

URBAN LIVEABILITY FORUM

PRESENTS

"MY RESOURCE. MY RESPONSIBILITY"

A knowledge series from the experts on effective management of resources to enhance urban Liveability during and post pandemic.

WATER PROBLEMS IN INDIAN CITIES AND SOLUTIONS

by, Ms. Amla Ruia, Aakar Charitable Trust

IN THIS ISSUE :

- THE URGENCY FOR WATER HARVESTING IN CITIES
- INNOVATIVE SOLUTIONS AND PARTICIPATORY APPROACH
- PARTICIPATORY APPROACH

"My Water. My Responsibility"

A knowledge article on effective management of Water resource to enhance Self Sustainability in Urban Societies.



Fig. 1 Perils of water contamination

Source: <https://www.pexels.com/search/water%20pollution/>

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AND PARTICIPATORY
APPROACH**

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IMPENDING CALAMITIES

If we do not wake up to the water crisis facing us.

- I. Cities without water.
- II. Rivers dried up or on the verge.
- III. Rural degradation.

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I. CITIES WITHOUT WATER

The Chennai Crisis is staring us in the face. Truly speaking, it is a man-made calamity. When 4 years ago floods happened in Chennai, none of the underground sources got recharged because most of the age-old lakes and reservoirs had either got silted or urbanized after land filling. It is to be noted that many of the original catchment areas were glazed so that actually no underground streams could be recharged. If the recharge had taken place, Chennai could have averted the crisis. Tamil Nadu is already facing drought. Worst affected are the slum dwellers in cities like Chennai, who have to beg for water from middle class houses.

Delhi & Jaipur are also prey to original *talavs* being filled and building colonies sprouting there. To name but a few, Hauz Khas and Tal Katora in Delhi. Also Tal Katora in Jaipur and *Ghati(or, Ghanti) ka talav* in Dungarpur. To avert crisis in Bangalore the government's decision to prepare a detailed project report (DPR) to draw water from Linganamakki reservoir on the Sharavati river for Bengaluru has set the cat amongst the pigeons. Environmentalists are outraged since the fragile ecosystem could be destroyed and locals wonder why their water is being taken away from them.

Shimla is another example where Ashwani Khud, which caters to 25 per cent of water requirement has been frozen because of contamination due to construction of a sewerage treatment plant (STP) on top of this stream. Now the Shimla Municipal Corporation is struggling to meet the daily requirement for water.



Fig. 2
Source: 'Women collect water from a pit dug up in a dried lake in Chennai'- scroll.in



Fig. 3
Source: Sewerage Treatment Plant near Ashwani Kund, Shimla (downtoearth.org)

Many large cities like Hyderabad, Coimbatore, Vijaywada, Amravati, Solapur, Shimla, Kochi are also moving towards acute water scarcity. Climate change, early summer, deficit rain-fall, depleting water level, rising population and lack of water management policy is making it difficult for the urban local bodies to meet the increasing demand of water. According to a World Bank report, at least 21 Indian cities are moving towards zero ground water level by 2020, which has already set the alarm bell ringing for policy makers and urban planners.

The case of Latur, one of the districts from Marathwada region in Maharashtra, still haunts public memory. over exploitation of groundwater and lack of policy planning forced the Latur Municipal Corporation to announce that they can provide water only once in a month. Maharashtra's total water storage has gone down to 30 per cent and in many districts, sources of water have dried up completely.

A report by World Resources Institute, says 54 per cent of India's total area is under high to extremely high water stress and groundwater levels are declining in 54 per cent of wells across India. The study further says that water demand in India will reach 1.5 trillion cubic meters in 2030 while India's current water supply is only 740 billion cubic meter. The clock is already ticking and given the climate change, the crisis can come earlier than anticipated if we do not take proactive measures now,"

According to India's official Ground Water Resources Assessment, more than one-sixth of the country's groundwater supply is currently overused, which is forcing cities to go for temporary measures like water imports which has economic implications.

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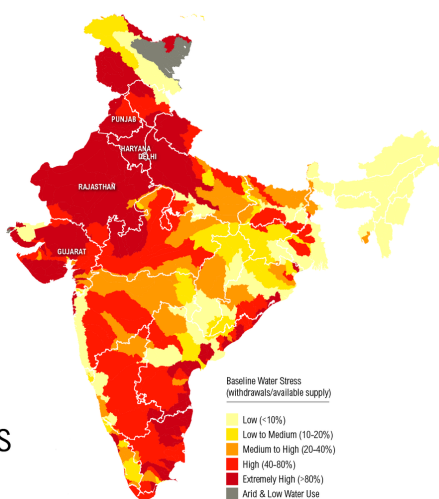


Fig. 4
Source: Map explaining India's growing water risks- wri.org

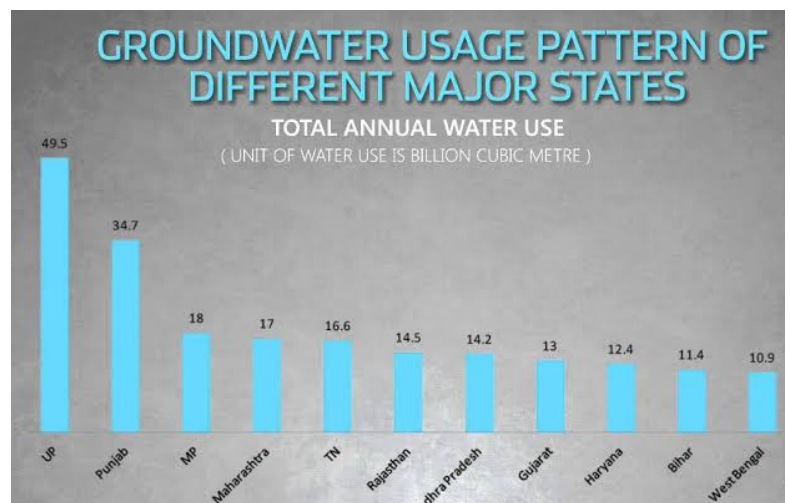


Fig. 5
Source: Chart explaining India's water risks- livemint.com

Water scarcity can stall projects. In cities such as Solapur, which was also selected as a Smart City, most projects have been stalled due to scarcity of water. IT City Hyderabad, is facing shortfall of drinking water by 45-47 per cent. Last summer was challenging as many restaurants put the board of no water in their toilets. The board already spent Rs. 30 crore to build temporary pumping stations to pump in emergency supplies from Nagarjuna Sagar reservoir. Another critical issue is the increasing levels of pollutants in drinking water making it unsafe for consumption. According to data by the Central Pollution Control Board, nearly half of the country's 445 rivers are polluted for safe consumption without extensive treatment. The UN has ranked India 120th of 122 countries for water quality, estimating that 70 per cent of the supply is contaminated, with high arsenic levels.

Solutions

If Mumbai starts harvesting rainwater, it can meet 20 per cent of the city's daily water supply. In Delhi up to 70 per cent of the demand can be met through roof water harvesting. While many cities have taken initiatives in this regard, harvesting rainwater alone is not enough to recharge the ground water level, given the deficit rain in most cities.

- What India requires is 'drain water' harvesting. Rainwater harvesting, along with sewerage treatment can go a long way to recharge our underground water. Ensured, safe drinking water can also save millions of lives by cleaning our rivers and water bodies. All that we need is common goal and a holistic approach.
- What is to be done about this raging thirst? One way is to reduce standards and limit supply to say 100 liters per person per day. The second is to aggressively plug leaks in the system. It should be reduced to 20% from the existing 37%.
- The third is to systematically harvest rainwater - through individual building and through lakes. Rainfall over 1,250 sq. km of the city amounts to about 3,000 mld (millions of liter per day). All buildings, must collect or recharge rainwater. This will also mitigate urban flooding.
- The fourth is to manage groundwater better, to ensure recharge and to control exploitation through better governance. The normal rate of recharge is estimated between 3% and 10% of rainfall. We must identify recharge zones and make sure this number goes up to 50%. This increased recharge will prevent the groundwater table from collapsing and it will ensure a steady supply from 4,00,000 bore-wells. Groundwater rules and regulations must be implemented vigorously.
- The fifth is to reuse treated waste water for non-potables purposes. The city must set up waste water treatment plants capable of treating 1,400 mld. About 500 mld can be used for non-potable purposes such as industrial use or to fill lakes, thus enhancing ecological diversity and recharging groundwater. The rest could be distributed in the districts.

The best model to follow is that of Singapore with its 'four taps' approach-external water, water from local catchments, treated waste water and desalination. Groundwater could replace desalination for land-locked Bengaluru.

The most important thing to learn from Singapore is to transform BWSSB (Bangalore Water Supply and Sewerage Board) into a strong, professional, capable and financially independent organisation. Like the Public Utilities Board in Singapore, like Singapore our board should also be capable of delivering universal connections and should manage all water in the city, including groundwater. Only then can we can leave the Sharavati river alone and get rid of the Jevons Paradox.

4 NATIONAL TAPS

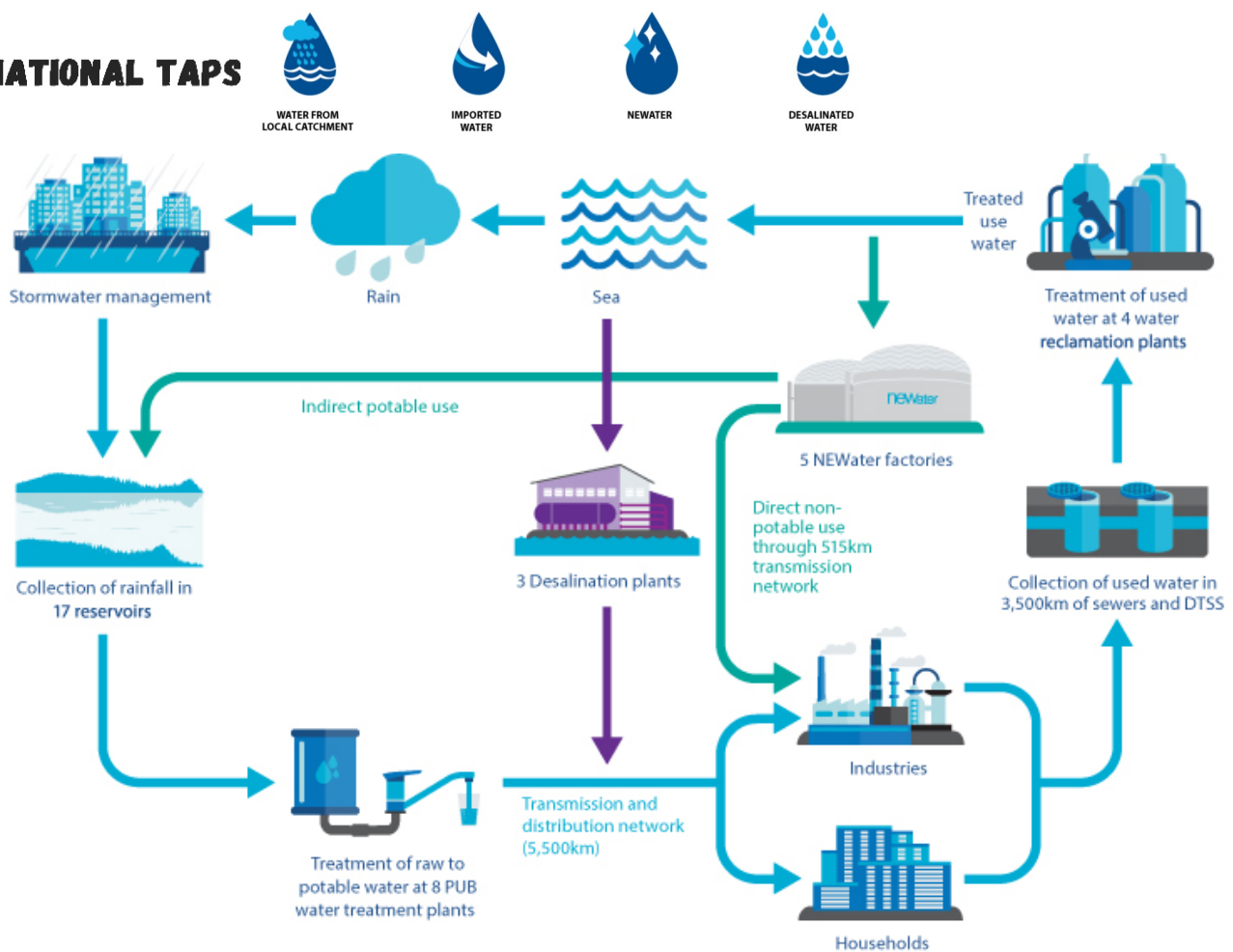


Fig. 6

Source: 'Four tap approach' of Singapore - <https://www.pub.gov.sg/watersupply/singaporewaterstory>

Examples

We can take the case study of Indore and Bhopal, which have emerged as top two cleanest cities. Indore produces 240 million litres per day (MLD) of sewage, of which 25 per cent is treated. The rest finds its way into the Kshipra River. This should also be treated.

- Bhopal generates 285 MLD of sewage, of which 39 MLD is treated and rest of 246 MLD is discharged into nearby ponds and lakes, polluting them. This can also be minimized. The state government lifts water from Narmada River, which is 70 km away and this costs Rs.60 per litre on an average. Bhopal has spent nearly Rs.1,500 crore on water and sanitation together in last one decade.

II. RIVERS CALLING

There is a total of 10350 rivers in the country with a length between 1.6 to 2525 km. The nine important rivers are - Ganga, Yamuna, Brahmaputra, Mahanadi, Narmada, Godavari, Krishna, Cauvery and portions of the five rivers of the Indus river flowing in part within the sub-continent of India.

There are two challenges facing the rejuvenating of our rivers -

a) The dwindling waters

with almost 60 % loss of water in the last 50 years in most rivers which have been the life line of civilizations for millions of years.

b) The indiscriminate and mindless pollution of our rivers and water bodies.

Solution for restoring the water in the Rivers

(a) Let us take the case of river Cauvery which is a severely affected river in Tamil Nadu. Here it has become a people's movement, and the Govt. departments are working hand in hand with NGO's to set a standard of how India's rivers revitalized.

Cauvery has been a forest fed perennial river which is fast becoming a seasonal stream as 87% of tree cover has been removed in 50 years. The forests along the banks and in the basin of the Cauvery have lost 87% tree cover. The solution is to plant 242 crore trees.



Fig. 7

Source: Degrading Cauvery river due to existing and planned reservoirs- mongabay.com

In the first phase of this public + people participation the plan is to plant 73 crore trees this year in areas which are falling in the farmer's belt. The people sponsoring a plant are contributing 42/- per plant which has been nurtured in nursery managed by NGO's and Govt. running nurseries. The farmer gives Rs.8/- per plant.

The Govt. provides incentives for the first 5 years to the farmers for the orchards. In 5 years, the farmers' income is expected to grow 5 times and in about 10-12 years the river is expected to revitalize and start flowing as per its original size and form. In the meantime, the govt. will continue with the tree plantation program in those areas which are falling within the forest departments.

This is a highly practical comprehensive plan but one has to be patient as this will bear result in about 10 to 12 years. At least the ecology and environment will be restored for future generations and rivers will be restored to their pristine glory.



Fig. 8

Source: Local river cleaning programme in India- mongabay.com

(b) Govt. Plan to tackle pollution of rivers:

1. The Central and State Govts have identified 351 stretches on 323 rivers in 28 states & union territories where the biological oxygen demand is showing levels of 30 to 10 mg/l.

Under the Namami Gange Program III sewerage infrastructure projects out of 150 projects have been

completed at a cost of Rs. 23000 crores. This will treat and rehabilitate 3800 million litres per day.

2. The CPCB (Central Pollution Control Board) and SPCB (State Pollution Control Board) are tackling the pollution of rivers and water bodies on 2 fronts-

i) to ensure treatment of sewage before discharge into rivers

ii) to control discharge of industrial effluents in the rivers only after reaching the prescribed norms.

The govt. to take immediate action for non-compliance of the 351 stretches, the highest numbers – 55 have been identified in Assam's 44 rivers with Maharashtra having 53 stretches on its 53 rivers. Madhya Pradesh has 22, Kerala 21 and Gujarat 20. Then we have the 'Maily Se Nirmal Yamuna' Plan. The govt. has spent 1500 crores in the 1st and 2nd phase of the cleaning of the Yamuna project. While the sewage infrastructure and implementation of industrial waste for the cleaning of the rivers has to be handled by the Central and State govt. the people can participate as per the Cauvery model. Unless we all come together.

III. Rural Degradation

Abject poverty, failing monsoons, lack of infrastructure, unscientific methods of agriculture and govt. schemes not reaching the farmers are some of the reasons leading to the pitiable conditions of the farmers. Added to this is the unavailability of cold storages and market facilities. Apart from this, the dependence upon fertilizer & pesticides which add to the cost and reduce the fertility of the soil, has taken a massive toll on the farmer community as a whole.

As an answer to this, we have, through Aakar Charitable Trust, revived the age-old practice of building check dams and by God's grace, eased the miseries of the farmers to a very large extent. Each check dam recharges 70-150 wells in the vicinity and facilitates the sowing of crops in 100-400 additional acres of land now made arable.



Fig. 9

Source: - Abundance of water in check dams during monsoon-
aakarcharitabletrust.org



Fig. 10

Source: - Female children join schools as well-aakarcharitabletrust.org

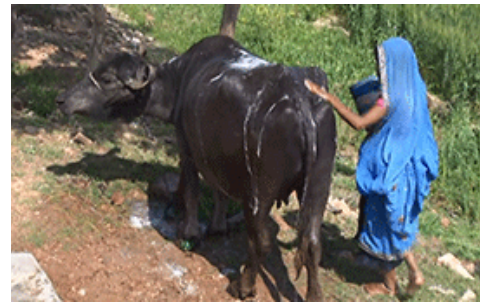


Fig. 11

Source: - Animal husbandry as source of income-aakarcharitabletrust.org

Animal husbandry becomes an added source of income because now, fodder is readily available and each household has 8-10 cows/buffaloes tied to their doorstep.

- The entire village moves towards becoming debt free and prosperity returns along with all the able-bodied youth coming back home because now their land is able to support them. They are able to take 2-3 crops per year and each household has at least 2 two wheelers and each village can boast of four tractors. Large tracts of arid land now come under irrigated cultivation with the farmer not depending entirely on the vagaries of the monsoons. Environment is restored and greenery returns to the villages.
- Health and hygiene of the village show a marked improvement. Mal-nourishment of women and children is now a thing of the past.
- Women and female off-springs are the biggest beneficiaries of this initiative. No longer do they have to trek with heavy pitchers on their heads and arms destroying their skeletal systems. The female child is now able to attend school and become educated.
- Small scale industries crop up in the village and the youth can become self employed.
- Festivals and functions are celebrated with pomp and gaiety.

The Good news regarding check dams – Nov 2020

We have completed 450 check dams as of Nov 2020. This has transformed the lives of 750 lakh people living in 540 villages.

What does benefit mean?

These many villages have become drought proof. They are debt free and above poverty line. Each house hold has two wheelers and each village has 4 to 5 tractors. Villagers are having much enhanced life style. All children male and female are going to school.

We have spent a total of Rs.28 crores in the ratio of 70% by the Trust and 30% villagers' contribution and the villagers are earning a net income of over Rs.1300 crores year after year and will continue to do that for several generations to come. The math is mind boggling. No stock market the world over can boast of such phenomenal returns.

In short these check dams have all the advantages of large dams with none of their disadvantages. Another major advantage of check dams is that it is prevention against flash floods that cause immense damage to life and property. Many such dams will hold flooding water in pockets, thus helping to recharge underground aquifers and rivers. These in turn give rise to springs in the course of the streamlets which eventually may become perennially flowing rivers.

Once the farmer is thus empowered with water, he is now in a position to take to horticulture and put sizeable tracks of land under tree cover. It is a well-known fact that water and soil go hand in hand to improve the nutritional value of the produce of the land. To create more biomass in the soil we need to have large tracts of land under the benevolent shade of trees. When orchards are planted the soil is not tilled and hence top soil remains intact.

Certain policies must be in place such as allowing the farmer to plant trees for timber. Today, India is importing Rs.70,000 crores worth of timber for making furniture and another Rs.120,000 crores worth of finished furniture is being imported by us for home consumption.

All this expense in dollars can be saved and the indigenous furniture industry will get a tremendous boost. Also, it should be made compulsory for each farmer to have at least 5 cattle-head in 10 acres of land. Without this, biomass levels in the soil cannot be improved.

However, for tree plantation or animal husbandry to thrive, the first and foremost requirement is the construction of check dams, which not only facilitate at least 2 crops, but also allow the farmer to bring 30% of his land holding under horticulture.

Another major advantage of the check dam is that if we have enough number of medium or small check dams in a water shed development, these check dams will hold large amounts of top soil which would otherwise have silted large dams, rivers or canals thus undermining the effectiveness of these water solutions .

ABOUT THE WRITER



Amla Ruia

Founder of **Aakar Charitable Trust**

Amla Ruia is an Indian social activist known for her work in water harvesting. She founded the Aakar Charitable Trust to partner with villages to build check dams that provide water security. She has brought life-giving water to parched villagers through her water harvesting projects. She has converted a herbal garden in Mumbai into a beautiful space where nature trails for school children can be conducted and activities of social relevance can be facilitated. Her endeavor teaches children to care for Mother Earth and create such gardens when they come of age.

Contact:

Website:

<https://www.aakarcharitabletrust.org/contact.html>

Email: aakartrust31@gmail.com

Tel: +91-98-33298801

To Contribute an article, Shaurya Somani

e: info@urbanliveabilityforum.com

t: +91-9619604324

For Partnership, Sarang Mehta

e: sarang@urbanliveabilityforum.com

t: +91-9004785696.



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