaken for NamamiGange, which has resulted in its transformation into a Jan Andolan. Dedicated cadres of Ganga saviours such as Ganga Praharis, Ganga Doots, Ganga Vichar Manch, Ganga Mitras, etc. are making persistent efforts to mobilise grassroot level communities and raise public awareness.

Several innovative public outreach activities such as Ganga Utsav, Nadi Utsav, Ganga Amantran, Ganga Run, Ganga Quest, Azadi ka Amrit Mahotsav, Mission LiFE, Ghat par Haat, Ghat par Yog, Rag Rag Main Ganga, cleanathons and plantation drives, etc. are conducted to maintain the momentum.

Real Time Water Quality Monitoring

In April 2023, NMCG inaugurated PRAYAG or 'Platform for Real-time Analysis of Yamuna and Ganga and their Tributaries'. Eight dashboards have been set up in PRAYAG including Project Monitoring Tool: a



centralised cloud-based tool to monitor real time status of all projects undertaken under NamamiGange,

Boosting Nature Based Sustainable Livelihood Opportunities

Arth Ganga is based on the symbiotic relationship between nature-society and aims to strengthen the people-river connect. It strives to improve the quality of life of people in Ganga basin by boosting local economy and generating livelihood opportunities. ▶

Cleaning Ganga is not just the government's job; society's contribution is crucial as well!

– Gajendra Singh Shekhawat,
Minister of Jal Shakti, Government of India





Celebrating Water Conservation Champions That Are Making a Difference



Water is essential for sustenance of life. It is a limited resource. However, we have monumentally failed to harness and use it in a judicious manner. And the results are staring us in the face. In 2014-15, the IPL cricket matches were not

allowed to be conducted in Maharashtra to save water. In Indore, the state government had ordered police escort for water tankers and guards at all water sources. In 2019, Chennai reeled under a severe water crisis and the civic bodies declared 'Day Zero' as the city ran out of water and all the reservoirs dried up. Water was brought in by trains from 200 kms away to save the city.

Meanwhile, water activists and organisations in different parts of the country are fighting to conserve water and supply it to those who need it the most!

HIWARE BAZAR IS a nondescript village in Ahmednagar, Maharashtra. Circa 1989, this was a drought-prone and impoverished area marked by low agricultural yield, paucity of resources and a high migration rate. 80% of the people migrated to bigger cities in search of work and hardly 90 families were left to face the frequent crop failures in the semi-arid region.

It was one man's vision and efforts - Mr. Popatrao Pawar – who was moved by the plight of the villagers when he visited his home town in the summer. He contested the Gram Panchayat elections and became the Sarpanch of the village. Thereafter, he started water conservation programmes in full earnest with a focus on watershed management and rainwater harvesting. The villagers built 52 earthen bunds, 32 stone bunds and 9 check dams to collect the rainwater and recharge the groundwater.

One of his unique approaches was to introduce different cropping patterns to conserve water. This was met with resistance from the farmers in the initial stages.

Today, Hiware Bazar is a green, prosperous and self-sufficient village that stands as a role model for the entire country. More and more people are returning to the village and the population now stands at 235 families - or 1250 people. It has also earned the distinction of India's richest village and supports the highest per capita income in the country with the villagers earning an average of Rs. 30,000 every month. What's more, nearly 60 families are millionaires now!

In 2020, Mr. Popatrao Pawar received the Padma Shri honour from the Government of India for his contribution in the field of social work. He is the Executive Director of Maharashtra state government's Model Village programme. The Rural Development Ministry has set up a training centre in the village while Pawar regularly travels to other parts of the country to spread awareness and knowledge about water conservation.

Mr. Pawar drew inspiration from Anna Hazare's model of village development in Ralegaon Siddhi, another village



“My endeavour is to replicate this formula in 100 villages across the state and solve the water crisis permanently!”

– Padma Shri Popatrao Pawar

However, they slowly agreed to stop cultivating water-intensive crops like paddy and sugarcane and shifted to pulses, vegetables, fruits and flowers that require less water.

Hiware Bazar is perhaps the only village in the country with a Water Budget. The villagers meet every December 31st and decide which crops to grow based on the availability of water. If there is a deficit, they take a collective break from farming.

Meanwhile, the consistent efforts have enabled the village to save water and even raise the groundwater table. It has 294 open wells, each packed with water. The exemplary turnaround was assisted by Pawar getting the Gram Sabha to tie up with the Bank of Maharashtra to grant loans to poor farmers.



Did you know that for every drop of water that falls per second from a leaking tap, 1000 litres goes down the drain every month? You and I may dismiss this as just another statistic, but it shook Mr. Aabid Surti to the core. This author, painter and cartoonist founded Drop Dead Foundation in 2007 and has saved more than 20 million litres of water. The 87 year old goes around every Sunday morning with a plumber and volunteer, fixing leaking faucets across Mumbai for free!





India's self-sufficiency relies on the country's water resources and water connectivity; rapid development is not possible without water security and effective water management. People should boost water conservation efforts and undertake water management work such as desilting and deepening and widening of water bodies, before the onset of monsoon, so that the country can be well-prepared to conserve rainwater.



– Prime Minister Narendra Modi



UNSUNG WATER WARRIORS



MIHIR SHAH



RAJU MASTIHALLA



SONAM WANGCHUK



SANJAY SINGH



VISHWANATH SRIKANTAIH



RAMVEER TANWAR



RAJENDRA SINGH

in Ahmednagar district itself. What used to be another parched village with hardly any water in the 1970s has transformed into a green paradise with more than 1000 acres of land under cultivation. The social activist's interminable determination and efforts have ensured that 80% of the village land is now irrigated and drinking water is never an issue even in rain-deficit years!

Apart from these two stalwart pioneers with their commendable water conservation models, there are scores of unsung water warriors that are battling it out to help their community get water. There is noted water conservationist Mihir Shah, who is now the chairperson of the National Water Policy Committee to a relatively unknown Raju Mastihalla of Uttara Kannada district. The

latter fills a huge water tank with water from his own well and supplies around 4000 litres of water at his own expense to several farmers and other villagers who don't have drinking water!

Sonam Wangchuk, the man who inspired the 3 Idiots movie, started Ice Stupas in Ladakh - artificial glaciers that freeze and hold water which would otherwise flow downstream and be wasted. They hold the water in winter and melt in springtime when nearby fields need watering.

Then there is Sanjay Singh - 'Water Man' of Bundelkhand, Vishwanath Srikantaiah the - 'Rain Man' of Bengaluru, Ramveer Tanwar - Pond Man of India and Rajendra Singh - Waterman of India! In 2021, 41 Indian women were recognised as 'water champions' by UNDP. ▶



Consumers, Beware

Water Matters: Use it with Awareness

Water is the cornerstone of our life – second only to oxygen for our survival. Mankind is to be blamed for the growing water scarcity around the world. And the onus is on us to use it in a mindful manner to safeguard it for the future!



WATER HAS TRULY been termed as the elixir of life! We use it all through the day for drinking, bathing, cooking, washing, cleaning and other domestic uses – taking it for granted most of the time. And yet, even a couple of hours without water supply, or say, access to clean water, can send us into a tizzy.

Imagine this: 1 in 4 people – 2 billion people worldwide – lack safe drinking water. Almost half of the global population – 3.6 billion people – lack safe sanitation. (WHO/UNICEF 2021)

There are various aspects of water that we need to understand to become an aware and cautious consumer:

Necessary for the Body – Water makes up around 60% of the body weight – it is used for various body functions from regulating the temperature to helping the brain function to flushing out waste from the body. Every human has to consume sufficient water on a regular basis – be it through drinking water, other beverages or even food – to keep the body working properly.

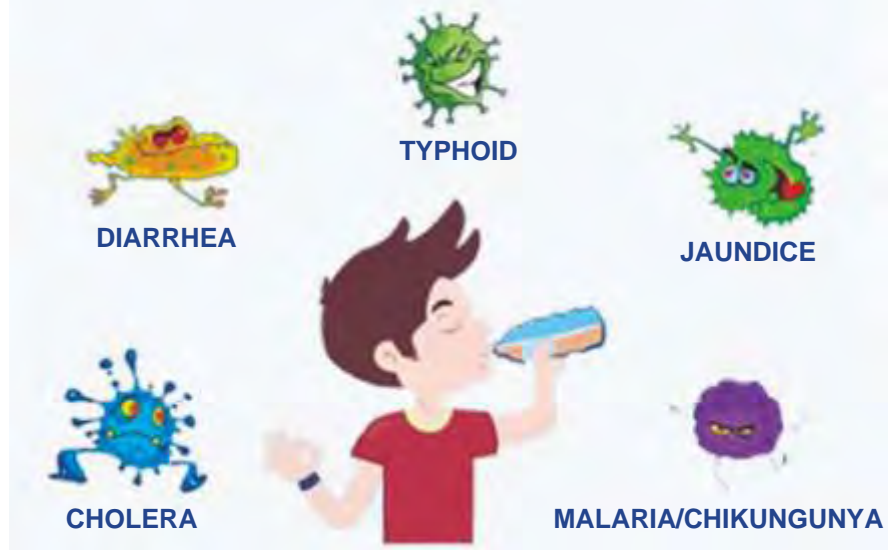
The amount of water consumption will vary depending on the climate, level of activity and other factors. However, insufficient water intake can lead to severe dehydration, resulting in kidney failure, seizures and swelling in the brain.

Tip: Carry a bottle of water with you and keep refilling it throughout the day rather than drinking unsafe water or buying packaged water bottles.

Pollution – It is not just the water in our lakes and oceans that is polluted with dirt, debris and other contaminants. Even the potable water coming from the taps in our homes is not really safe despite all the chemical purification and other processes. Water-borne diseases are very common - 21% of the diseases

WATER BORNE DISEASES

That Can Be Prevented By Consuming Clean Water



in India are related to water. They usually start with fever, stomach pain, diarrhoea and can lead to serious complications if left untreated.

According to the Central Pollution Control Board's estimates, around 80% of India's surface water is polluted; domestic sewerage contributes to 75% of water pollution by volume.

Every two minutes a child under the age of 5 dies of diarrhoea in India. Safe drinking water can prevent these deaths. Therefore, it is your duty to ensure that you and your family consume safe water by making adequate provisions for filtration and safe storage. Maintain proper hygiene standards on the one hand and be mindful enough not to pollute the water bodies around you on the other!

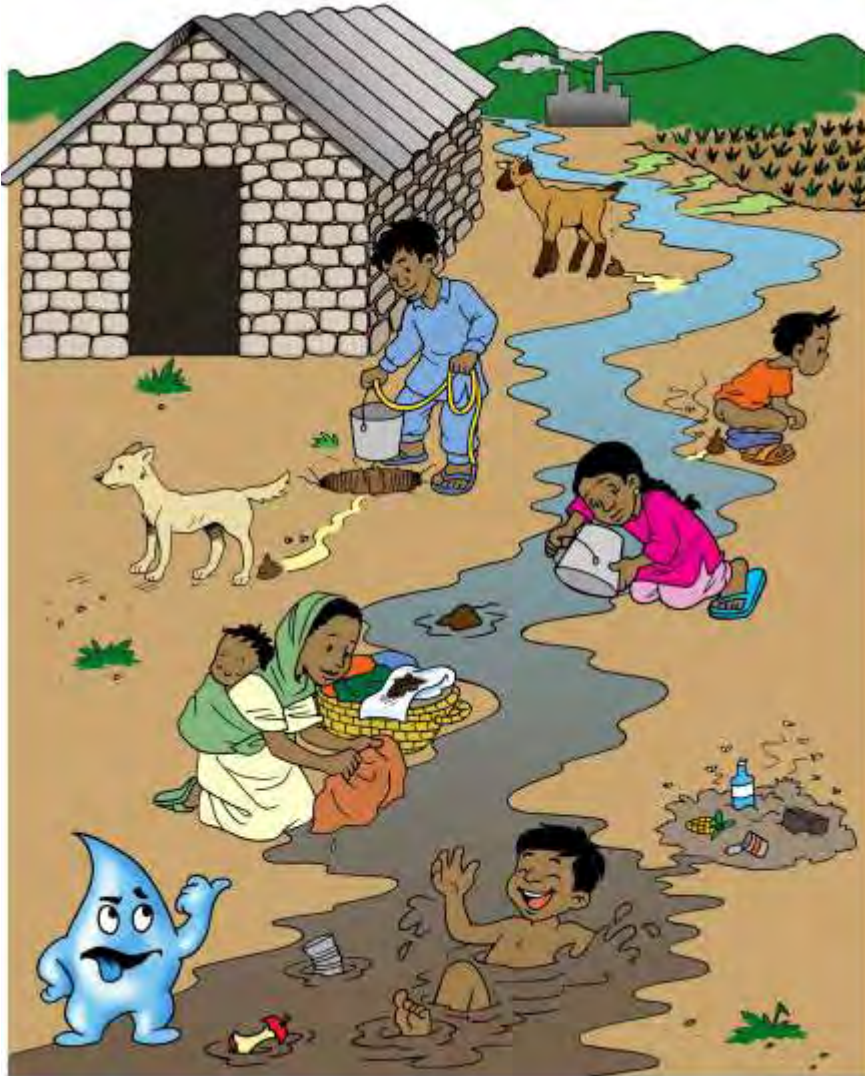
Tip: Proper disposal of waste and preventing littering itself can control water pollution to a great extent!

Scarcity – Whether we realise it or not, water is under threat! Indeed, even though it has been estimated that there is enough freshwater available globally and averaged over the year to meet demand, water scarcity is caused by a mismatch between when and where people need water, and when and where it is available. To add to this, the demand of water increases with the growing population. Not to mention that both our activities and climate change are disrupting the natural water cycles and pressurising the freshwater ecosystems.

A recent report by the government's policy think tank, NITI Aayog states that a large number of Indians face high to extreme water stress! In fact, water scarcity is a serious concern for countries across the world.

You may think that you will always be able to pay and get the amount of water you need – be it through the

1.4 million people die annually and 74 million have their lives shortened by diseases related to poor water, sanitation and hygiene. (WHO 2022)



HOW WATER IS CONTAMINATED



Consumer Alert: There is a strong push for adopting innovative water technologies driven by the growing scarcity of fresh water around the world. Scientists are coming up with solutions like producing water from air and other sources. These are portrayed as the picture of a water secure and sustainable world. However, there is growing anxiety too, as the water may not be safe to drink and can harm the health of the populace. Therefore, consumers should stay alert and not allow such policies to be implemented!



municipal supply, drinking water cans or tankers. However, the future of water is not as secure as you expect it to be!

Do you still think you can afford to be careless with this vital resource? Why not focus on using water in a rational and judicious manner?

Tip: Simply turning off the tap while brushing your teeth can save gallons of water per day!

Cooperation – International organisations and national governments around the world are striving to conserve water and preserve it for the generations to come. However, they cannot achieve water security on their own – the success of water resource management is possible only when the people participate wholeheartedly.

Simple methods of water conservation can be adopted at the household level – all you have to do is reduce wastage of water while bathing, washing dishes/clothes, cooking and the like. There are other focused techniques of water conservation like rainwater harvesting, recycling and reusing waste water, etc.

Tip: Water metering, pressure reducing valves and water-efficient bathroom accessories are more options that can be used by people to save water.

Conclusion

If we don't work together, the days when wars are fought over water will not be far! And the famous lines of The Rime of the Ancient Mariner will come true, "Water, water everywhere and not a drop to drink!" Why not use it wisely to keep water scarcity at bay? ▶



How Much We Have and What Are We Doing About It!

Diving deep into the essence and presence of water, we unveil the status and importance of water in our daily life. Action is ongoing at the international and national levels to combat the looming water crisis, before water becomes a scarce commodity like other natural resources! But the question is: Is it enough?



WATER IS THE basis of all life forms on Earth. We know that our planet is full of water. It covers around 70% of the Earth's surface, but majorly comprises of salt water in the seas and oceans. Indeed, only about 3% is fresh water that is present in rivers, lakes, glaciers and underground water.

That's not all. A miniscule 0.5% or so of the fresh water is suitable for use by people, animals and plants. The rest is either frozen in glaciers or lost in the atmosphere, soil, etc. And this consumable water is under severe threat!

Even the 0.5% of usable freshwater is not equitably distributed. 20% of the world's fresh surface water is in Bikal lake in Siberia, Russia that stays largely uninhabited and unutilised. Tourists visit the place hardly for a few weeks in summer.

According to different reports by the United Nations, nearly a billion people around the world lack access to safe, affordable water. It is projected that by 2030 water demand will exceed supply by 50% in some developing regions of the world. And by 2040, there can be about 4.5 billion people affected by water crisis.

Sea water contains large quantities of dissolved salts, that has to be desalinated for most uses, including human consumption. However, converting hard water to soft water is very expensive.

Unplugging the Uses of Water

Apart from domestic consumption, water is used for various other purposes like:

Agriculture – Water is an integral component of agriculture. Proper irrigation is crucial for growing most of the crops. In fact, around 70% of freshwater is used in agriculture.

Industry – Water is an excellent solvent for a variety of substances and is used in large quantities in many industrial processes. Textiles, paper, pharmaceuticals, steel, cement, chemicals, etc. require a lot of water for cleaning, cooling, diluting, processing and more.

The purity requirements of water for industrial use often exceed those for human consumption. For example, the water used in high-pressure boilers must be at least 99.999998% pure.

Power Generation – Most of the power plants are hydroelectric and use water to spin the turbines and generate electricity.

Transportation – Water serves as the medium of transportation for boats and ships carrying cargo (like oil, natural gas, metal, logs, grains, manufactured products, etc.) and people through oceans, seas, rivers and lakes.

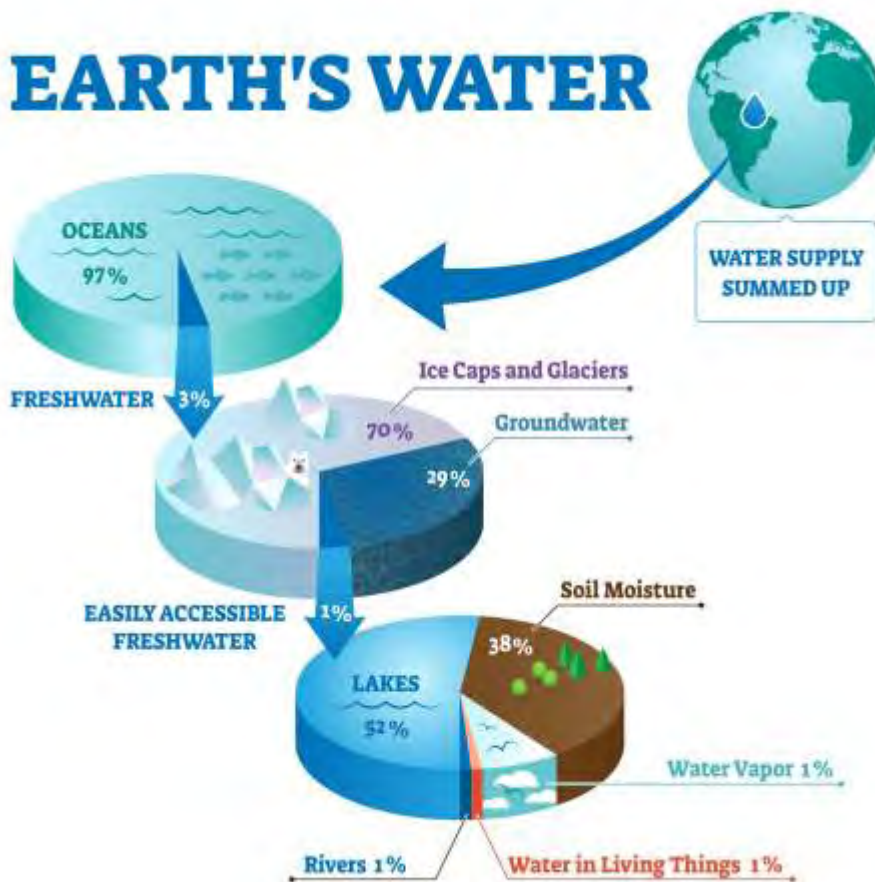
Recreational Activities – Water and snow lend themselves for various sports and activities like swimming, diving, boating, skating, skiing, fishing, etc.

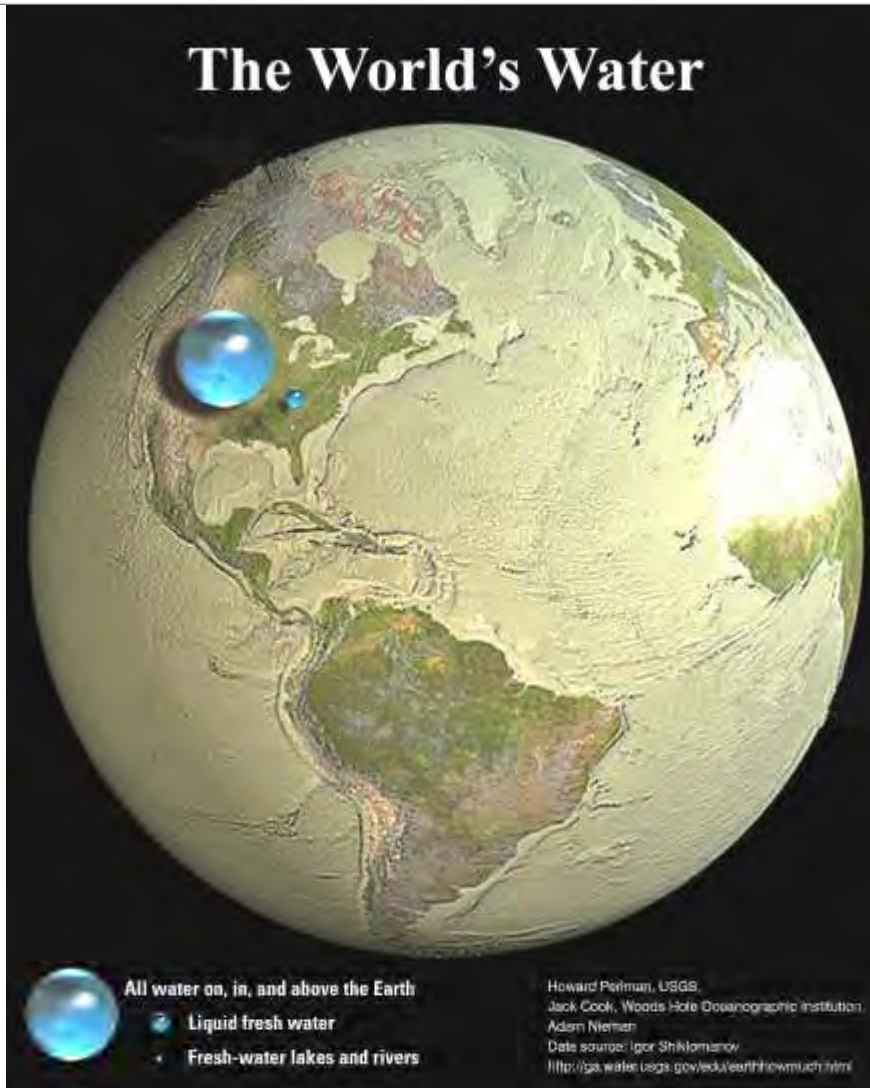
International Action to Protect Water

The use of water has been growing at more than twice the rate of population increase in the last century!

Taking the grave situation into account, the United Nations established the Millennium Development Goals for water in 2000. The overarching goal was to halve the proportion of people without access to safe water and sanitation across the world by 2015.

EARTH'S WATER





In 2022, the OECD estimated that to achieve SDG 6, current global spending on water needs approximately \$1 trillion per year

- Increase water-use efficiency and ensure freshwater supplies
- Implement Integrated Water Resources Management (IWRM)
- Protect and restore water-related ecosystems

The two 'means of achieving' the targets are to expand water and sanitation support to developing countries, and to support local engagement in water and sanitation management.

Right now, we are alarmingly off-track to meet SDG 6: Water and Sanitation For All by 2030. It is estimated that governments have to work on average four times faster to meet the goal on time.

World Water Day

To create awareness and action on the global water crisis, the United Nations established 22nd March as World Water Day. Since 1993, every year this day is commemorated with conversations - based on a central

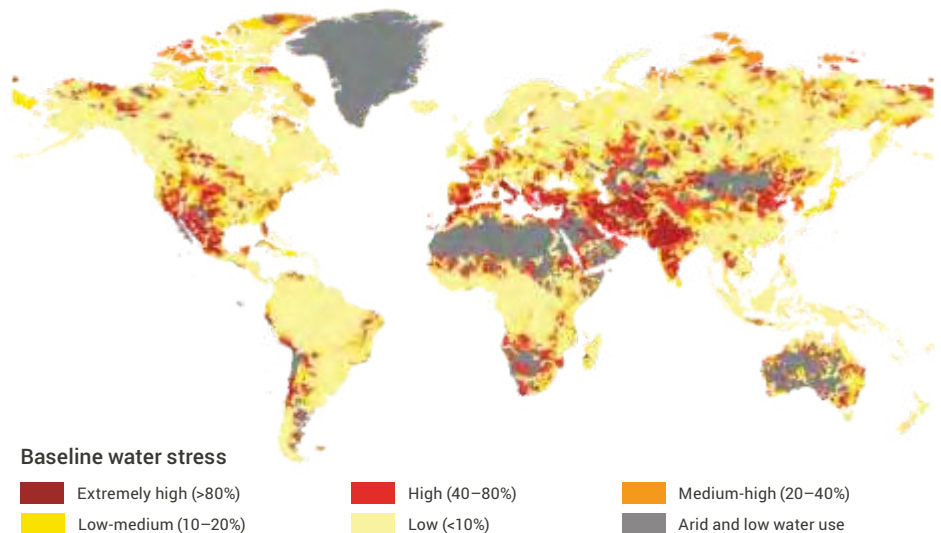
Access to clean water and sanitation facilities is a basic human right! – United Nations Organisation

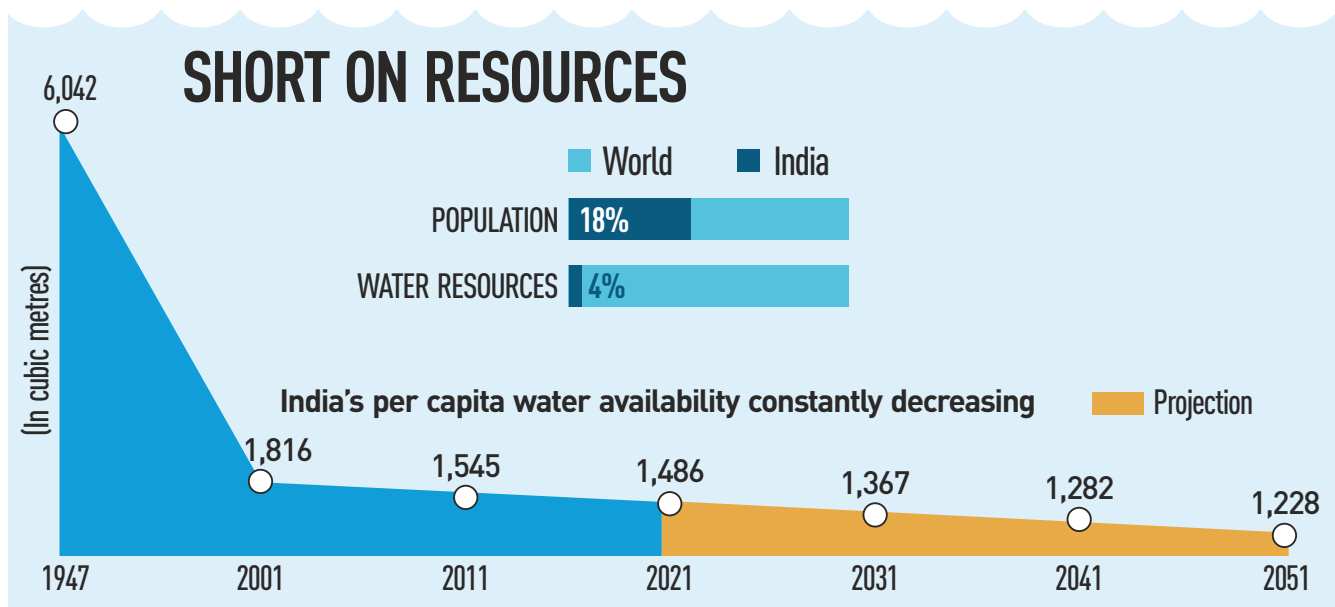
However, after uneven and unsatisfactory progress, the UN committed the Sustainable Development Goals (SDG) 6 as 'Clean Water and Sanitation for All'. With a mission to 'Ensure availability and sustainable management of water and sanitation for all', the goal has 8 targets (to be achieved by 2030) with progress being measured using 11 indicators. The targets include:

- Safe and affordable drinking water
- End open defecation and provide access to sanitation and hygiene
- Improve water quality, wastewater treatment and safe reuse

Annual Baseline Water Stress

(Source: UN World Water Development Report 2023)





Where Does India Stand?

It has been estimated that every person should get at least 1700 cubic metres (60,000 cu ft) of water supply every year. A country, state or region is considered water stressed when the water supply is between 1000 to 1700 cubic meters per person. However, when the annual water supply drops below 1000 cubic meters per person then it is called water scarcity and can threaten food production too.

The average annual water by precipitation in India is around 4,000 BCM (billion cubic metres) while the average annual availability as natural runoff after evaporation is estimated at 1,869 BCM.

Around 50 countries - roughly a third of the world's population - suffer from medium or high water scarcity.

In India, the annual per capita availability of water has declined to 1,486 cubic meters in 2021. Therefore, we are not water scarce, but the water stress can be attributed to disorganised planning, mismanagement and inefficient and over usage. According to a World Wide Fund 2020 report, by 2050, at least 30 Indian cities will face a grave water risk.

The Composite Water Management Index 2.0 (2018)

80% of rural & urban domestic water supply is served by groundwater in India, which is the largest user of groundwater globally

report by government policy think tank, NITI Aayog has clearly stated that water usage in current times is very high and inefficient. It estimated that 600 million people in India face high to extreme water stress, and about 200,000 people die every year owing to inadequate access to safe water, a crisis that is set to get worse.

The report projected that by 2030, India's water demand will be twice the

India is facing its first water crisis and the demand for potable water may outstrip supply by the year 2030 and around 20 cities will run out of groundwater in the next few years, if precautionary steps are not taken. – NITI Aayog

available supply. By 2050, it is likely to be 1,180 BCM in a high use scenario while availability is likely to be lower at 1,137 BCM. It also released a Water Management Index in 2019 which ranked Gujarat as the best performer in 2016-17 and Jharkhand the worst.

Conclusion

As populations and economies continue to grow, new water challenges are likely. Immediate and effective steps are crucial to counter the mounting issues! ▶

Restoration Programme Fills Defunct Tanks Once Again!

Mission Kakatiya has come up trumps in restoring and rejuvenating the tanks across the state, and thus the groundwater levels, in Telangana.



Enhancing and conserving the water resources in Telangana with Mission Kakatiya

TANKS HAVE BEEN the lifeline of the Telangana state owing to its geographical positioning. The people here are highly dependent on the tanks which are spread across all the 31 districts. The topography and rainfall pattern of the region makes tank irrigation ideal by storing and regulating water flow for agricultural use.

Construction of tanks has been an age-old activity in Telangana. It was carried out with great technical expertise during the Kakatiya era. Even in 1956, the Telangana region had around 70,000 tanks irrigating around 25 lakh acres of land.

However, over the following decades, farmers all over India decreased the use of water tanks and other local water bodies; they preferred groundwater irrigation from wells and started digging more and more borewells.

By 2014, there were only 46,531 tanks left in Telangana, nearly half of which were dry. It was noted that accumulation of silt in the tank beds over a long period had reduced the water storage capacity.

The expected water holding capacity of the tanks is 260,000 million cubic feet which can irrigate nearly 26 lakh acres of land. This was not utilised in reality.



Mr. K. Chandrashekhara Rao
Hon'ble Chief Minister of Telangana

On the other hand, the overextraction of groundwater led to rapid declines in the water table. Alas, with the extinction of the tank system, the self-sufficient villages of Telangana have transformed into drought-prone areas. Droughts in almost all the districts of the state created socio-economic stress. The rural folks started migrating to other cities and countries in search of work.

Mission Kakatiya

Mr. K. Chandrashekhara Rao, Honourable Chief Minister of the newly formed state of Telangana – along with the Minister for Irrigation, Mr. T. Harish Rao - initiated the 'Mission Kakatiya' irrigational programme in 2014-15 for irrigational development and support to the agricultural farmers.

This flagship initiative - under the Department of Irrigation and Command Area Development, Government of Telangana was rolled out to restore all the 46,531 minor irrigation sources in the state in the next five years in a phased manner, by taking up 9306 tanks every year (20% of total tanks). (see Figure 1)

The objective of Mission Kakatiya is to enhance the development of agriculture-based income for small and marginal farmers, by accelerating the development of minor irrigation infrastructure, strengthening community-based irrigation management and adopting a comprehensive programme for restoration of tanks.



Figure 1: Mission Kakatiya – Aim, Objectives and Target



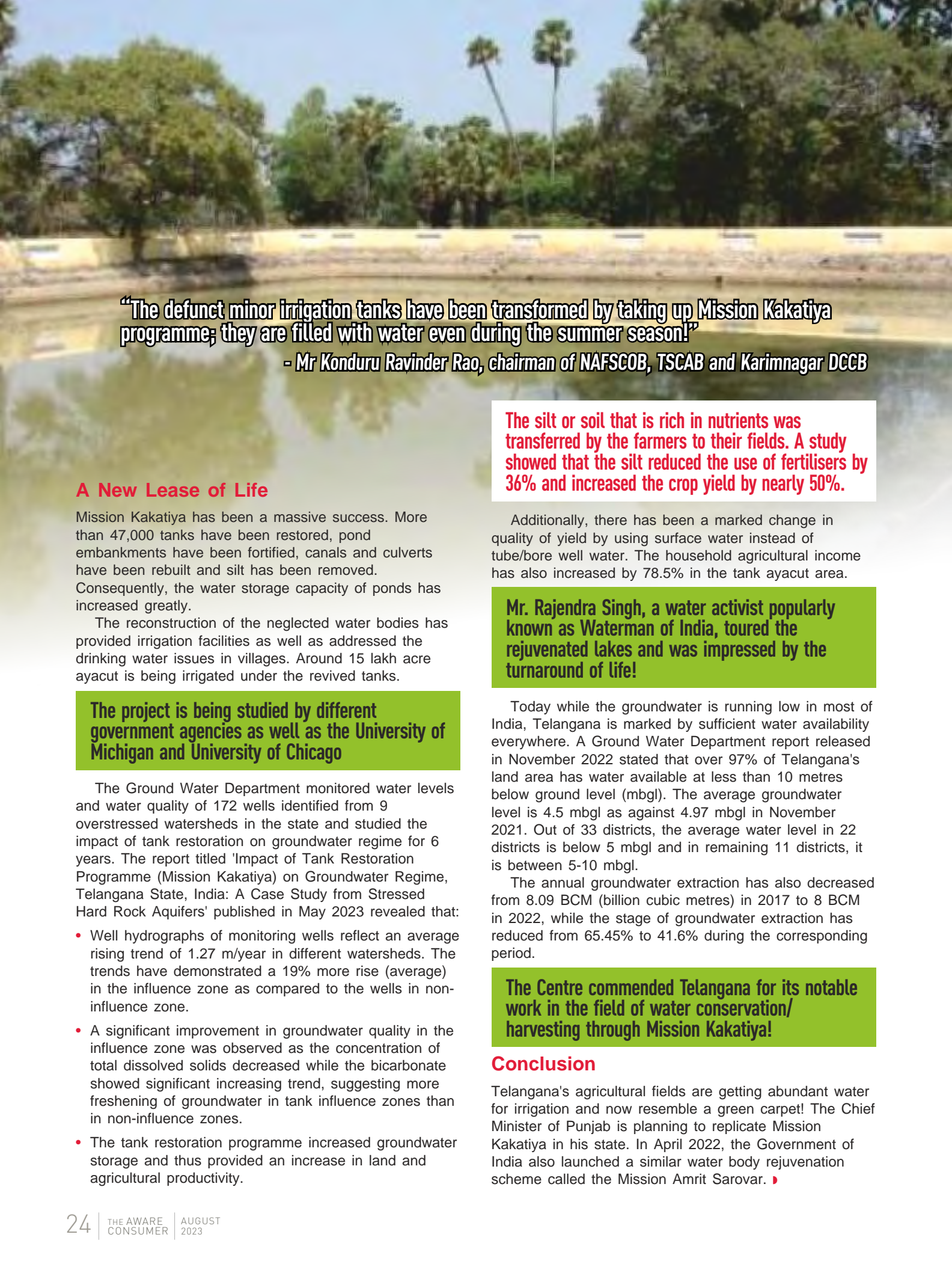
The target was to restore the tanks to their original capacity so as to effectively utilise 255 tmc of water allocated for minor irrigation sector under Godavari and Krishna river basins. This water can easily irrigate a minimum ayacut of 20 lakh acres; however, statistics denoted that it was irrigating only about 9 to 10 lakh acres.

Restoration of the tanks involved the following components:

- De-silting the tank beds to restore original water storage capacity of tanks
- Repairing dilapidated sluices, weirs, etc.
- Strengthening the tank bunds to the original standards
- Repairing the feeder channels to standards for getting water freely into tanks
- Taking up necessary works to supplement/filling minor irrigation tanks through canal networks of major, medium and lift irrigation projects taken up on both Krishna and Godavari rivers
- Re-sectioning of irrigation channels to standards and repairs for smooth distribution of water to fields according to their requirement

District-wise Proposed Restoration of Tanks in Telangana State (Year-wise Restoration of Tanks)

Sl. No.	District	No. of Sources	Number of tanks proposed during the year				
			2014-15	2015-16	2016-17	2017-18	2018-19
1	Karimnagar		1188	1210	1220	1200	1121
2	Adilabad	3951	790	800	800	800	761
3	Warangal	5839	1168	1170	1180	1200	1121
4	Khammam	4517	903	910	920	930	854
5	Nizamabad	3251	650	650	650	650	651
6	Medak	7941	1588	1590	1600	1610	1553
7	Ranga Reddy	2851	570	500	570	600	611
8	Mahaboobnagar	7480	1496	1500	1510	1510	1464
9	Nalgonda	4762	952	978	980	980	872
Total		46531	9305	9308	9430	9480	9008



“The defunct minor irrigation tanks have been transformed by taking up Mission Kakatiya programme; they are filled with water even during the summer season!”

- Mr Konduru Ravinder Rao, chairman of NAFSCOB, TSCAB and Karimnagar DCCB

A New Lease of Life

Mission Kakatiya has been a massive success. More than 47,000 tanks have been restored, pond embankments have been fortified, canals and culverts have been rebuilt and silt has been removed. Consequently, the water storage capacity of ponds has increased greatly.

The reconstruction of the neglected water bodies has provided irrigation facilities as well as addressed the drinking water issues in villages. Around 15 lakh acre ayacut is being irrigated under the revived tanks.

The project is being studied by different government agencies as well as the University of Michigan and University of Chicago

The Ground Water Department monitored water levels and water quality of 172 wells identified from 9 overstressed watersheds in the state and studied the impact of tank restoration on groundwater regime for 6 years. The report titled 'Impact of Tank Restoration Programme (Mission Kakatiya) on Groundwater Regime, Telangana State, India: A Case Study from Stressed Hard Rock Aquifers' published in May 2023 revealed that:

- Well hydrographs of monitoring wells reflect an average rising trend of 1.27 m/year in different watersheds. The trends have demonstrated a 19% more rise (average) in the influence zone as compared to the wells in non-influence zone.
- A significant improvement in groundwater quality in the influence zone was observed as the concentration of total dissolved solids decreased while the bicarbonate showed significant increasing trend, suggesting more freshening of groundwater in tank influence zones than in non-influence zones.
- The tank restoration programme increased groundwater storage and thus provided an increase in land and agricultural productivity.

The silt or soil that is rich in nutrients was transferred by the farmers to their fields. A study showed that the silt reduced the use of fertilisers by 36% and increased the crop yield by nearly 50%.

Additionally, there has been a marked change in quality of yield by using surface water instead of tube/bore well water. The household agricultural income has also increased by 78.5% in the tank ayacut area.

Mr. Rajendra Singh, a water activist popularly known as Waterman of India, toured the rejuvenated lakes and was impressed by the turnaround of life!

Today while the groundwater is running low in most of India, Telangana is marked by sufficient water availability everywhere. A Ground Water Department report released in November 2022 stated that over 97% of Telangana's land area has water available at less than 10 metres below ground level (mbgl). The average groundwater level is 4.5 mbgl as against 4.97 mbgl in November 2021. Out of 33 districts, the average water level in 22 districts is below 5 mbgl and in remaining 11 districts, it is between 5-10 mbgl.

The annual groundwater extraction has also decreased from 8.09 BCM (billion cubic metres) in 2017 to 8 BCM in 2022, while the stage of groundwater extraction has reduced from 65.45% to 41.6% during the corresponding period.

The Centre commended Telangana for its notable work in the field of water conservation/harvesting through Mission Kakatiya!

Conclusion

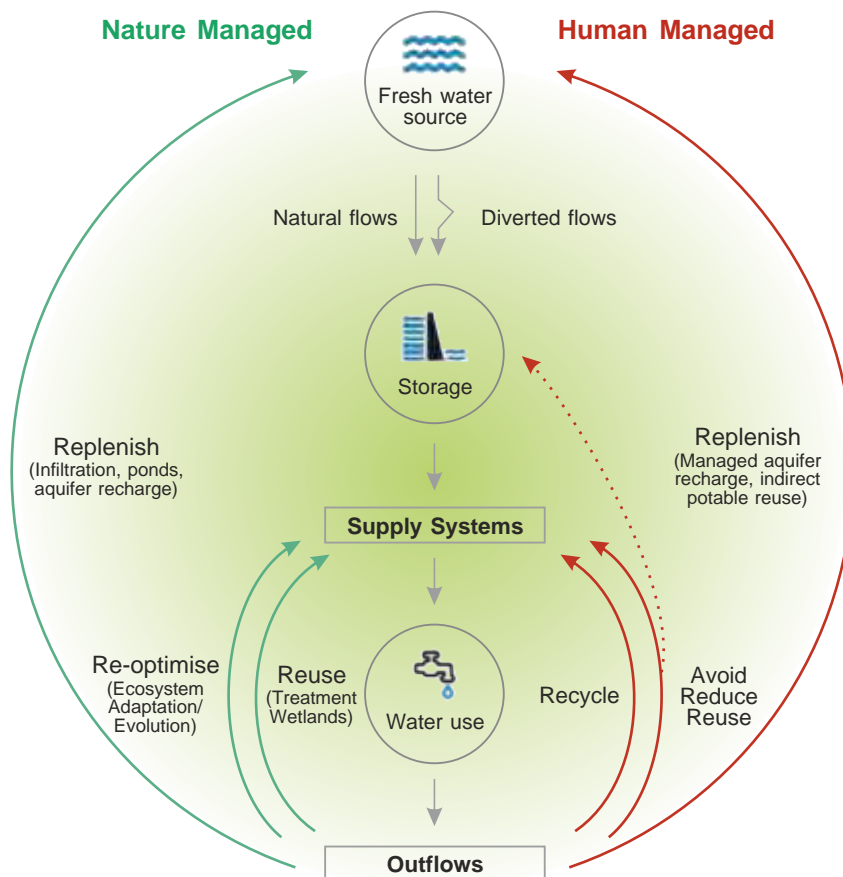
Telangana's agricultural fields are getting abundant water for irrigation and now resemble a green carpet! The Chief Minister of Punjab is planning to replicate Mission Kakatiya in his state. In April 2022, the Government of India also launched a similar water body rejuvenation scheme called the Mission Amrit Sarovar. ▶

The Water Positive Movement Gains Momentum

Top international companies are leading the way to return more water to nature than they consume. Meanwhile, some top cities have also persevered to emerge as water positive. Others can take a leaf from their book and follow suit to save the world together!



Circular water economy has become a principal benchmark in urban water management



CLIMATE CHANGE AND global warming are the unfortunate fallouts of the rapid industrialisation and urbanisation around the globe. Even as we develop and access lifestyle-redefining products and services, the environment around us is bearing the brunt of our unhampered economic growth. Pollution is rampant in varied forms, most of the natural resources are dwindling and the Earth is reeling under the impact.

Jolted by one wakeup call after another, governments, organisations and people are finally becoming aware of the crucial need for sustainability in our actions. While net zero pledges have become the buzzword in power and other such sectors that emit greenhouse gases, the water crisis has made mankind up the ante even further than carbon neutral and aim for water positive targets!

Being water positive means making more water available than you use!

Indeed, it is not just about saving water or minimising the use of water. We have to recover and return more water than we draw to be able to truly minimise the negative fallouts of water scarcity.

Reduce, Reuse and Recycle is no longer enough; Recharge has become essential in the context of water!

Water Stewardship by Corporates

Given the huge pressure on global water resources, Google, Facebook, Microsoft, etc. have made promises to become water positive by 2030 and

many other companies like PepsiCo, Gap and British Petroleum have also made similar commitments. In effect, they will return more water into fresh-water resources than they withdraw.

The voluntary pledges not only help the companies to align with the United Nations' goals but also ensure that they can secure their own water supply which cannot be taken for granted anymore.

In a watershed in the Mexico Valley, the water table levels are so low that the city is actually sinking. And the huge manufacturing facilities of PepsiCo and other companies in the region are primarily to blame for the looming fiasco.

To achieve this lofty goal, corporations are focusing on using less water; treating the used water so that it can be reused; and transporting it for use in a water stressed location. Innovative cooling measures are being implemented to improve water efficiency in data centres that guzzle water in gallons; attempts are also underway to create waterless cooling systems.

The tech giants are building wastewater treatment plants at some of their offices to recycle water for flushing toilets and watering plants. They also invest in water restoration and tree plantation projects in the regions where they operate, apart from funding the work of non-profits and local utilities.

The most effective strategies to become water positive are purifying non-potable water by desalination of sea water and recycling treated wastewater.

Balancing the Equation of Water in Cities

Water in most of the urban cities is getting depleted by overuse. Many of the metros are transporting water from distant regions at high costs. This grave scenario has given rise to the concept of water positive cities.

Indore (Madhya Pradesh) and Hyderabad (Telangana) were certified as 'Water Plus' cities in 2021 – by the Union Ministry of Housing and Urban Affairs under the Swachh Bharat Mission (Swachh Survekshan 2021).

There are a number of indicators for a city to be considered as Water Plus, like:

- Maintaining cleanliness in rivers and drains
- Not allowing dirty water to enter any river or drain
- All public toilets should be connected to sewer lines and must be cleaned
- Wastewater released from households, commercial establishments, etc. should be treated to a satisfactory level before releasing in the environment
- 30% of the sewer water should be recycled and reused

Therefore, Water Plus cities have safe and sustainable sanitation, adequate sewage treatment facilities, recycling of water, etc. However, it should be noted that the situation on the ground can be quite different at times.

The Safe Water Network, USAID and WRI India jointly convened a session on 'Making Cities Water Positive Through City Water Balance Plan' at the Stockholm World Water Week in August 2021. A 'Making Cities Water Positive through City Water Balance Plan e-Toolkit' was



D. THARA, Joint Secretary,
Ministry of Housing and Urban Affairs, Government of India

The scarcity of water has always been a concern when it comes to survival and livelihood. We need to encourage all the stakeholders to participate actively and make water everyone's business to create water-secure cities. Women should be involved to lead the water demand management.

launched to assist the decisionmakers in developing and implementing solutions for making cities water positive. A case study from Hyderabad showcased the steps it took to become 'water positive' through the 'City Water Balance Plan' (CWBP).

City Water Balance Planning comprises of social and technological interventions that can help cities overcome water scarcity by addressing the core problems through demand management, increased water availability through recharge, reduce non-revenue water, sensitise citizens on prudent water use and ensure institutional consensus.

During World Water Week in 2022, again case studies from Hyderabad and Bengaluru were discussed for other water-stressed cities in India and other parts of the world. It covered the steps undertaken like urban planning, reduction and reuse, data analytics-driven solutions, city aquifer mapping, rejuvenation of water bodies and rainwater harvesting. It also shined the spotlight on using technology to track natural infrastructural assets as well as forecast and mitigate imminent water resource challenges through scientific and evidence-based approaches.

Conclusion

Who is to say that these companies are not merely indulging in 'greenwashing' campaigns and will actually live up to their tall promises in the future? Much more needs to be done for sure! ▶

WHAT WORKED FOR HYD



➤ About **94%** safe discharge of sewage or septage (faecal sludge) from community toilets, public toilets and individual household latrines

➤ It also indicates that there is **76-100%** mechanised equipment and PPE/safety equipment available for safe cleaning of sewer and septic tanks in case of manual entry in unavoidable circumstances (with due approval from competent authorities)



➤ Sufficient capacity (**75-100%**) of desludging vehicles and jetting machines for cleaning septic tanks with soak pits and sewers



#65YearsOfSuccess

65th Anniversary

Thank you to everyone who has helped make this possible.
We hope to continue serving you for many more years to come.

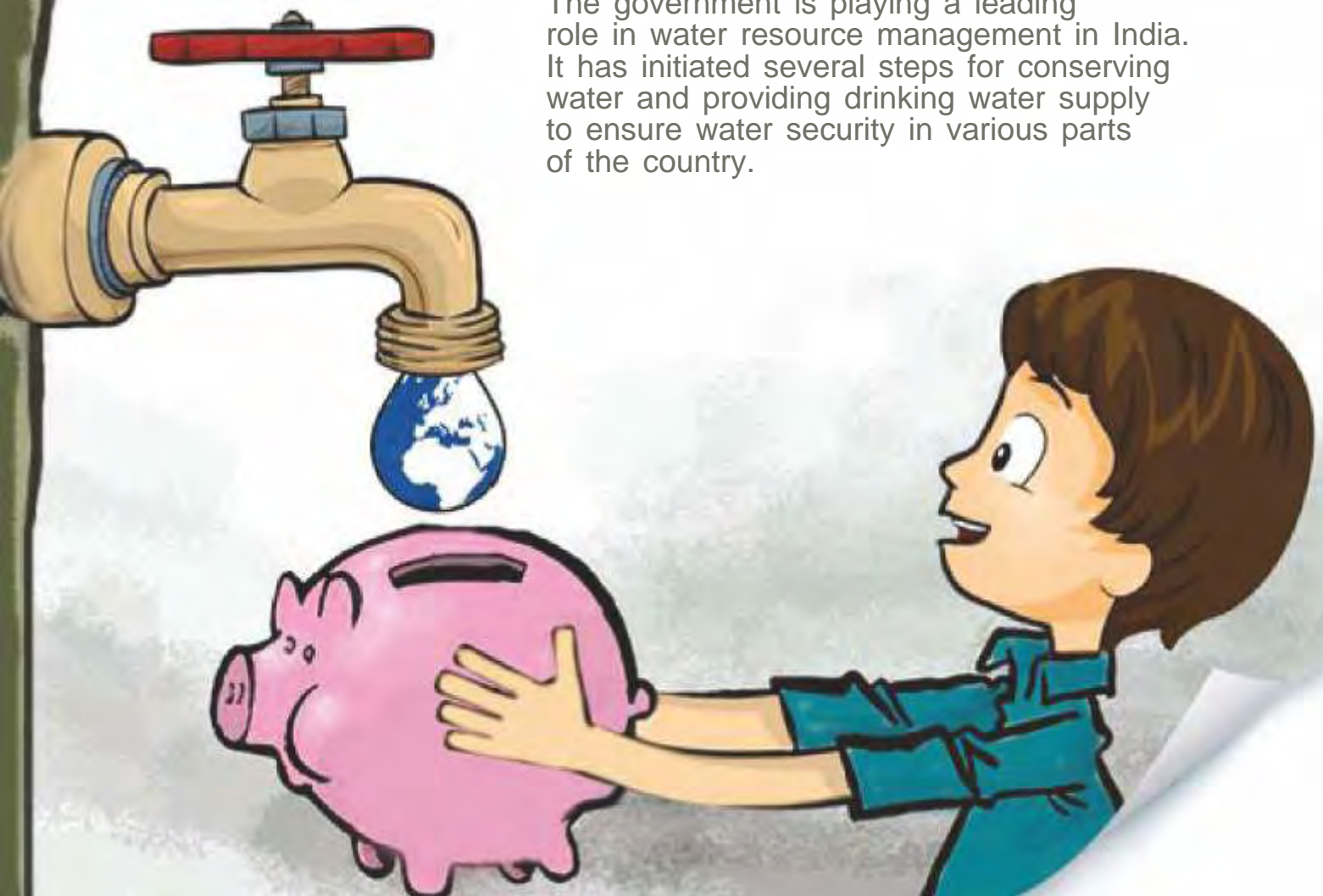


HINDUSTAN SYRINGES & MEDICAL DEVICES LTD.

Website : www.hmdhealthcare.com, E-mail : info@hmdhealthcare.com

India Addressing Its Water Needs

The government is playing a leading role in water resource management in India. It has initiated several steps for conserving water and providing drinking water supply to ensure water security in various parts of the country.



India accounts for 18% of the world's population, but only 4% of its water resources, making the country among the most water-stressed in the world!

THE GOVERNMENT OF India released the National Action Plan on Climate Change (NAPCC) in June 2008 to outline principles and identify approaches for combatting challenges due to climate change. The National Water Mission (NWM) is one of the eight National Missions established under the NAPCC.

The main objective of NWM is “conservation of water, minimising wastage and ensuring its more equitable distribution both across and within states through integrated water resources development and management”.

The Mission – in accordance with the provisions of the National Water Policy - has developed a framework to optimise water use through regulatory mechanisms. Various strategies for achieving the goals are underway to achieve integrated and sustainable development with active participation of the stakeholders. The priorities for water allocation are as follows:

- Drinking water
- Irrigation
- Hydropower
- Navigation
- Industrial and other uses



Ms. Archana Verma heads the National Water Mission as the Mission Director. The mission includes eight advisory groups/committees.

Ministry of Jal Shakti

To counter the escalating water crisis in the country, the Ministry of Drinking Water and Sanitation was restructured as the Ministry of Jal Shakti in May 2019. It is bifurcated into two key departments

- Department of Water Resources, River Development and Ganga Rejuvenation (DoWR, RD & GR) – It is mainly responsible for laying down policy guidelines and programmes for the development, conservation and management of water as a national resource.
- Department of Drinking Water and Sanitation – It provides technical and financial assistance to the states to provide safe and adequate drinking water along with hygienic sanitation facilities in rural India.

Water being a State subject, steps for augmentation, conservation and efficient management of water resources are primarily undertaken by the respective state governments. The central government supplements the efforts of the states through technical and financial assistance to them through various schemes and programmes.

Primary Schemes under National Water Mission

Jal Jeevan Mission: Har Ghar Jal – The National Rural Drinking Water Programme (NRDWP) was restructured and subsumed into Jal Jeevan Mission (JJM) on 15th August, 2019 to provide Functional Household Tap Connection (FHTC) to every rural household (including

Goals of NWM



Comprehensive water data base in public domain and assessment of impact of climate change on water resources



Promotion of citizen and State action for water conservation, augmentation and preservation



Focused attention to vulnerable areas including overexploited areas



Increasing water use efficiency by 20%



Promotion of basin level integrated water resources management

tribal areas) of the country by 2024. The programme not only aims at providing potable water in adequate quantity of prescribed quality on regular and long term basis, but also implements mandatory source sustainability measures such as recharge and reuse through grey water management, water conservation, rainwater harvesting, etc.

More than 12 crore rural households now have tap water supply at home vis-a-vis only 3.23 crore rural households at the time of the launch of the mission!

Jal Shakti Abhiyan: Catch the Rain – Phase One of Jal Shakti Abhiyan was launched in 2019 in 256 water stressed districts of the country. It focuses on creating appropriate rainwater harvesting structures (RWHS) to collect and conserve rainwater in the pre-monsoon and monsoon periods in all the blocks of all districts (rural as well as urban areas) in the country.

A Master Plan for Artificial Recharge to Groundwater - 2020 was prepared which envisaged construction of about 1.42 crore rainwater harvesting and artificial recharge structures in the country.

This was re-introduced with the tagline 'Catch the Rain, Where it Falls, When it Falls' on 22nd March, 2021 (World Water Day). The fourth phase is underway this year.



The scheme targets an accelerated implementation of five target interventions - water conservation and rainwater harvesting, renovation of traditional and other water bodies/tanks, reuse and recharge of borewells, watershed development and intensive afforestation. The aim is to build resilient systems that ensure water availability even in the most vulnerable regions and provide long-term solutions for sustainable use of water in the country.

The states have been requested to open Rain Centres (Jal Shakti Kendras) in each district with a dedicated mobile phone number and manned by an engineer or a person well trained in RWHS. It will act as a technical guidance centre to all in the district as to how to catch the rain, as it falls, where it falls.

JAL SHAKTI ABHIYAN: CATCH THE RAIN - 2023

WATER CONSERVATION AND RAIN WATER HARVESTING

Works No(s): **2,74,709**

*Ongoing No(s): **1,31,242**

*Expenditure (in Lakhs): **3,42,368**

RENOVATION OF TRADITIONAL WATER BODIES

Works No(s): **64,388**

*Ongoing No(s): **18,569**

*Expenditure (in Lakhs): **1,42,673**

REUSE AND RECHARGE STRUCTURES

Works No(s): **2,38,178**

*Ongoing No(s): **58,389**

*Expenditure (in Lakhs): **13,337**

WATERSHED DEVELOPMENT

Works No(s): **3,65,563**

*Ongoing No(s): **1,52,316**

*Expenditure (in Lakhs): **2,97,243**

INTENSIVE AFFORESTATION

Works No(s): **4,20,29,350**

*Expenditure (in Lakhs): **69,461**

TRAINING / AWARENESS PROGRAMS

Programs No(s): **29,758**

Participants No(s): **5,36,487**

PIPED WATER SUPPLY SOURCES

Total: **2,83,064**

Sourced Geotagged: **1,85,422**

RECHARGE STRUCTURE FOR PWS

Structures Identified: **3,03,791**

Structures GeoTagged: **2,33,172**

Structures Completed: **1,89,656**

SOURCE SANITATION SURVEY

35,586

JAL SHAKTI KENDRA

656

ENUMERATION OF WATER BODIES

24,24,590

PHOTOS

1,00,455

VIDEOS

1,354

(* figure for Ongoing works and Expenditure is only for activities under MGNREGA)

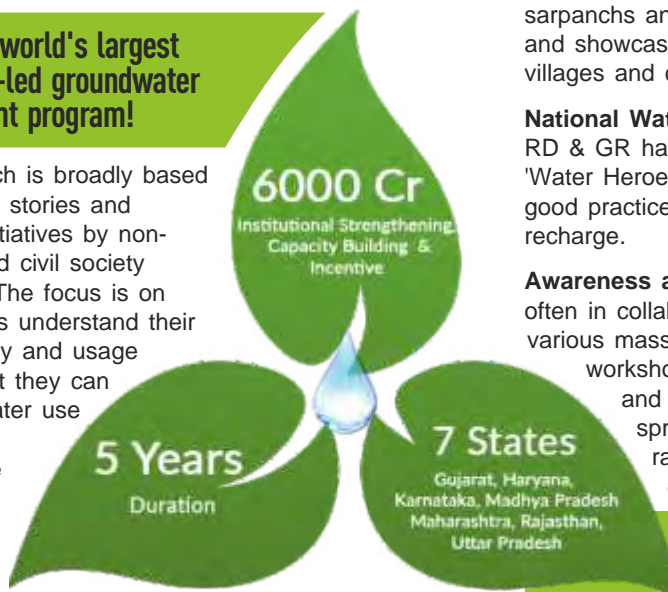
Atal Mission for Rejuvenation and Urban Transformation (AMRUT)

– This was first launched in June 2015 in selected 500 cities and towns across the country for a period of 5 years (till 2020) to develop basic urban infrastructure in the sectors of water supply, sewerage and septage management, storm water drainage, green spaces and parks and non-motorised urban transport. It has been extended – in the form of AMRUT 2.0 – to now cover all the statutory towns of the country to ensure universal coverage of water supply and make the cities 'water secure'.

Atal Bhujal Yojana (Atal Jal) – This was launched in April 2020 in 8353 water stressed areas in seven states (Haryana, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan and Uttar Pradesh) to facilitate sustainable groundwater management with a focus on community participation and demand side interventions.

This is the world's largest community-led groundwater management program!

The approach is broadly based on the success stories and verified field initiatives by non-government and civil society organisations. The focus is on helping villagers understand their water availability and usage patterns so that they can budget their water use accordingly. It strengthens the capacity of the states to manage their groundwater on the one hand, while preparing village level water security plans on the other.



Sahi Fasal – This was launched to nudge farmers in the water stressed areas to grow agricultural crops which consume less water and to use water more efficiently in agriculture, as a part of demand side management. These crops should be healthy and nutritious, economically remunerative, environment friendly and suited to the agro-climatic-hydro characteristics of the area. The aim is to reduce the drawing of excessive groundwater for agriculture which is one of the main reasons for the depletion of the groundwater in many districts.

NamamiGange – This is an Integrated Conservation Mission launched in June 2014 (as a flagship programme) to accomplish the objectives of effective abatement of pollution, conservation and rejuvenation of our national river Ganga.

Mission Amrit Sarovar – Launched in April 2022, it aims to conserve water for the future by developing and

rejuvenating 75 water bodies in each district of the country. The target of constructing or rejuvenating 50,000 Amrit Sarovar ponds across India by 15th August 2023 has been doubled in December 2022. Every Amrit Sarovar will have a pondage area of 1 acre with a water holding capacity of about 10,000 cubic metre. They will be surrounded by trees like neem, peepal, banyan etc.

Water Talk – This is a monthly seminar series (initiated in March 2019) to promote dialogue and information sharing among participants on variety of water-related topics with the overarching aim of drawing attention to critical aspects of water. The focus is on creating awareness, building capacities of stakeholders and encouraging people to become active participants in the conservation and saving of water. It provides a platform wherein, among other Water Talkers (which include academicians, bureaucrats, activists, water experts), sarpanchs and representatives of NGOs also participate and showcase the best practices in water sector in villages and cities/towns across the country.

National Water Awards and Water Heroes – DoWR, RD & GR has instituted National Water Awards and 'Water Heroes – Share your Stories' contest to incentivise good practices in water conservation and ground water recharge.

Awareness and Interaction – The Jal Shakti ministry, often in collaboration with other organisations - organises various mass awareness programmes (seminars, workshops, exhibitions, competitions, trainings, etc.) and Public Interaction Programmes (PIPs) to spread awareness and information about rainwater harvesting, artificial recharge of groundwater, water conservation, etc.

The Fifteenth Finance Commission (FFC) in its report for 2021-26, has earmarked 60% of the total grants reserved for Panchayati Raj Institutions (PRI) for national priorities like drinking water supply and rainwater harvesting and sanitation for 50 Million-Plus cities.

Many other schemes and programmes – including the crucial interlinking of rivers – are underway.

Bureau of Water Use Efficiency (BWUE)

This national bureau was set up in October 2022 to realise the National Water Mission by promoting, regulating and controlling the efficient use of water in irrigation, power generation, industries and domestic sector. The Bureau has set up a high-level Task Force to prepare a vision document that will eventually guide its actions and improve water use efficiency. The primary aim is to chalk out strategies for adopting 'Water Efficiency Rating' for water-using products and technologies.

The great Indian thirst



Radical Change in the Approach to Water Management on the Cards

The Ministry of Water Resources, Government of India formulated the National Water Policy in September 1987 to govern the planning and development of water resources and their optimum utilisation. It was reviewed and updated in 2002 and again in 2012.

The present challenges in the water sector call for key changes in water governance structure and regulatory framework. Accordingly, in November 2019, the Ministry of Jal Shakti set up a committee to draft the new National Water Policy (NWP). This is the first time that the government has asked a committee of independent experts to draft the policy.

The proposed NWP (awaiting approval) is based on a multi-disciplinary, multi-stakeholder approach to water management. The two major recommendations include:

- Shift focus from endlessly increasing the supply of water towards measures for demand management.
- Shift in focus within the supply side as the country is running out of sites for further construction of large dams, while water tables and groundwater quality are falling in many areas.

Conclusion

The government is taking various integrated initiatives for water conservation, river rejuvenation, water management, restoration of freshwater ecosystems and spreading awareness among the people. ►



Mr. VEERAMALLA PRAKASH RAO

(better known as Telangana Prakash) is the co-founder of Telangana Rashtra Samiti (now BRS) party and the Telangana formation movement. He was appointed as the Director and Chairman of Telangana Water Resources Development Corporation in March 2017. He also supervises the Department of TS Ground Water, WALAMTARI (Water and Land Management Training and Research Institute) and Engineering Research Laboratory.

Mr. Prakash has been closely associating with Dr Rajendra Singh, Waterman of India for a few years now, who appointed him as Chairman of Indian Peninsular River Basin Council.

Q Can you share your thoughts on enabling citizens to access piped potable water as per BIS Standard IS 10500 (2012) at home or public places?

It is essential for us to provide piped drinking water facility to all the citizens. Our state is collecting taxes and water cess from industrialists consuming water more than 20,000 litres per connection, but not from the people who are consuming within above limit. Accordingly, we provide treated, safe drinking potable water in the taps to each and every house in all the cities including rural areas. There are almost 23,000 habitations in Telangana and we have given drinking water connection to each and every household – almost 11 million houses - 60% of which covers rural areas.

Under Mission Bhagiratha, the state has spent Rs. 50,000 crore to connect all the households to safe drinking water. For this, 1,25,000 kms length of pipelines have been laid across the state in just 3 years – which will be equivalent to 3 times the diameter of the Earth (Source: Rural Water Supply & Sanitation, Government of Telangana). However, we have collected a nominal charge – just Re. 1 - for giving tap connection in rural areas.

I feel proud to be able to state that the quality of water meets the BIS standards and is better than packaged drinking water. We have tested both the bottled water of leading brands and municipal water – the quality of the latter has been found to be better. The pH value of our municipal water (river water) is 7.1 to 7.4 while it is less than 7 in bottled water. The former even contains calcium, zinc, magnesium and other essential minerals.

50% of the water available in many rivers is being utilised for farming and other purposes. Most of the water from Godavari and Cauvery rivers goes into the sea. Ganga and its tributaries have huge quantity of water that flows through 13 states, most of which is plains and agricultural belt. However, majority of the cities and towns are suffering from water shortage. We need many more water bodies and other infrastructure to stop rain water run off to tap it for agriculture and human use and recharging aquifers. The government is focusing on short-term measures like linkage of rivers, but this is not a feasible and permanent solution for providing sufficient water to people and agriculture.

An average green cover of 33% is required to get good rains; but some states have less than 5% to 10%. The regions that experience water scarcity need to improve their green cover. Telangana had a green cover of 23% in 2014 which we have now increased to 31% by planting and protecting 235 crore saplings under "Haritha Haram" scheme in the past nine years. Mr Santhosh Kumar MP (RS) has started *Green Challaga* programme. The results are clear – our state is enjoying good rains since 4 to 5 years! There is plenty of water in the water bodies even in summer. We are taking up adding the additional 2% by planting saplings in a big way.

Our country needs river rejuvenation plans so that we don't lose a single drop of rain water – we have to catch each and every drop. The other aspect is sending only regenerated, recycled, treated water to the rivers. All water used in agriculture, industries and homes should be purified before sending into the river.

“We train farmers to get more yield by using less water! While 1tmc of water was used for irrigating 6000 acres, it has now doubled to 12000 acres.”

Q What are the key challenges currently faced by our country in terms of water scarcity and sustainable water management? What initiatives has the Government of Telangana taken to address these issues?

There are two aspects that come into play here – water for drinking and for agriculture. 2/3 of the fresh water available in the world is used for agriculture, while the remaining goes for industrial and domestic use.

Abundant water is available in India; we have 14 big rivers while more than 500 are of considerable size. The problem here is not scarcity of water, but lack of proper management. In fact, successive governments over the past 75 years have failed in management – less than

Q Can you provide insights into any ongoing or future projects aimed at conserving water resources and promoting water efficiency?

The momentum and awareness for conserving water originated many decades ago in Maharashtra. The state has more than 5000 big, medium and minor dams and people are actively involved in water conservation. Activists like Anna Hazare and now Popatrao Pawar have done exemplary work in saving water and protecting rivers.

Telangana is also adopting some villages to duplicate the achievements of Maharashtra. We invited Mr. Pawar a couple of times to train the people here. After becoming 100% successful in providing drinking water to all habitations, our state is now focusing on supplying

water for irrigation to all fields irrespective of their size. Of the cultivable land of 1.8 crore acres, more than 1.35 crore acres is under cultivation.

Major work of our landmark Kaleshwaram Lift Irrigation project – like construction of ten pumping stations using 40 MW to 139 MW lifts, huge reservoirs, lakes and distributaries have been completed. We are using almost 160 tmc water here; the only thing remaining is taking the water to the fields. Under Mission Kakatiya, we have revived about 28000 lakshla and ponds and filled thousands of water bodies with Kaleshwaram water. Ground water is increased to 5-6 meters due to desilting the water bodies under mission Kakatiya.

The Palamuru Rangareddy and Dindi Vidyasagar Rao projects will be completed over the next couple of years and will provide water to drought-prone areas in Nalgonda, Mahbubnagar and Rangareddy districts. What we need is assured water for these ongoing projects in the Krishna basin. However, we are still waiting for the verdict from the Brijesh Kumar tribunal over distribution of the water between the states.

The Sita Rama project in Khammam and other projects in Godavari basin for stabilisation will also be completed in next 2 years. We noticed that many of our old projects are not getting sufficient water due to the barrages and other projects constructed upstream of Godavari. Therefore, we are pumping water from 100m to an unimaginable 635m under the Kaleshwaram project. All the old projects like SRSP, Nizamsagar, etc. have been linked to Kaleshwaram for stabilisation. In fact, this project is giving water to only 18 lakh acres of new ayacut; about 19 lakh acres is stabilisation or reviving of old projects.

All projects that were pending before formation of Telangana state - particularly Kalwakurthy, Nettempadu, Bhima and Koil Sagar (remodified project) - in Mahbubnagar have been completed. With this we are able to supply water to 8 lakh acres of land as compared to only 1 lakh acres earlier. The picture of the district has changed drastically – 14 lakh people had migrated from here to other states and countries (popularly termed as Palamurulabour that are employed in construction sites). Reverse migration is underway as these people are coming back in large numbers and taking up agriculture once again. The district has shifted from having hardly any green cover to 9 lakh acres being used to cultivate crops! What's more, even the birds that had migrated to different countries many years ago are now coming back home!

Q Should access to water be made free of any charges or should it be paid?

We have removed water cess of agriculture lands and are providing free water and power to all the farmers. We collect water cess only from industries and business establishments which brings an element of cross subsidy into play. This is purely a cost recovery model and not for profit.

Q Should rainwater harvesting and groundwater recharge be made mandatory? Should a regulator be established to manage water distribution in the country?

I agree wholeheartedly that we need a water regulatory authority in the country. Right now, all we have is guidelines and they are not being followed. For instance, it has been made mandatory that every house should have a rainwater pit. The government gives an incentive of around Rs. 4000 – what most people do is take the money and dig a pit, get the permissions and then close it! Proper vigilance and regular checks are needed here to ensure that the rainwater from the roof is sent into the ground.

However, rainwater pits are not the solution for every household. Take Hyderabad for example, 2/3 of the city has a rocky ground and this cannot be recharged. However, the roof water does not have to end up in the drainage. It can be used to recharge the old borewells that have dried up in the past few years. Sending the rainwater to the defunct borewell will recharge the aquifer in the rocky regions and make the borewells active once again.

The central and state governments have never bothered to rejuvenate the rivers. Even those that do, only focus on the fourth order or the tributary level; however, the focus should actually be where the rainfall starts and the initial levels of small streams for the efforts to be effective. Therefore, the government should allot a separate budget for taking up rejuvenation of all rivers. It should also spread awareness among the consumers about the importance of water, rejuvenation, recharge, etc. The Government of India has already prepared DPRs to rejuvenate 14 major rivers, but is delaying its implementation.

Q Please share some of the innovative approaches initiated by you in Telangana as the Chairman of the Telangana Water Resources Development Corporation?

Borewells are traditionally used to extract water from the ground. I introduced an innovative mechanism for recharging the groundwater through the same borewells. We have dug borewells inside check dams with pipes that have holes all around. The dotted pipes are placed 10 feet beneath and 5 feet above the ground and covered with plastic mosquito net. The rainwater that flows in the streams stops in the check dams and the run off enters the borewell. This way we are putting water back into the ground while arresting the sand and other debris with the plastic mesh so that it does not block the borewell. This simple technique has enabled us to rejuvenate aquifers in Nalgonda, Mahbubnagar, Siddipet, Sangareddy and parts of Karimnagar and the effect is perceived in a radius of 2 sq. kms.

We have also started Water Literacy course to create awareness among farmers and youth about water. We train farmers to get more yield by using less water! While 1tmc of water was used for irrigating 6000 acres, it has

now doubled to 12000 acres. This rationalised use of water is actually increasing the yield as well.

For instance, paddy cultivation requires only moisture for most of its lifecycle. We control the water supply by providing water under the On and Off system – on for 3 days and closed for the next 3 – which keeps the farm dry. But there is sufficient moisture and the yield multiplies. Such changes are workable solutions for water scarcity areas.

In 2014, paddy cultivation in Telangana was 45 lakh metric tonnes. With a four-fold increase to 260 lakh metric tonnes, we have surpassed Punjab and become the leading producer of paddy in the country. Irrigated water was provided to 20 lakh acres in 2014 which has risen to 85 lakh acres now.

Q What role can technology play in water management and conservation? Are there any plans to use them in our country?

Technology plays a very important role here. We have put sensors that allow us to closely monitor the inflows and outflows in reservoirs and other water bodies while sitting in the office. We still have to implement technology at the field level to track the amount of water that is going into the field channels from the distributaries. Technology solutions can also be used to check the moisture and other nutrients in the soil and control them accordingly.

Q Can you update our readers on the various initiatives taken by the State Governments in addressing inter-state water disputes and fostering cooperation among states for equitable water sharing?

Unfortunately, the centre has an adamant attitude which is not allowing us to resolve water sharing issues with Andhra Pradesh, Karnataka and other states. The Brajesh Kumar tribunal was constituted in 2004 and after prolonged discussions, arrived at a decision in 2010. However, it was stalled by Apex Court due to the formation of Telangana state. The disputes continue and no verdict has been reached even after almost 20 years.

2/3 of the Krishna basin is in Telangana and 1/3 in AP; however, the Bachawath tribunal has awarded only 1/3 of the water to Telangana and the rest to AP. Then again, most of the water is diverted outside the basin under the garb of drinking water to Chennai by digging big canals to divert the water to the Penna basin and to cultivate lakhs of acres.

Our Chief Minister, Shri KCRji, had invited the present Chief Ministers of AP for resolving the water issues in an amicable manner. They were 2-3 meetings with Mr. Jagan Mohan Reddy. We suggested that as Godavari has plenty of water that is going into the ocean without being used, the two states can jointly construct lifts to share the Godavari water by filling in Nagarjunasagar and Srisailem reservoirs. After making some headway, the discussions stalled due to mistrust and other apprehensions.

The central government even appointed separate Krishna River Management Board and Godavari River Management Board four years ago to resolve the riverwater disputes quickly and amicably. There is an Apex Committee as well in case the decision of the Board is not satisfactory. The members mostly hail from the Central Water Commission who meet dozens of times every year without any proper outcome. With the right approach, the problems can be resolved swiftly, but the centre only seems to be deriving political advantage from the squabbling between different states.....

Q How do you envision the future of water management in our country, considering the increasing water demand, pollution and the potential impacts of climate change?

Climate change is a serious issue but no one is bothered about it. India has signed the Paris Agreement and made net zero commitments, but this is only lip service without any serious implementation. The coal burning is actually increasing for generating more thermal power. Political parties promise safe drinking water everyday and for cultivation at the time of elections, but fail to fulfil them.

All the water bodies in the urban areas across the country are highly polluted. They have less than 1% dissolved oxygen and no marine creatures are able to survive in the polluted waters. Nearly 500 villages are situated on both sides of the Ganga at the point where it meets the ocean. At least one person in every family here is suffering from cancer while many have died already. The chemical pollution from upstream which accumulates here and merges with the groundwater is to blame.

The Central Pollution Control Board has clearly directed that no polluted water can be discharged into the rivers without being treated. However, it remains only on paper without proper implementation.

I started an agitation in 1997 against the water pollution by Natco Pharma. It is noteworthy that that they paid heed and are the only industry in Telangana to discharge properly treated water into the river. Similarly, the Tatas in Jamshedpur do not allow even a drop of discharged water to enter the river without being purified to the CPCB standards.

We are now focusing on Musi River Rejuvenation that requires Rs. 10,000 crores. Many sewage treatment plants have been set up and we spent around Rs. 3600 crores since 2020. Even the Hussainsagar does not have a single fish in it since 1979. We are doing systematic work with a top-down approach to arrest the pollution at the origin by diverting canals and treating the waste water.

Political will remains crucial here. The Gaekwad project on Godavari river in Maharashtra is supposed to provide water to Aurangabad by constructing a pipeline of 110 kms. However, only 60% has been completed in 16 years! Except Mumbai, the entire state gets drinking water only once a week despite the substantial budgetary allocation which is not being used efficiently. ▀



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Pyush Misra
Trustee,
Consumer Online Foundation



NAVIGATING THE TIDE OF WATER SHARING ISSUES BETWEEN STATES



“Every state in India seems to be fighting with another over water from some river or the other. Water politics turn complex and acrimonious with disputes raging on for years and years. Will there ever be an end in sight?”

— Pyush Misra

Water resource management has to incorporate techniques for distributing the finite river resources between different states

Rainfall accounts for nearly 85% of freshwater available in India. The remaining 15% comes from melting snow. Increasingly erratic and unpredictable monsoons are exacerbating the water challenges.

THE AVERAGE ANNUAL water available depends mostly on the geological and meteorological factors of a region. And the average water available per person will depend on the population of the region.

India being the most populous nation in the world, the growing population is gradually diminishing the per capita water availability. Additionally, the climate is highly uneven with huge variances in precipitation leading to an unequal distribution of water. The effects of climate change and global warming have further reduced the amount of water available in many regions to levels lower than the national average, even to the extent of water stress and scarcity conditions.

There are about 30 major rivers along with more tributaries in India. Each river flows through two or more

states, leading to disputes over the use, distribution and control of the same. The river basin being a shared resource, contentious political dynamics also crop up.

As the actions of upstream states affect the water availability and quality in downstream states and vice versa, the intense hue and cry is not just about the allocation of water quota among states who share the same river. It also extends to the building of dams and reservoirs on the said rivers or diverting the flow, not just to meet the water needs of the people, but also as a power play between the states.

The conflicts often escalate into protests, violence and destructive actions. Not just this, many regions even demand a separate state status as the mother state continues to deprive them of water!

India is primarily an agriculture-based economy that relies on regular and continuous supply of water. Increasing urbanisation is also raising the demand for clean drinking water manifold.

The common issues for inter-state water disputes are:

- Apportionment of water among distinct states
- Allocation of the cost of construction and benefits in case a project is worked upon or advanced jointly by two or more states
- Compensation to the states unjustifiably or wrongfully afflicted by the enactment of a project by some other state
- Excess takeaway or removal by a state
- Settlement of disputes involving interpretation of agreements

Constitutional Provisions and Water Laws

Water is primarily a State subject in India and the states can govern the use and harnessing of river waters – supply, storage, drainage, irrigation, canal, embankments and water power in their own way. Water on the central jurisdiction entitles the union government to only develop and regulate the 'inter-state rivers and river valleys' in the manner announced by Parliament to be advantageous for the public interest.

The central government has enacted the following Acts under the provisions of the Constitution:

River Board Act, 1956 – It seeks to set up boards for inter-state rivers and river valleys in consultation with state governments. However, no such board has been established till date.

Major Inter-State River Disputes

River (s)	States
Ravi and Beas	Punjab, Haryana, Rajasthan
Narmada	Madhya Pradesh, Gujarat, Maharashtra, Rajasthan
Krishna	Maharashtra, Andhra Pradesh, Karnataka, Telangana
Vamsadhara	Andhra Pradesh, Odisha
Cauvery	Kerala, Karnataka, Tamil Nadu, Puducherry
Godavari	Maharashtra, Andhra Pradesh, Karnataka, Madhya Pradesh, Odisha
Mahanadi	Chhattisgarh, Odisha
Mahadayi	Goa, Maharashtra, Karnataka
Periyar	Tamil Nadu, Kerala

Inter-State River Water Dispute Act (IRWD), 1956 – It provides for setting up a tribunal in case state government(s) approach the centre for the same, but only after trying to resolve the dispute through consultations. It should be noted that the Supreme Court cannot question the formula or award provided by the tribunal. However, it can raise questions on the functioning of the tribunal

This Act was amended last in 2002 for instituting a 1 year duration frame to establish the tribunal and 3 year duration frame to pronounce a decision. Further amendment bills were introduced in 2017 and 2019 in the Parliament – to streamline the adjudication and set up a single, permanent tribunal to adjudicate on inter-state river water disputes. However, they have not reached fruition as yet.

Dams Safety Act, 2021 – It was passed to monitor the safety of aging dams located on all rivers of India.

Mechanism for Resolution

The first step is for the states to work on their own with mutual discussions and negotiations to resolve an inter-state water dispute. If they fail to reach an agreement, they can approach the centre (under the IRWD Act) to constitute a Water Disputes Tribunal for the adjudication of the dispute.

A number of inter-state water disputes tribunals have been constituted so far, but most of them are beset with protracted proceedings and extreme delays in dispute resolution. At times, it takes so much time that the states stand completely polarised to the point of no return!

Then there is increasing defiance by states and subversion of resolution mechanisms. Many dissatisfied states question the rationale/fairness of the proceedings and the impartiality of the award.

Maharashtra, Karnataka, Andhra Pradesh and Telangana are still fighting over the Krishna waters while Chhattisgarh and Odisha battle it out over the Mahanadi.

The political opportunism over water has transformed the disputes into turfs of vote bank politics. What we need is a clear and binding mechanism that can provide a permanent and efficient resolution of water disputes among states. Experts have also suggested that India needs to depoliticise water related policies and issues taking water as a welfare commodity and 'common good'.

Conclusion

With decreasing availability and increasing demand for water, it is predicted that clean water will become the 'next oil' in an international context. Indeed, the global politics of water show no sign of abating. In fact, India's water disputes are also not limited to the inter-state level. The waters of the Ganga are the constant bone of contention between India, Nepal, Bhutan and Bangladesh, while India and Pakistan continue to squabble over the Jhelum and other rivers. ▶



Dr. R. Ilangoan, M.E. PhD.
Former Chief Engineer,
Tamil Nadu Public Works Department

Unlocking the Path to Pure and Non-Chemical Healthy Drinking Water

SAFE DRINKING WATER is a fundamental requirement for humans in the world. In the olden days, people used to directly drink river water and open well water. Even deep bore well water is used for drinking purposes.

Clean treated water started at the beginning of the 19th century. Filtration was used to remove the debris from the water. It is the duty of the government to provide safe drinking water.

IMPACT ON HUMAN HEALTH



WATER MAKES UP
60% OF THE WEIGHT
OF THE HUMAN BODY

2 BILLION PEOPLE DRINK
FROM A SOURCE THAT IS
CONTAMINATED WITH FAECES

3 BILLION DIE EACH YEAR
FROM WATER POLLUTION
(MOSTLY UNDER 5 YEARS OLD)



The improper discharge of sewage from the water closets and cesspools into rivers and lakes makes the water resources polluted. So, the pollution of rivers is increasing day by day and the need for river water treatment has arisen. 3 million people die every year due to water pollution.

Common Methods of Treatment

The good old water treatment system is coagulation, sedimentation, and filtration. The coagulation process involves adding iron or aluminium salts, such as

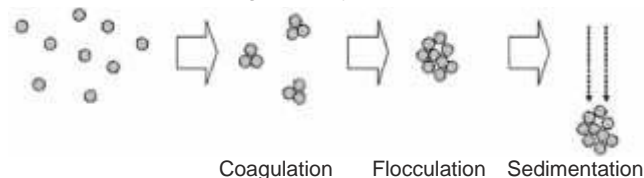
The Government of India, in partnership with States, is implementing Jal Jeevan Mission-Har Ghar Jal, which aims at providing potable water in adequate quantity of prescribed quality on regular and long term basis to every rural household including tribal areas of the country through tap water connection by 2024.

Andaman & Nicobar Islands, Goa and Telangana have achieved the 100% target of providing functional tap water connections to every rural household.

While the drinking water supply has improved, the quality in most parts continues to be suspect. People complain about the deterioration in quality – the water is often cloudy, muddy or has an odd smell.

And continuous piped water supply is still a pipe dream with most urban households receiving water for a couple of hours a day or even only a few days a week.

Components producing turbidity



aluminium sulphate, ferric sulphate, ferric chloride, or polymers to the water. The coagulation chemicals are called coagulants and have a positive charge. The positive charge of the coagulant neutralises the negative charges of dissolved and suspended particles in the water.

When this reaction occurs, the dissolved particles bind together or coagulate (this process is sometimes also called flocculation). The particles after binding together will be larger or floc are heavy and quickly settle to the bottom of the water supply. The settling process is called sedimentation. The following diagram shows the basic reactions and processes that occur during coagulation:

This treatment process removes dissolved organic particles referred to as Natural Organic Matter (NOM). But it will not remove around 27% to 84% of pathogenic bacteria. So, chlorine must be added to disinfect the water. But in practice, excess chlorine is used due to the conveyance distance being more. If excess chlorine is used, a byproduct called Trihalomethanes (THM) will be produced and it is very dangerous to health.

Alternatively, sodium hypochlorite or bleaching powder is also used in rural areas where treatment facilities are not available, which is also dangerous to human health and aquatic living organisms.

Some of the primary parameters for drinking water are mentioned in Table 1.

Disadvantages of the Present System

The coagulation, sedimentation, filtration, and disinfectant systems have the following disadvantages:

- It requires a huge land area for treatment
- It requires heavy capital investment
- In the final output, some percentage of excess chlorine shall be found which is dangerous to health.
- The shelf life of the chlorine is 12 to 24 hours only. It can get oxidised during the conveyance, and reappearance of bacteria and E. coli are found in the water.

But in India, all states use this method or a modified treatment system.

Is R.O System Safe?

Nowadays, from the capital cities to the main rural villages, people have started to use the Reverse Osmosis (R.O) treatment system. Thousands of firms produce bottled water through the R.O. system and supply it to homes,

offices, hotels, shops, and in all middle and upper classes family functions. The TDS level may be around 100 ppm and almost it is mineral-less water. Nowadays, we deactivate the minerals and add the necessary minerals for better taste and better health conditions.

Is R.O. system good or bad? Many research papers are published at the international level and register the ill effects of R.O. water.

According to the World Health Organization, low-mineral (TDS) drinking water produced by reverse osmosis or distillation is not suitable for long-term human consumption and, in fact, can create negative health effects for those consuming it.

It has been confirmed that the prolonged use of R.O. water can cause chronic gastritis and gastric duodenal ulcers. On a less severe level, it is reported to have caused indigestion, bloating, stomach ache, and nausea.

But the commercial R.O. plant owners propagate that R.O. water is doing good for health.

Disadvantages of R.O. Water

- Wastes significantly more water than it produces
- Removes healthy minerals present in water and decreases pH
- Costly installation and requires expensive maintenance
- R.O. water will deplete the calcium and magnesium minerals from the body
- Knee and other joint pain will be found in people who regularly use R.O. water
- Bones become very weak due to calcium deficiency
- Immunity power is reduced in the people

New Novel Methods of Treatment

Disinfectant is one step where game changer technology can be introduced. Disinfectants like chlorine, bleaching powder, and sodium hypo chlorite are the common disinfectants being used for drinking water treatment. All these disinfectants are chemical based which is unhealthy for users. R.O. treated water is also not good if people continuously use the water. There are options like:

- Boil the water and use it for drinking
- Use the natural treatment like herbs and shrubs available as indigenous treatment systems (Vetiver plants and Thethankottai seeds)

But the scope for treating in a large-scale level is doubtful by using herbs and shrubs.

Then how to change the present treatment system? What type of technology is needed?

The technology needed should kill all the pathogenic bacteria and E. Coli. The disinfectant should be natural and non-chemical and should not have any side effects on human beings. The shelf life of the disinfectant should be more than 120 hours (5 days) so that the reappearance of bacteria can be stopped.

Table 1: Indian Standard Specifications for Drinking Water: 10500 - 1983

Sl. No.	Substance or Characteristics	Requirement Desirable Limit	Undesirable Effect Outside the Desirable Limit	Desirable/ Essential	Remarks
1.	Colour, Hazen Units, Max.	--	Above 10	Essential	May be extended to 50 only if toxic substances are not suspected in absence of alternative sources.
2.	Odour	Objectionable	--	Essential	a) Test cold and when heated. b) Test at several dilutions.
3.	Taste	Agreeable	--	Essential	Test to be conducted only after safety has been established.
4.	Turbidity, NTU, Max.	10	Above 10, Consumer acceptance decreases.	Essential	May be extended upto 25, in absence of alternative sources.
5.	pH Value	6.5 to 8.5	Beyond this range the water will affect the mucous membrane and/or water supply system.	Essential	May be relaxed upto 9.2 in absence of alternative sources.
6.	Total Hardness (as CaCO ₃) mg/l Max.	300	Encrustation in water supply structure and adverse effects on domestic use.	Essential	May be extended upto 600 in the absence of other sources.

Alkaline water having pH of more than 8.00 is recommended in India. It has become very popular and alkaline water-producing firms have started their business. But the capital cost for one home of 4 members shall be around Rs. 4 to 5 lakhs. Alkaline water is an anti-oxidant water that improves the immunity of human beings. But only a limited sector of people can install the alkaline water machine. Maintenance cost is also more for the alkaline treatment system.

To fulfil the above goals, one non-chemical disinfectant is available. Sodium Hypo Chlorous (HOCl) is the Game Changer solution. Instead of chlorine and other chemical-based solutions, the governments should come forward to use this Hypo Chlorous solution.

It is called AQUASOL-A and AQUASOL-C or Anolyte Solution. These products are manufactured using ordinary table salt, potable water and electricity.

The AQUASOL-A (Oxidants) is broad spectrum - killing bacteria, spores, and viruses, algae, fungi and even some protozoa. No resistance by microorganisms has been reported to date. It also removes colour, bad odour, controls biological oxygen demand (BOD) and chemical biological oxygen demand (COD), etc. without dangerous byproducts like polycyclic aromatic hydrocarbons (PAH) and Trihalomethanes (THM) like in other chemical methods. AQUASOL-A is a pH stabiliser, and heavy metals neutraliser and increases the taste.

Conclusion

These AQUASOL solutions can be produced at any site and have a shelf life of more than 12 months. The reappearance of pathogens will not occur in this system. So, the scientists and governments should come forward to do more research on this system. ▶

Our editor, Prof Bejon Kumar Misra stressed in his book, 'Safety Issues Concerning Storage Water Purifiers', that the leading storage water purifier brands do not adhere to international standards of providing safe drinking water. A study conducted by his health foundation revealed that these purifiers use various chemicals like chlorine, bromide and nano-silver in excessive and undisclosed doses. The residues from these chemicals used for filtration get deposited in the body and have adverse effects on our health.





Payal Agarwal
Editorial Consultant

Returning Water by Recharging the Ground!

“Groundwater accounts for majority of the liquid freshwater that is used on the planet. Water that is drawn from the ground forms the lifeline of the people of India. And this is facing severe threats of depletion and pollution. A studied focus on its recharge and aquifer management is the need of the hour!”

– Payal Agarwal

A photograph showing a woman in a red sari operating a traditional water wheel (dugweli) in a dry, yellowish field. The wheel is partially submerged in a stone-lined well. The background shows sparse trees and a hazy sky.

**We can no longer
disregard the dangers of
overuse of ground water!**

WATER SCARCITY OR water crisis is the lack of fresh water resources to meet the demand for water. In 2019, the World Economic Forum, in its Global Risks Report, 2019, listed water scarcity as one of the largest global risks in terms of potential impact over the next decade.

When we think of water, we picture water coming from rivers and dams. However, a major portion of the water we use comes from under the ground in the form of borewells, tube wells and dug wells.

India does have more surface water than ground water. But since the former is confined to specific areas and may not always be available where people need water, the decentralised availability of groundwater makes it easily accessible. In fact, India is primarily a groundwater economy. It is estimated that groundwater resources serve about 85% of the domestic water supply in rural areas, 45% in urban areas and over 60% of irrigated agriculture. Moreover, the groundwater works as a critical buffer against the variability of monsoon rains.

The average annual usable water in India comprises of 690 BCM of surface water and 432 BCM of groundwater. (BCM = billion cubic metres; 1 cubic metre = 1,000 litres) Source: report in Times of India

India draws 260 BCM per year for irrigation, domestic and industrial uses, making us the highest user of groundwater in the world. We use 25% of all groundwater extracted globally, ahead of USA and China.

Global water demand (in water withdrawals) is projected to increase by 55% by 2050 (OECD 2012)

The Mechanics of Groundwater

As the name goes, groundwater is water that seeps through the soil and rocks and is stored beneath the ground. The rocks where groundwater is stored are

termed aquifers and the area where water fills the aquifer becomes the saturated zone.

The depth from the surface at which groundwater is found is called the water table. This can range from a foot below the ground to hundreds of metres deep. It rises with heavy rains; conversely, continuous extraction of groundwater can cause it to fall.

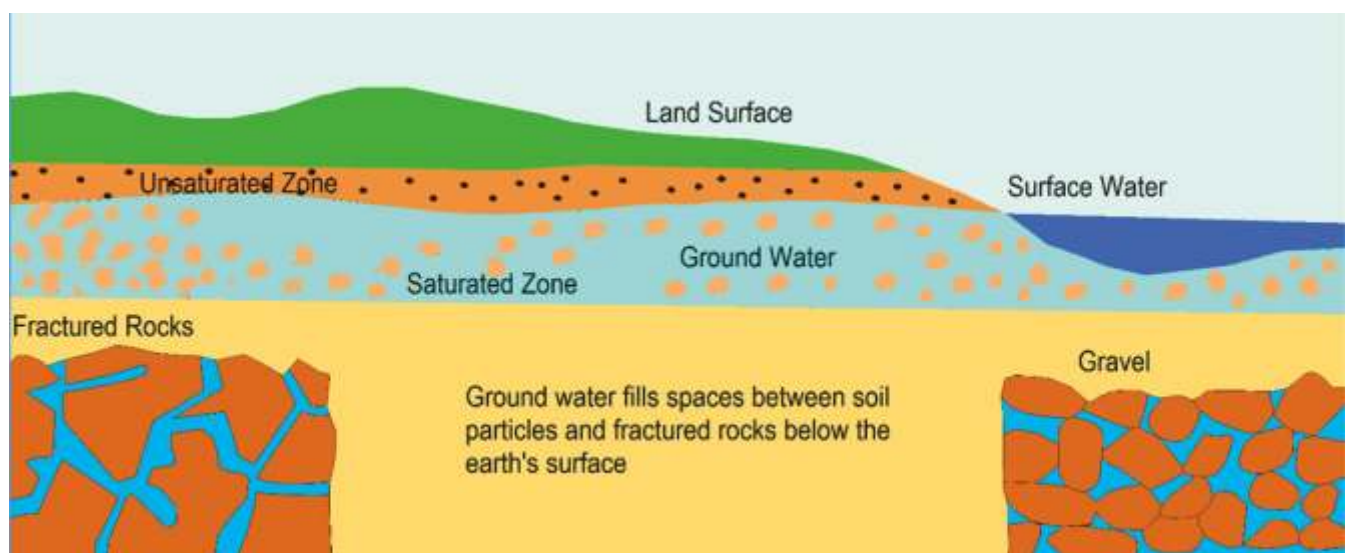
Around 65% of India's overall aquifer surface area is marked by hard rocks, low storage and poor permeability. This limits their recharge from rainfall and they will eventually dry out from continuous usage.

India is facing a constant decline in surface water use and indiscriminate increase in groundwater utilisation for irrigation and other purposes. Meanwhile, most of the recharging of groundwater is left to rainfall that seeps into the ground and enters the water table. However, with the erratic rains due to climate change and overexploitation of groundwater on the other, the water table is declining rapidly and we are staring at a de-saturation crisis of aquifer zones. Meanwhile, people continue to dig deeper and larger wells and bore deeper into the ground to find water!

A report by Central Ground Water Board (CGWB) revealed that the groundwater level in 33% of the monitored wells declined by 0-2 metres in November 2020 as compared to the decadal water level average (2010-2019).

Metro cities with declining water tables

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



Graphical Representation of Groundwater

Groundwater overuse happens when the average extraction rate from aquifers is greater than the average recharge rate over a period of time.

17 countries extract more water annually than is recharged through their natural water cycles, thus straining the groundwater resources.

The *Dynamic Groundwater Resources of India, 2022* report released by CGWB in November last year stated that around 14% of the 7,089 groundwater assessment units (blocks, talukas or mandals used to assess groundwater) across India are overexploited, 4% are critical and 12% are semi-critical. The numbers are 1,006 over-exploited (annual groundwater extraction exceeds the annual recharge), 260 critical (90% to 100% groundwater extraction) and 885 semi-critical (70% to 90% groundwater extraction) groundwater assessment units.

The stage of groundwater extraction is as high as 165.99% in Punjab, Rajasthan and Haryana. They are overexploited as the annual groundwater consumption is more than the annual extractable groundwater resources. Delhi - at 98.16% - falls in the critical category. The overall stage of groundwater extraction in the country is 60.08%.

DYNAMIC GROUNDWATER RESOURCES OF INDIA, 2022

Total Annual Groundwater Recharge	437.60 bcm
Annual Extractable Groundwater Resources	398.08 bcm
Annual Groundwater Extraction	239.16 bcm
Stage of Groundwater Extraction	60.08 %

Note: Stage of Groundwater Extraction is the percentage of utilisation with respect to annual extractable resources.
bcm is billion cubic metre

Source: Dynamic Groundwater Resource Assessment 2022

A study titled 'Assessing the Impact of Groundwater Abstractions on Aquifer Depletion in the Cauvery Delta, India' published in April 2023 highlights that the Cauvery Delta is at a tipping point marked by continuous decline in groundwater levels and depletion of groundwater storage. Overextraction and seawater intrusion are rapidly drying up the freshwater resources here. It recommends reduction in abstraction by 50% for the deeper aquifers and recharge for the shallow aquifers.

The depletion issue is compounded by the growing hazard of deterioration of quality of groundwater. Groundwater contamination happens when the pollutants in groundwater exceed the limits prescribed for drinking water. The proportion of naturally existing chemicals like arsenic, fluoride, nitrate and iron is increasing steadily.

Bacteria, phosphates and heavy metals are also entering the groundwater due to human activities like sewage, industrial effluents, leaky underground gas tanks, landfills, and overuse of fertilisers and pesticides in agriculture.

The CGWB monitors the chemical quality of the groundwater once every year through a network of about 15,000 observation wells located all over the country. It stated that nearly 60% of all districts in the country have issues related to either availability or quality of groundwater, or both.

The overuse and contamination poses threats to health, livelihoods, food security, urban development, etc.

The theme for World Water Day 2022 was 'Groundwater: Making the Invisible, Visible'!

Measures to Recharge Groundwater

Groundwater is still governed by a British era Act that states that the groundwater is owned by the landowners – they have the right to collect and dispose all water under their land. Additionally, landowners are not legally liable for any damage caused to the water resources as a result of overextraction. This makes it difficult to regulate the extraction of groundwater which should actually be managed as a community resource!

Many states provide power subsidies for agriculture which is primarily responsible for decline of water levels. The challenge is to find a balance between the needs of farmers and the need to ensure sustainable use of groundwater.

Given the state of depletion, recharging of groundwater cannot be left to monsoon precipitation alone. Artificial recharge of aquifers - by modifying the natural movement of surface water through suitable civil construction techniques - is becoming increasingly important.

The Ministry of Jal Shakti accords special focus to the groundwater sector. The Ministry of Rural Development also implements certain programmes related to groundwater management. The Ministry of Environment, Forests and Climate Change is partially responsible for the prevention and control of groundwater contamination.

- The National Water Policy, 2012 advocates rainwater harvesting and conservation of water. It also recommends that the overextraction of groundwater should be minimised by regulating the use of electricity for its extraction.
- The Department of Water Resources, River Development & Ganga Rejuvenation circulated a Model Bill to all the states/UTs to enable them to enact suitable groundwater legislation for its regulation and development (including provisions for rainwater harvesting). The Ministry reported that 15 states/UTs have implemented groundwater legislation on the lines of Model bill.

Institution	Role
Central Water Commission	Initiating and coordinating schemes for the conservation and utilisation of water resources in the country in collaboration with state governments; and monitoring water quality
Central Ground Water Board	Developing and disseminating technology related to sustainable use of ground water; monitoring and implementing policies for the sustainable management of ground water resources; estimating ground water resources
Central Ground Water Authority	Constituted under Section 3(3) of the Environment (Protection) Act, 1986 to regulate and control development and management of ground water resources; can resort to penal actions and issue necessary regulatory directives
Central Pollution Control Board	Implementation of the Water (Prevention and Control of Pollution) Act, 1974 which seeks to restore water quality

Major central level water institutions responsible for groundwater management

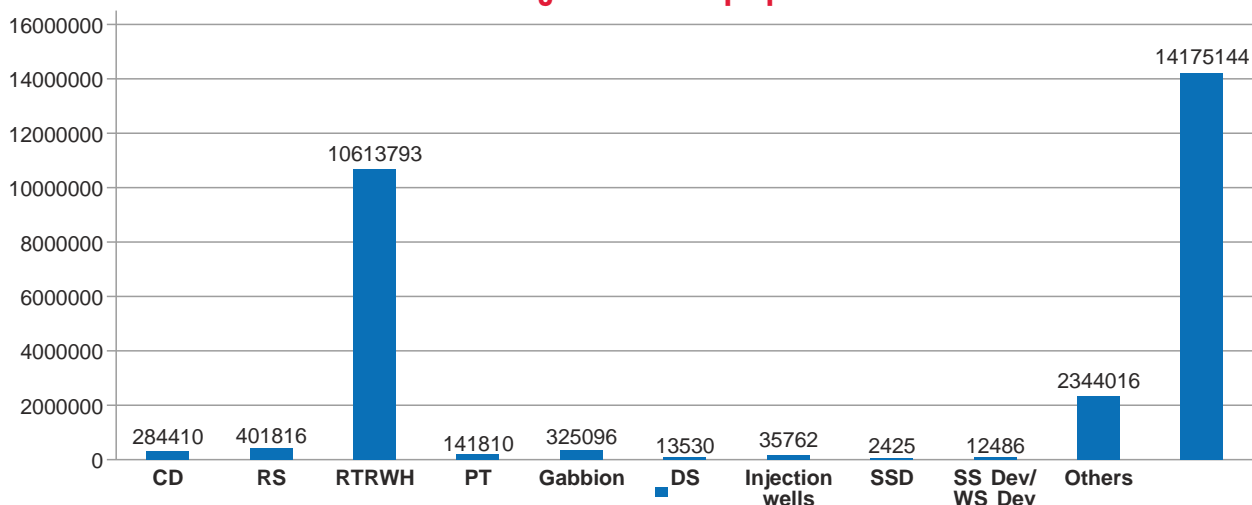
- The CGWB prepared a 'Master Plan for Artificial Recharge to Ground Water in India' in 2013 with a vision of constructing 1.11 crore rainwater harvesting and artificial recharge structures in the country. This was revised in 2020 as a macro level plan indicating various structures for the different terrain conditions of the country at the district/block level. It envisages construction of about 1.42 crore rainwater harvesting and artificial recharge structures to harness 185 BCM.
- The Jal Shakti Ministry has issued guidelines (applicable pan-India) to regulate and control groundwater extraction for commercial/industrial purposes.
- The Central Government has launched various schemes like the Jal Shakti Abhiyan and Atal BhujalYojna apart from Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) and PMKSY-Watershed Development Component and Command Area Development & Water Management (earlier named Integrated Watershed Management Programme or

IWMP). They undertake various watershed management, aquifer recharging and tank rehabilitation activities. Percolation tanks, check dams, gabion structures, recharge shafts, etc. are built to collect water that permeates and recharges the groundwater. Dug wells that have gone dry are being used to directly recharge the dried aquifer by diverting the storm water, tank water, canal water, etc. into these structures. Neglected water bodies are being rejuvenated, and new ones created to hold rainwater.

The World Bank has been assisting the Government of India to enhance groundwater management

- As water is a State subject, various state governments have formulated some novel schemes to augment groundwater resources - like Neeru Chettu (Andhra Pradesh), SujalamSufalam Jal Sanchay Abhiyan (Gujarat), Jalyukt Shivar Abhiyan (Maharashtra), Paani Bachao Paisa Kamao Scheme (Punjab) and Mission Kakatiya (Telangana).

Number of Artificial Recharge Structures proposed in the Master Plan



CD-Check dam, RS-Recharge Shaft, RTRWH-Roof Top Rainwater Harvesting, PT-Percolation Tank, DS-Desilting, SSD-Sub-Surface Dyke, SS Dev/WS Dev-Springshed Development/Watershed Development

- The government notifies highly overexploited blocks in water-stressed states to restrict development of new groundwater structures (except those for drinking water). Environmental compensation charges are levied on illegal extraction of groundwater and unauthorised consumers.

Tamil Nadu attempted an innovative plan to recharge groundwater using treated water to alleviate water shortages in areas that are already affected by seawater intrusion and the groundwater is already saline.

Other suggested measures like stormwater harvesting, rain-garden and bio-retention ponds are also being taken up. Another approach for addressing the groundwater challenge in cities is blue-green infrastructure with adequate green (trees, parks, gardens, playgrounds and forests) and blue (seas, rivers, lakes, wetlands and water utilities) spaces.

Rainwater Harvesting

A large part of the rain water runs off our roofs and roads and ends up in the drains. This water is clean and potable – it should ideally be collected and used for domestic purposes, irrigation or recharging the water table. Termed as rainwater harvesting, this is actually an ancient practice that is being propagated today to collect the run-off from our roofs and other impervious surfaces and directing into a storage tank or 'pit'. The rainwater harvesting system can be basic or complex – but the end result is the same.

The CGWB Master Plan also states that roof top rain water can be conserved and used to recharge the groundwater by connecting the outlet pipes from roof top to divert the water to either existing wells/tube wells/bore wells or specially designed wells.

In 2001, Tamil Nadu became the first Indian state to make rainwater harvesting compulsory for buildings! Groundwater levels rose by almost 50% in Chennai within a span of just 5 years! An improvement in water quality was also noticed.

The Ministry of Housing & Urban Affairs circulated the Model Building Bye-Laws, 2016 to all the states/UTs. The recommendation of rainwater harvesting for all types of buildings and residences with plot size 100 sq.m or more has been incorporated in all the 36 states/UTs except Sikkim, Mizoram and Lakshadweep. Accordingly, the plans submitted to the local bodies should indicate the system of stormwater drainage along with points of collection of rainwater in surface reservoirs or in recharge wells.

Many states offer cash incentives or rebate in the water bill for complying with the rainwater harvesting regulation.

Moreover, the Central Ground Water Authority (CGWA) insists on mandatory rainwater harvesting (as per the guidelines) for granting a 'No Objection Certificate (NOC)' for drawing groundwater.

However, the Rainwater (Harvesting and Storage) Bill, 2016 that provides for compulsory rainwater harvesting in every government, residential, commercial and institutional building continues to remain pending before the Parliament.

Artificial groundwater recharge schemes are essential, but it is equally essential to maintain the quality of water when augmenting this resource. Lack of fresh water for recharging can cause saline sea water to seep into the ground, rendering it infertile.

The CGWB report claims that the government interventions and public participation reflect in the groundwater assessments. The overall groundwater extraction has marginally decreased from 244.92 BCM in 2020 to 239.16 BCM in 2022. Even the overall stage of groundwater extraction has marginally decreased from 61.6% to 60.08% in the same period. It was 63.33% in 2017.

“There is improvement in groundwater conditions in 909 assessment units in the country when compared with 2017 assessment data. In addition, overall decrease in number of over-exploited units and decrease in stage of groundwater extraction level have also been observed.” – statement by Ministry of Water Resources

However, many experts have expressed their doubts over the accuracy of these assessments. Himanshu Thakkar of South Asia Network on Dams, Rivers and People said, “The findings on recharge and extraction both seem counter-intuitive. What is happening on the ground doesn't seem to reflect what has been reported.” He further added that, “Communities need to be made aware and empowered to collectively conserve groundwater”.

In sum, while the efforts are a step in the right direction, we are eons away from bringing a paradigm shift towards positive change. The authorities seem to lack accountability and responsibility apart from having limited knowledge and capacity.

Conclusion

New water cannot be created, so we must be efficient with the water we use and return what we take! Strong community awareness and participation supported by implementation of coordinated actions is essential for proper groundwater management. ▀


Groundwater is not always free or can be taken for granted. The Central Ground Water Authority (CGWA) recommends fixing tariffs for extracting groundwater and this has been followed by many states. Recently, Telangana also issued an order for levying of charges on all packaged drinking water supply units, bulk suppliers, large housing societies and private tankers (except small domestic users) for extracting groundwater.



Dr. R. Ilangovan, M.E. PhD.
Former Chief Engineer,
Tamil Nadu Public Works Department

Treating Wastewater to Make it Reusable

– A Revolutionary Technology Comes into Play



Discharges of domestic and industrial wastewater deteriorate the fresh water in ponds, lakes, rivers, and streams, and fertile lands. Though STP (sewage treatment plants) & ETP (effluent treatment plants) are provided in many municipalities, local bodies and industries, the pollution and natural resources deterioration has not stopped. The reason is obvious. The ETP or STP needs more recurring expenditure, due to the type of technology adopted by them. Sometimes the authorities do not run the treatment effectively due to complicated technology.

So, the pollution of groundwater and surface water continues, leading to serious disasters on the land, environment, and human beings. It is necessary to identify a cost-effective and environmentally sound technology for wastewater treatment. Conventional domestic wastewater treatment technologies like aerated lagoons, oxidation ponds, ASP, TF, RBC and RBR need either more mechanical equipment or more land area.

I have conducted many pilot projects for solving the environmental issues in wastewater and polluted lakes. We have identified a viable treatment system for domestic wastewater and industrial wastewater. Here the Bio-Ozolyte Treatment system is recommended for sustainable treatment which has been implemented in local body domestic wastewater, college hostel sewage wastewater and slaughter house wastewater treatment plants.

This case study delves into the concepts of the working principle and process of implementation in the Salem slaughterhouse plant and the results of new raw sewage, treatment after EBB, after Ozonization and Anolyte treatment. This success story will be useful to all other wastewater and slaughter house wastewater treatment!

IN URBAN AREAS, a huge quantity of wastewater from toilets, kitchens, bathrooms and hotels is discharged into underground sewer systems/open drains and ultimately pollutes aquatic bodies like rivers, lakes, canals etc. There is a need to go for reuse & recycling systems wherever possible to have a better sustainable approach.

Wastewater treatment is not a new technology. Oxidation ponds, aerated lagoons, activated sludge processes, trickling filters and rotating biological reactors, chlorination, ion-exchange, electro dialysis and reverse osmosis are some of the available treatment technology. But local bodies and other agencies do not implement the wastewater treatment plant - except in some industries - due to its high capital and maintenance costs.

WASTE WATER TREATMENT TECHNOLOGY - OPTIONS

- Oxidation ponds. - **Need huge land**
- Aerated lagoons. - **same**
- Activated Sludge Process. - **Need more mechanical equipments**
- Trickling filter. - **same**
- Extended Aerator System. - **Complicated**
- UASBR system. - **Costly and inadequate**
- RBC / RBR. - **Costly**
- New Biological system. - **(Powder, EM, EBB)**
- R.O. system. - **Costly**
- Chlorination and Ion exchange. - **Costly**
- Ozonization. - **Costly**
- Root zone system. - **Suitable for less qty.**

If the proper technology is available and a treatment plant is provided, wastewater becomes a good resource. Especially for hotels, hospitals residential colonies, educational institutions and small cities, wastewater recycling is a good way of saving water. The recycled water can be used for agriculture, gardening, flushing and groundwater recharging.

Bio-Ozolyte System

The Bio-Ozolyte system represents the Ozonization and Anolyte treatment systems. Though many technologies are available for wastewater treatment, some need huge land and some need heavy electrical and mechanical equipment. But this Bio-Ozolyte system has special features that can be designed fully below ground level and partly above and below ground level as per the land terrain available. It does not require a standard design pattern and is flexible to club with any other technology. This could be accommodated according to the site condition with power or without power.

Advantages

- Very cost-effective technology and effective in treating wastewater
- Can be maintained by any nonskilled worker
- Running cost is less and can be reduced further by using non-conventional energy
- Power requirement is 50% reduced when compared with conventional treatment plants
- Most feasible during operation
- Even if power fails for a few hours, the system will not be affected
- The treated water could be used for irrigation purposes
- This technology involves easy operation in remote villages
- The design can be updated for 25 to 30 years
- Rapid reduction in sludge generation
- Clubbing with other technology is possible and could be suitable even if any industrial wastewater mixes with domestic wastewater

Eco Bio Block

Eco Bio Block (EBB) is a Japanese technology recently used in wastewater treatment plants. The EBB is made of with volcano rock, and zeolite cement and infused with bacteria available in the form of blocks. Since the microbes are necessary to degrade the pollution load in STP, the EBB plays an important role in generating microbes continuously when immersed in water. So, adding microbes daily is not required. This technology was tested in a pilot study by the Central Pollution Control Board, New Delhi at the Mayur Vihar channel for 3.5km of open drain. It has also been tested in Suler Town Panchayat in Coimbatore and in Orathupalayam Dam for treating dyeing wastewater. The results are very encouraging.

Ozone Treatment

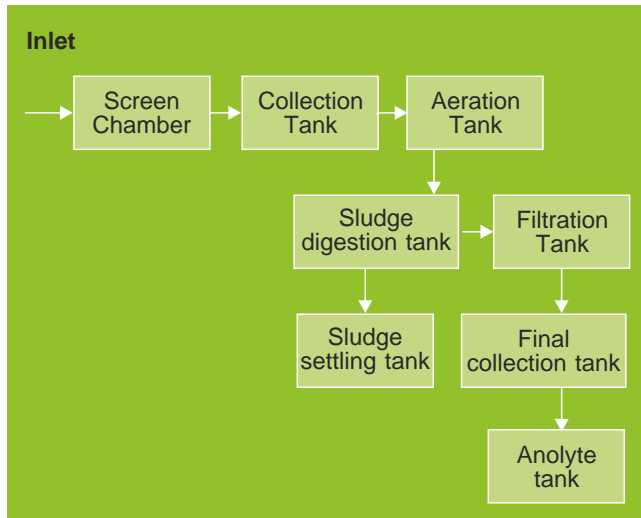
Ozone is a powerful treatment not used for industrial wastewater treatment due to its higher cost. But if the technology is cleverly clubbed with another biological method, it can be effectively used for domestic wastewater treatment depending on the degree of treatment needed. By using this technology, BOD, COD, colour, odour & bacteria will be treated well.

Anolyte Treatment

The Anolyte system has been used in space by Russians. The Anolyte liquid water is produced from the Envirolite reactor and used for wastewater treatment plants. This liquid shall be used in the wastewater system after the OCAT system. The requirement of liquid is 0.5% to 1% of the total quantity. The water quality after the Anolyte system shall be free from all kinds of chemical and biological parameters.

Case Study

Salem Corporation constructed a slaughterhouse for 500 goats at Maniyanur in Salem. It was proposed to have a proper treatment plant for the wastewater generated here. The general flow diagram is shown below:



Apart from the construction components, the following lump sum provision are provided for the effective functioning of the plant:

- Provision for EBB Block (Eco-Bio Block)
- Provision for internal electrification for the pump room
- Provision for external electrification arrangements
- Provision for screen bar arrangements
- Provision for garden and fencing arrangements and reuse of water for aquaculture
- Mechanical equipment, electrical motors, submersible aerators, ozone generator, oxygen control machine, pipelines, filtration control valves pipe fittings, and microbes costs including design, erection, and commissioning charges, etc.



- Provision for photograph and video charges
- Provision for documentation, awareness program & training program
- Unforeseen items of work, if any, found necessary during execution

The total estimated cost worked out to Rs 22 lakh including fencing water supply and electrical arrangements. Above all, the area is free from all kinds of pollution. People's cooperation in solid waste management schemes will enhance the efficiency of the treatment plant.

Results

Parameters	Raw Water	After EBB	After Ozone	After Anolyte
COD mg/l	352.17	126.32	107.8	45.73
BOD5 mg/l	110.00	30	25	15
Coliform Bacteria MPN/100 ml	10X10 ³ Cfu/ml	2X10 ³ Cfu/ml	NIL	Nil
E.Coli	2X10 ³ Cfu/ml	NIL	NIL	Nil

Merits

- This treatment system is based on a natural eco-friendly process without the use of any chemicals
- Combination of two technologies will reduce the cost and increase the efficiency
- It needs less space and machinery
- Operation & maintenance cost is very minimal
- Very simple and user-friendly for operation and maintenance

Cost Component

Capital cost of the Bio-Ozolyte System treatment plant including all civil works out to Rs. 25 lakh per 1 lakh litres (for the current year 2023-24 schedule of rates)

- Maintenance cost will be around Rs. 4 to 5 per 1 cu.m.
- Cost for a separate sewer line to be provided as per actual

Other Applications

- The Bio-Ozolyte System is useful for local bodies, municipalities, and educational institutions where the treated water could be reused for the garden, aquaculture, and groundwater recharging.
- It could also be used for mixing of industrial effluent.
- The above combination could also be blended with some cost-effective filter media, the Total Dissolved Solids (TDS) also can be addressed.
- This technology shall hold good for hotels, hostels, hospitals, and urban domestic waste water. ▶



Dr. Anamika Wadhera
Director
Consumer Online Foundation

Beyond the Tap: The Rise of Packaged Drinking Water

“Is your source of drinking water reliable in terms of safety and purity? Bottled water is considered a more hygienic and convenient option by people from all strata of society. However, the packaged drinking water industry opens up a new can of worms of its own!”

— Dr. Anamika Wadhera



THERE WAS A time when the water we drink came solely from taps and hand pumps, or wells and ponds in the villages. Bottled water was considered a premium commodity that was fancied by the rich, privileged, NRIs and foreign tourists as 'quality' water. Cut to today, when small pouches of packaged water are bought regularly in rural areas!

Packaged drinking water is derived from varied sources including surface, ground or sea and subjected to treatment like decantation, filtration, demineralisation, mineralisation and reverse osmosis. It is disinfected before being packed in sealed containers so that it does not get contaminated until consumed (within a specific time). It is suitable for direct consumption without further treatment.

The drastic shift is not centred only on the convenience of packaged drinking water when you are out and about – be it for work, shopping or travel. At-home consumption of bottled water – from bulk cans – is also robust and growing.

This is attributable to the unsafe, unreliable and insufficient nature of the drinking water supply. Increasing concerns of health and hygiene from consuming municipal water is making more and more people opt for 'pure mineral water'. The affordable cost of packaged drinking water and growing disposable income on the one hand and education and awareness on the other are working in its favour as well.

Exploring the Market

According to the Trade Promotion Council of India, the packaged drinking water bottle market in India

Drinking water that comes in our taps is supposed to be clean and potable. However, in reality, it is contaminated with both pathogens and harmful chemical substances, which makes filtration a must. Moreover, tap water usually has the taste of chlorine. The taste also tends to vary from region to region – at times, even from home to home, depending on the method of purification.

was valued at \$24 billion in 2019, and is expected to reach \$60 billion by the end of 2023. While other studies also peg the industry in a similar bracket, MarketResearch.com and other sources gauge that the industry was worth \$160 billion in 2019 and expect it to scale \$400 billion by the end of 2023.

As per the industry analysis by BizVibe, "The complete list of mineral companies in India has over 3,000 organised mineral water companies in India, and it is estimated that there are around 12,000 unorganised mineral water companies in India."

India was the 12th largest consumer of bottled water by value and the 14th biggest by volume in 2021 - United Nations report released ahead of World Water Day on 22 March, 2023

The packaged drinking water is sold in bottle sizes of 250 ml, 500 ml, 1 litre and 2 litres apart from small pouches and barrels of 15 to 20 litres. While we consider all bottled water to be the same and often call it 'mineral water', they are actually differentiated into mineral water, natural water and treated water. Most of the packaged drinking water in India is actually treated water.

Packaged water containers of 20 litre capacity are delivered to the doorsteps, like LPG gas cylinders – at a minimal cost of Rs. 30 to Rs. 40!

The problem here is that while people blindly trust packaged water and have no second thoughts about the purity, fact is that this too may be microbiologically unsafe for drinking. The sourcing and treatment processes are considered questionable in many cases.

It is noteworthy that it was a group of concerned consumer activists that pushed the Centre to make BIS standard mandatory for packaged drinking water!

In March 2017, a leading consumer organisation tested 12 leading brands of one-litre packaged drinking water on quality, acceptability and sensory parameters. The testing was conducted in an NABL-accredited laboratory based on the IS: 14543: 2004 standard with the latest amendments. While most brands passed all the tests and fulfilled the specified parameters, the samples of a few leading ones failed in crucial microbiological tests. Based on the overall test findings, Rail Neer was the top performer, followed by McDowell's and Bisleri.

While the situation may have changed since then, it is possible that your bottled water brand is not as safe and reliable as you assume it to be!

The issue is more pronounced in the unorganised segment that does not adhere to government regulations and operates on lower price bands. Most of them are counterfeiters that get away with misspelt versions of top brands – like Bilseri, Belsri and Birseli in place of the original market leader, Bisleri.

It should be noted that the recommended pH value of drinking water is between 6.5 to 8.5. Most packaged drinking water brands have a pH value of 6.8 to 7.1 (should be mentioned on the bottle). On the other hand pure rain water or even river water has a pH value of 7.4 and above.

The Other Side of the Bottle

Between 2018 to 2021, India's packaged drinking water market reported the second fastest growth rate after South Korea. The escalating consumption of packaged drinking water in India is considered as a beacon of the emerging health-conscious lifestyle in the country. However, everything is not as rosy as it seems to be!

While we easily slug packaged water from one bottle after another, the swelling demand indicates that our public water supply system is unreliable and that the government has failed in supplying clean water to our homes.

The same report by the United Nations also signals that the fast-growing bottled water industry is actually slowing down progress towards having access to safe water sources, which is a key sustainable development goal for the world. Moreover, the rising consumption of bottled water is also depleting groundwater levels!

To add to this, the resources to manufacture, fill and transport bottled

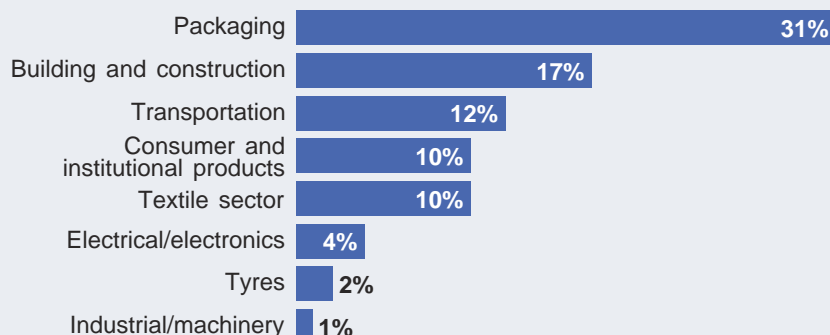
water pressurise and harm the environment.

The Issue of Plastic Usage

Plastic is the most common form of packaging for bottled water. Containers are by far the most common type of packaging in the bottled water industry. This plastic is believed to leach harmful chemicals into the water, especially when exposed to extreme temperatures or allowed to sit for long periods of time.

As per the Organization for Economic Cooperation and

Figure 1: Global Share (%) of Plastic uses in 2019



Development (OECD) data, plastic for packaging dominated the use of plastics in 2019 (see Figure 1).

A UNEP report states that over a million plastic bottles are sold globally every minute. Approximately 80% of them are not recycled; they end up in garbage dumps or clog our drains. Ultimately, the plastic litters our seas and oceans, thus threatening the marine life.

Plastic pollution associated with bottled water currently generates billions of plastic bottles every year, with much of the plastic waste not being recycled but disposed of in landfills – a UNU-INWEH report

If the use of packaged water continues like this, we need to at least shift to environmentally friendly and economical alternatives to plastic bottles.

Conclusion

While we would not suggest that you should go back to drinking water directly from the tap, why not consider installing a good filtration system at home and carry a bottle of water from your house when on the move? Why not ask your host, client or waiter to provide you with filtered water in a glass in place of the bottled water that is routinely offered to us? Even one less bottle or sachet of packaged drinking water is a step in the right direction!

Let us make bottled water an option that we use only when in a pinch! ▶





Dr. Rajendra Singh

– Renowned water conservationist, river rejuvenator and environmentalist; popularly known as 'Jal Purush', Waterman of India. He is Founder and President of Tarun Bharat Sangh that is preparing and supporting society to construct water structures since 1975. He won the Stockholm Water Award in 2015 (equivalent to Nobel prize for water) and Ramon Magsaysay Award for community leadership in 2001.



Dr. Indira Khurana

Ph.D.

– Chairperson of the Indian Himalayan River Basins Council (IHRBC), a growing network of concerned citizens linking the hearts, minds and action of people with rivers in 23 states of India. She is also the Vice Chairperson at Tarun Bharat Sangh, Director at the Coastal Salinity Prevention Cell (CSPC) and Advisory Council Member of Balipara Foundation. She holds the position of Commissioner, Communication of the People's World Commission on Drought and Flood (PWCDF).

Drought, Flood and Climate Change: Mitigation, Adaptation and Resilience Through Community-Led Decentralised Rainwater Conservation

DROUGHTS AND FLOODS are among the greatest global threats to sustainable development. Since 2000, droughts have increased by 29%, as compared to the two previous decades. When more than 2.3 billion people already face water stress, this is a huge problem. No country is immune to drought now. This is due to overextraction of water, unsustainable tampering with nature and climate change.

In Africa, in the last 100 years, more than 200 drought events were recorded, accounting for 44% of the global total. In terms of populations, over the past century, the highest total number of humans affected by drought were in Asia.

More than 1.8 billion people living worldwide are at risk of severe floods: Most reside in low- and middle-income countries in Asia, and 4 out of 10 live in poverty.

Looking back, the year 2022 was one of climate shocks: As people and economies struggled to recover from COVID-19, high intensity cyclones, hurricanes and storms, unprecedented high temperatures, forest fires, drought and dumping of rain bombarded populations across the world. In Europe, rivers dried up and buried history emerged. In other continents, river flows hit rock bottom before drying up. As a result, agricultural produce declined, food insecurity increased, GDPs declined, and prices rose. No continent was spared. Distress migration took epidemic proportions.

A Brief Snapshot Since 2020

In 2020, the number of people affected worldwide due to drought was nearly 19 million.

In 2022, drought across Europe, the US and China was made 20 times more likely by climate change. Rivers dried up, water shortages increased, soils dried up and there were extensive fires. The Netherlands, a country long shaped by its overabundance of water, is now forced to confront drought. Withered, the Mississippi River in the US is choking shipping lanes and endangering drinking water supplies. Researchers say that this type of drought, which would only happen once in 400 years can now be expected every 30 years, given the extent of climate warming.

The deadly floods that swept across western Germany and parts of Belgium in 2021 shocked scientists. Within 24 hours, 15 cm of rainfall was dumped, swelling streams which then washed away houses and cars and triggered landslides. It was then that the scientists realised that they needed to focus on smaller streams, and not only large rivers.

India and Extreme Weather Events

India recorded extreme weather events on 241 of the 273 days from January 1 to September 30, 2022: For close to 90% of the first nine months, India had an extreme weather event breaking in one or more parts of the country. Included heat and cold waves, cyclones, lightning to heavy rain, floods and landslides. India experienced record-breaking temperatures for several months and regions across the country were deluged because of very and extremely heavy rainfall. This led to floods and the loss of life and livestock. This speaks of the increased

frequency and intensity of the extreme events that we are seeing in our rapidly warming world.

These disasters have claimed 2,755 lives, affected 1.8 million hectares of crop area, destroyed over 416,667 houses and killed close to 70,000 livestock. This loss and damage is probably an underestimate.

Economic Loss Due to Climate Change, Drought and Flood

The global economy could lose 10% of its total economic value by 2050 due to climate change. Global warming is now acknowledged as a factor that leads to inflation, called heatflation. The African Development Bank reported that the continent is losing between 5% to 15% of its GDP each year because of climate change. Between 1980 and 2020, climate-related extremes caused economic losses totalling an estimated EUR 487 billion in the EU-27 Member States.

Economic Impacts: India

According to a 2018 World Bank report, rising temperatures and erratic rainfall patterns could cost India 2.8% of its GDP and climate change impacts are likely to lower the living standards of nearly half of India's population (approximately 600 million people) by 2050.

A central government estimate indicates that extreme temperature shocks reduce average farmer incomes by 4.3% and 4.1% during kharif and rabi seasons, respectively, while extreme rainfall shocks reduce average incomes by 13.7 %.

Climate Change and Health

Between 2030 and 2050, climate change is expected to cause around 250,000 additional deaths annually from malnutrition, malaria, diarrhoea and heat stress. The direct damage costs to health is estimated to be between USD 2-4 billion per year by 2030.

Climate change will have a heavy health burden, as existing diseases will expand to new areas and new diseases will emerge. Droughts and floods also have health implications. In expecting women, inadequate intake of calories and micronutrient malnutrition, resulting from food and mineral shortages, compromise maternal health and foetus development. Malnutrition, in turn, compromises the immune system, increasing susceptibility to infection.

Climate change can facilitate zoonotic spillovers, wherein pathogenic viruses manage to overcome natural barriers and infect other animal species. Zoonotic diseases already account for 60% of all diseases and 75% of emerging diseases. The chances of an extremely infectious disease epidemic – similar to COVID-19 – could triple in the coming decades.

Understanding Droughts and Floods

Droughts and floods have increased because of environmental destruction AND climate change. The rain that used to nurture nature, rejuvenate water resources and regenerate soil now erodes it, causing both, droughts and floods.



Between 2030 and 2050, climate change is expected to cause around 250,000 additional deaths annually from malnutrition, malaria, diarrhoea and heat stress.

Natural ecosystems that protect against catastrophic weather events are being destroyed. The regeneration of the soil stops due to decrease of grass cover and greenery that acted as a sponge, slowing the flow of rain, arresting it and recharging groundwater. Now, the rain that falls on the bald surface of the earth takes the soil with it, causing siltation in rivers, and as the riverbed rises, water holding capacity of the river is reduced. Blocking, encroachment of water channels, ponds and other surface waterbodies results in poor drainage and speedy flow of water, causing soil erosion. This causes flooding. When intense rain falls within a short period of time, then chances of both, drought and flood increase.

Why Only Focusing on Carbon Emissions is Not Enough?

A decarbonised economy will not be enough to mitigate, adapt and develop resilience against climate change. The earth is wounded and in need of healing. This healing is not possible without nature rejuvenation, for which water is key. Water is key for climate change mitigation, adaptation, and resilience and its conservation and management is possible through decentralised community-centred rainwater management. While the problems are global, the solutions are local.

When rainwater is harvested, water resources are recharged and greenery expands. This reduces temperatures – mitigation. As evapo-transpiration increases, the micro clouds attract larger clouds that bring rain. This is adaptation. As 'water banks' are created, even if the monsoon cycle is erratic, over time the communities are able to continue with their agricultural livelihoods. This is resilience. Replete aquifers and flowing rivers provide space for excessive water during floods and the stored water provides water during water scarcity/drought. This is cushioning.

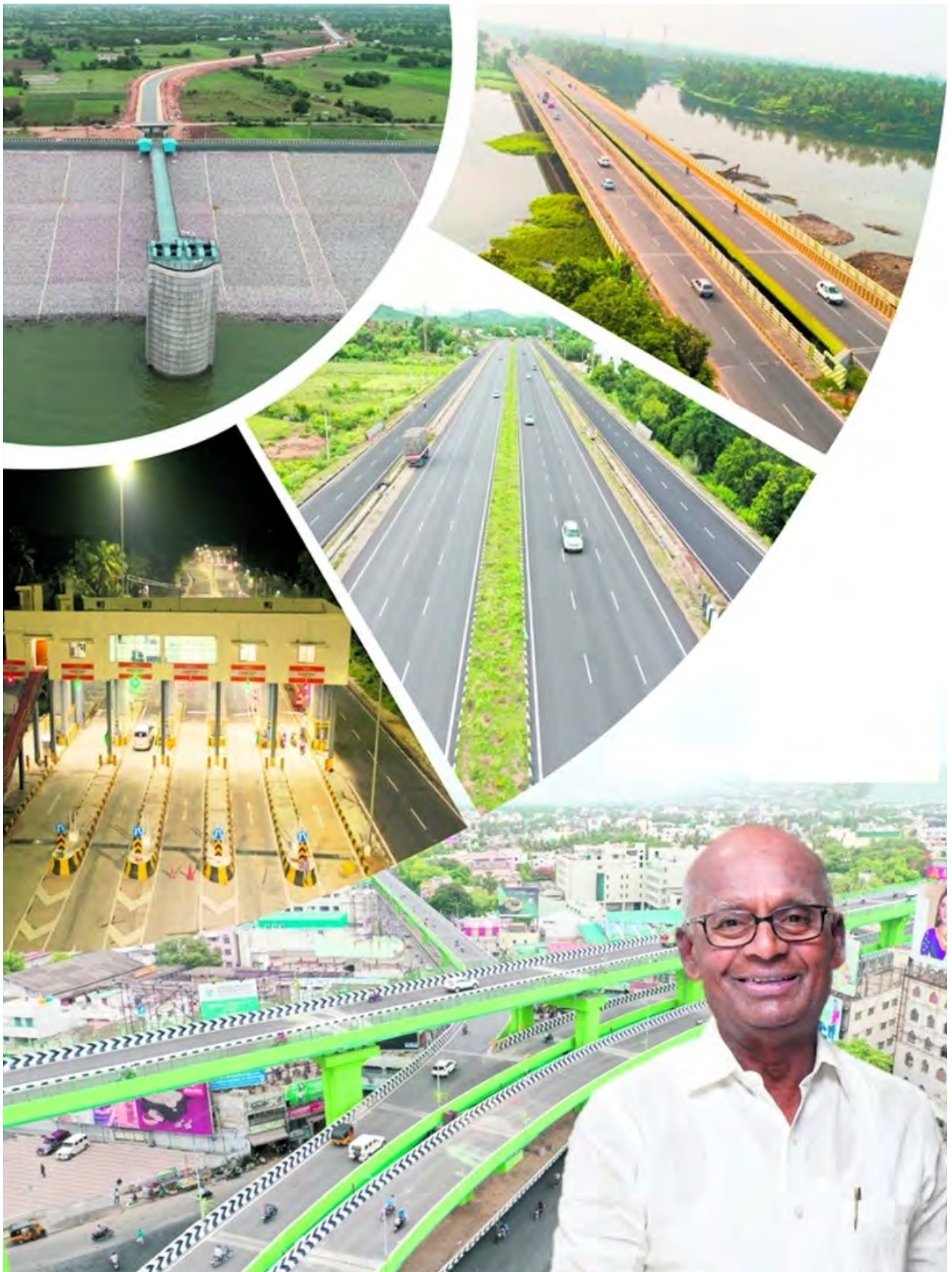
How can Rainwater be Conserved?

Clouds store sufficient water. Slowing the flow of rain and directing it into the groundwater aquifers and surface waterbodies provides cushioning against droughts and floods. Recharge of groundwater aquifers is possible through water conservation structures whose designs are based on local ecology, rainfall, and terrain and made with community involvement. In India, traditional water harvesting systems were based on the ecology and captured the rain which was used for recharge or for direct use.

Small/ micro rainwater conservation structures are powerful. They lead to immediate benefits in surrounding areas and if constructed over a large area, lead to macro nature rejuvenation and livelihood benefits, without displacement or destruction. Over time, with judicious use of water these structures contribute to river flows and to cushioning against extreme weather events. Continuous work of rainwater conservation by communities supported by Tarun Bharat Sangh has led to revival of small rivers: Arwari, Ruparel, Bhagani, Sarsa, Jahazwali, Sherni and Maheshwara.

Healthy flowing rivers are critical for climate resilience. The rainfall needs to be harvested for groundwater recharge. Healthy river flows contribute to groundwater recharge and the reverse is also true. The symbiotic relationship between groundwater and surface water must be maintained for climate cushioning and resilience.

To cool the planet and reduce water-related disasters of droughts and floods, the solution lies in greening the earth. For this the key element is water. Appropriate decentralised water conservation and rejuvenation of rivers/waterbodies is critical for local climate mitigation, adaptation, and resilience! ▶



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Sridhar Rao Deshpande
Superintending Engineer & Officer on
Special Duty to CM, Telangana State

Water Speaks for Irrigation in Telangana!



THE TELANGANA STATE is dependent on two major rivers Godavari and Krishna and their tributaries, apart from a large number of minor irrigation tanks and ponds for providing irrigation facilities to the farming fraternity. The available water resources in Krishna and Godavari basins are unevenly distributed, both in terms of time and space. Flow in the rivers is only during the months of June to October under the influence of south-west monsoon. Though the average annual rainfall is 927.58 mm, it is unevenly distributed - ranging from 604 mm in

semi-arid belt in Mahabubnagar district to 1157mm in the north of the state.

The state has an allocation of 1266.94 TMC - 967.94 TMC in Godavari river and 299 TMC (ad hoc) in Krishna river - besides an additional 250 TMC which is under adjudication by tribunal of assured waters in Krishna river apart from 500 TMC of surplus waters in both the rivers.

Due to improper planning and lopsided programs earlier, there was little scope for tapping assured water in the projects. It was difficult to ensure even safe drinking

water to most of the districts. The farmers in the region were subject to untold hardships due to poor irrigation infrastructure and underutilisation of water resources.

Major Initiatives

The state government has given the highest priority for creation of infrastructure to irrigate 125 lakh acres in the state as against the total area of 276.95 lakh acres. Several measures were taken to harness the river water and rejuvenate minor irrigation tanks for all-round development.

The state adopted a comprehensive strategy comprising of the following steps:

- Speedy completion of ongoing projects which had been neglected for years.
- Modernisation of old projects like NagarjunaSagar, NizamSagar and Sri Ram Sagar.
- Grounding irrigation projects like PalamuruRangareddy LIS and Dindi LIS which were conceived earlier.
- Linking of tanks with major and medium projects by construction of sluices and check dams for rejuvenation of streams and rivers flowing through the project command areas.
- Effective operation and maintenance of irrigation systems for achieving better water use efficiency and crop productivity.

The government has focused on expediting and completion of ongoing 40 major and medium irrigation projects (including modernisation of 2 projects and one flood bank) envisaging creation of an irrigation potential of 70.12 lakh acres and stabilisation of 28.90 lakh acres of existing ayacut under various projects, to fully utilise the state's share of dependable and surplus/ flood water.

- Formulation of gigantic Lift Irrigation Schemes based on the topography – the prominent ones being Kaleshwaram Project, PalamuruRangareddy Lift Irrigation Scheme (PRLIS) and Sita Rama Lift Irrigation Project (SRLIP).

Kaleshwaram Project

It is proposed to create a new ayacut of 19.63 lakh acres and stabilisation of 18.83 lakh acres which covers 13 districts, 31 constituencies, 121 mandals and 1698 villages. It consists of 7 links and 28 packages with a complex network of 3 barrages, 15 reservoirs, 21 pump houses, 19 sub stations, 1531 km gravity canal, 203 km tunnels, 98 km pressure mains, etc. The total storage capacity is 141 TMC with a power demand of 3967 MW.

This was completed in a record time of 3 years achieved through a landmark inter-state agreement with State of Maharashtra, large increases in budgetary provisions and diligent settlement of judicial and contractual challenges.

- i. Construction of three Barrages i.e, Laxmi, Saraswathi and Parvathi is completed and water is

impounded, Construction of the Lakshmi, Parvathi and Saraswathi lift system and water conveyor system works are completed and water is lifted from Lakshmi barrage upto SYP successfully.

- ii. Works from SYP to Sri Raja Rajeswara Reservoir (Mid Manair Reservoir) and upto Kondapochammasagar are completed and the water is lifted from Godavari river. Main works upto last reservoir i.e, Baswapur would be completed shortly.

- iii. An ayacut of about 15.80 lakh acres and 15.26 lakh acres including Nizamsagar ayacut was stabilised in the last two years in Kharif and Rabi.

- iv. More than 50% of works and 91% of land acquisition is completed. It is proposed to complete the project by December 2023.

PalamuruRangareddy Lift Irrigation Scheme (PRLIS)

It envisages lifting 90 TMC of flood water in 60 days to supply drinking water to 1226 villages in 70 mandals of Nagarkurnool, Mahabubnagar, Narayanpet, Vikarabad, Rangareddy and Nalgonda districts including Hyderabad in Phase-I and irrigation facilities to 12.3 lakh acres in Phase-II. Most of the works pertains to reservoirs with a gross capacity of 64.72 TMC, tunnels of length 99.894 km and canals of length 30.38 km and pump houses are completed.

Sita Rama Lift Irrigation Project (SRLIP)

It is proposed to create a new ayacut of 3.29 lakh acres and stabilisation of 3.45 lakh acres, which covers 3 districts, 9 constituencies. It consists of 16 packages with a network of 4 pump houses, 299 km gravity canal etc.

Apart from the above projects, remarkable progress has been achieved in major projects viz., SitammaSagar Multipurpose project (SSMPP), JCRDLIS and medium projects.

Mission Bhagiratha

This scheme was started with the objective of providing clean drinking water to every household through tap in all the villages and towns of the state. Government has earmarked 10% of water from all reservoirs in the state for Mission Bhagiratha.

This was completed and was hailed as a great scheme across the country and received many awards. The central government has announced that Telangana is the state which has provided safe drinking water facility to 100% of its villages.

Conclusion

In the last 9 years, the Telangana government has taken up crucial construction activities including dams, reservoirs, tunnels, pump houses, sub stations, main canals, etc. The fructification of the initiatives is apparent in the agriculture and allied sectors. Government is steadily progressing on its path to complete all the projects including the distributary canals, and achieve its objective in the next 3 to 4 years. ▶

UPDATE ...



Moving a Step Ahead

Update on the June edition on

Celebrating World Accreditation Day 2023

NABL ORGANISED THE World Accreditation Day 2023 celebration jointly with NABCB on 9th June, 2023 simultaneously in 6 cities – New Delhi, Bengaluru, Mumbai, Kolkata, Ahmedabad and Lucknow.

Padmashri Prof. S. Ayyappan, Chairman NABL while delivering the inaugural speech at Bengaluru, highlighted the importance of accreditation as one of the strong tools to overcome technical barriers to international trade. He urged the laboratory fraternity to focus more on delivering quality products and services which match the global standard requirements and support Make-in-India, Made-in-India initiative by our Honourable Prime Minister.

The program at New Delhi was graced by eminent persons like Mr. Jaxay Shah, Chairperson QCI, Dr. R.P. Singh, Secretary General QCI and Mr. Sanjiv, JS DPIIT.

During the special address, Mr. Jaxay Shah stressed on the importance of quality products and how accreditation is useful in getting quality products. It is a



matter of great pride that India's national accreditation system under the Quality Council of India (QCI) has been ranked 5th in the world in the recent Global Quality Infrastructure Index (GQII) 2021.

Mr. Sanjiv gave insights on this year's WAD theme with a special emphasis on the role of accreditation in global trade. Mr. Adil Zainulbhai, Chairman, Capacity Building Commission, in his keynote address specified the importance of quality and how accreditation can be used in achieving quality in day-to-day life. Dr. R.P. Singh, Secretary General, QCI, in his welcome address notified the gathering about the role of accreditation and how it is impacting the future of global trade.

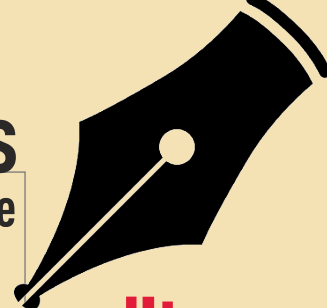
There were sessions on the following topics in all the 6 cities:

- QR code in test reports and calibration certificates
- Uploading reports on block-chain portal
- ULR number ▶



YOUR OPINION MATTERS

letters to the



editor

(June issue:
World Accreditation Day
2023)

We are truly humbled by the praise and acknowledgment that is flowing in from varied sources. Please feel free to send in your comments, views or feedback on The Aware Consumer magazine at bejonmisra@theawareconsumer.in – we will publish your opinions and implement your feedback while ensuring that your voice is heard on the right platforms.



Excellent edition once again in June on Accreditation and Quality certification to educate the consumers on the difference. There's one again a wealth of information and will serve as a future reference handbook. I treasure each monthly issue as a reference handbook

and unlike other magazines this is not discarded in a bin.

– *Rajiv Nath, Managing Director,
Hindustan Syringes & Medical Devices Ltd.
Forum Coordinator,
Association of Indian Medical Devices
rajivnath@mac.com*



Yet another excellent compilation! Kudos to the dynamic leadership of Prof Bejon Misra in shaping the contents so well every time!

– *Dr Alka Mukne, Mumbai
alka.mukne@gmail.com*



I just browsed through the latest issue of The Aware Customer. It is very informative. Wish I could read it from start to end. But tight schedule and the tendency to get information in capsule form are my limitations. It would be really good if we can get snapshots, highlights or bullet

points of each article in summarised form. Or it could be one WhatsApp or online message giving summary of the major takeaways.

Nonetheless it would be worthwhile to squeeze in time to go through each page!

– *Usha Sangwan, Chandigarh
usha.sangwan@gmail.com*



Congratulations to The Aware Consumer for publishing useful and informative issue on accreditation on World Accreditation Day. Accreditation by National Authority in any field is an integral part of Quality Management System and Quality by Design. Now in India also, many Acts and rules have made it compulsory for companies to get their products tested in NABL accreditation laboratory. The FSSAI is also directing FBO to get tested their products in NABL laboratories. Such accreditation will give more specific, precise and reproducible results to stakeholders.

My best wishes to the entire team of The Aware Consumer!

– *Dr C D Shelat, Deputy Commissioner, (Retd),
Food and Drugs control Administration, Gujarat
cdshelat.fdca@gmail.com*

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Watch out for the next issue in September dedicated to
“World Patient Safety Day!”

A symbol that ensures **Patient Safety & Quality of Healthcare**



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For further details please contact:

National Accreditation Board for Hospitals & Healthcare Providers (NABH)
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UNDER THE LEADERSHIP OF KCR, THE REVOLUTION NEVER STOPS!

On June 2nd, 2014, Telangana State was formed. Since that day, our resolve to serve the people of Telangana as per the Constitution of India, has created several new Revolutions.



**TELANGANA FORMATION
DECENNIAL
CELEBRATIONS**

2014 - 2023

- Today, we record an unparalleled quantum leap in GDP, from Rs. 5.05 lakh crores in 2014, to Rs. 14 lakh crores.
- Our per capita increased from Rs. 1,24,104 to Rs. 3,17,115, Rs. 1.46 lakh higher than national average, it is the highest in India.
- The waters of the world's largest life-irrigation project, Kaleshwaram, executed in just 3.5 years, irrigate our once-dry lands.
- With 24 hour free power to farmers, uninterrupted power to all sectors, we are the first in per capita power utilisation across India.
- Our capital city Hyderabad won global 'livability' Mercer awards for five years in a row, highlighting the quality of life.
- The jump in green cover in Telangana by 7.8% of the total geographical area is unprecedented, as declared by the Forest Survey of India.
- Mission Bhagiratha delivers drinking water via pipelines to each home in the state, urban and rural, the only state in India to do so. Many states are replicating the mission to ensure safe drinking water to their people.
- Mission Kakatiya's revival of 47,000 networked water tanks, brings back life and livelihood to each village, dramatically increasing the water table level across the state.
- Our revolutionary Industrial Policy, TSIPMS, and EODB are the envy of every state. It has resulted in the fastest technological growth, housing more than 1500 new large and small tech companies, with IT exports at 2.20 lakh crore.
- The globally unprecedented financial assistance under the Dalit Bandhu scheme is rewriting the destiny of the scheduled castes.
- Communal harmony and pride in our culture has brought an identity we never had before.
- The stable Law and Order ecosystem has brought a sense of security to each citizen.

Today, as we begin our tenth year, life has come full circle,
We have kept our promises, our people dream of a hundred more.
We are ready for a thousand more revolutions.



The new 125 feet Ambedkar statue which highlights Hyderabad's skyline is the largest in the country.

The B.R. Ambedkar Telangana Secretariate is Hyderabad's new seat of governance, an inspiration to all.

