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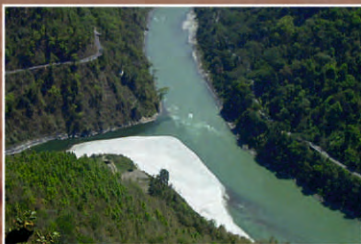
Jalasangvad

A Dialogue on Water
Editors: Dr. Datta Deshkar, Shri Satish Khade



Cover Story:

On 25th World Water day,
We need drastic action
to save rivers





Different concepts related to the quality of water :



pH of water :

Depending on the amount of acidic or alkaline substances mixed in water, we have a measure of pH. It is an universal indicator to measure the quality of water. The numbers from 0 to 14 on a given scale are indicated by different coloured marks. It indicates the amount of acidic substances decreased from 0 to 7 and increases alkaline substances from 7 to 14. Number 7 indicates neutral pH. Rainwater, running water pH levels are generally between 6.5 and 8.5.

Ground water pH level, however, ranges from 6.0 to 8.5. The higher the level of ions of iron, manganese, copper, lead, zinc in the water, water is more acidic in nature. Such water causes rust on metals, stains on clothes, its consumption harms human health. Conversely, an increase in calcium carbonates leads to increase in salinity. pH of some substances are as follows:
Apple Juice : 3 Orange Juice : 3.5 Coffee : 5.5 Milk : 6.2 Soap water : 10
Solution of bleaching powder :

Dissolved Oxygen :

The most important factor in water quality is the dissolved oxygen in water. Fish and the other living things in water need oxygen to survive. Due to movement of air in the atmosphere , oxygen enters in water and exists in dissolved form there. Oxygen formed during the photosynthesis process the aquatic plants, in wetlands or in the mud also gets dissolved in water. This oxygen is useful for the fish and other living things to breathe. The amount of oxygen in flowing or turbulent water of streams or rivers is higher than that of stagnant lake water. This process of dissolution continues till the time full saturation takes place.

There is a relationship between the temperature of water and the dissolved oxygen. It is lower in hot water and higher in cold water. This dissolution can be increased by creating artificial turbulence in the water. Thus this amount of dissolved oxygen in water depends on the temperature of water, air pressure and also the salinity of water. Saline water has poor dissolution. The aquatic life consumes this oxygen and therefore the process of dissolution has to be continued regularly.

Jalsamvad



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Mouth Piece of Bharatiya Jala Sanskriti Mandal

■ October 2022

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On 25th September the entire world celebrated the World River Day. On this auspicious occasion we wish all the river lovers a happy rivers day. Taking inspiration from this, let us try to know something more about rivers i.e. important rivers in the world, their length, breadth and depth. Famous rivers in the world are Amazon (South America), Yangtzi (China), Ganges (India) Volga (Russia) Nile (Africa), Danube (Germany), Rhine (France), Murray (Australia), Thames (England), Shinano (Japan) and so on.

The largest river in the world is Amazon having a length of 6992 kilometers, followed by the second largest river Nile in Africa having a length of 6650 kilometers. The largest river in India is Sindhu having length of 3180 followed by Brahmaputra having a length of 2900 kilometers. Most sacred river in India is Ganges having length of 2510 kilometers. Smallest river in the world is Row which flows in Montana State of America. Its total length is just 61 meters. Before joining Missouri river, it flows parallel to this river. In our country also there is one very small river named as Arawari having a length of just 90 kilometers. A river having maximum depth is Congo having the total depth of 720 meters.

As far as breadth is concerned, every river does not have uniform breadth throughout its flow. Near its origin, it is very narrow and as it flows ahead the breadth increase. At the end , the breadth is maximum. There is one river in Africa by name Neel which has a total breadth of 150 kilometers when it joins the sea. In India, Brahmaputra river is said to have maximum breadth. There is one river in our country by name Luni which originates in Arwali hills but it does not meet the sea. It terminates in the Run of Kaccha.

Every river likes to flow at its will. But unfortunately for them, they propose and the human being disposes. For his benefit, he stops the flow of the river by constructing dams to stop the flow. The normal water cycle created by Nature is thus disrupted. There are more than 8,00,000 such dams in the entire world. China is the leader in this field having more than 98,000 dams. America follows China having more than 84,000 dams. In our country also we have more than 5000 dams. Bhakra Nangal Dam is the biggest dam in our country. Longest dam is however Hirakud. Tehri Dam is a peculiar Dam having maximum height. Oldest dam in our country is Kallinai Dam constructed on Kaveri river by the kings in Chola dynasty. This dam was renovated by Britishers in the 19th century. The purposes for which these dams are constructed are very many like irrigation, flood control, hydropower generation, urban water supply etc.

Now a days, river water is being used as a tool for waging wars. The best example is that of China. By regulating the water supply of some rivers, it has created problems for some countries located in South East Asia. India is also one of the victims. India also could have done like this by re- directing the flow of the rivers going to Pakistan. But, since India is a peace loving country, we have refrained ourselves from such a unhealthy practice.

In our country, we treat rivers as the gifts of God. We have given them the status equal to our mother. At places like Benaras, Nasik and Ujjain we hold Kumbha Melas to honour the rivers. But unfortunately, the treatment, we are giving them in our everyday life is really miserable. Not a single river in our country is free from pollution. Whatever trash we do not need ,we put that in rivers. This must stop. Today, in the honour of our rivers, let us take an oath that we would give them the same old status they deserve.

Dr. D. G. Deshkar
Editor.

We need drastic action to save our rivers

(Cover Story)

Authorities must shed their lax attitude to river protection and management

"Killing rivers" used to be a metaphorical expression in Bangladesh until rivers were granted the legal status of "living entities" in early 2019. That designation made it more literal, symbolising the importance of rivers in our life. About four years later, however, it remains the only outcome of a verdict hailed as "historic" as everything else remains unchanged, with rivers being polluted, filled, and encroached across the country as before. We get a fresh reminder after newspaper reports observing this year's World Rivers Day – with a time-befitting theme of "Rights of Rivers" – showed how dire the situation is. The rights of these "living entities" are not only being violated with reckless abandon, but even their so-called guardians, who are supposed to protect them, are partaking in this slow killing.

Eviction and excavation remain two of the biggest challenges facing our rivers. Reportedly, about 68 percent of the 57,390 illegal river grabbers listed by the National River Conservation Commission are yet to be evicted.

This is deeply disturbing. Not that Bangladesh doesn't have enough laws, policies or resources dedicated to the protection and management of rivers. But the futility of official endeavours – by relevant authorities including Bangladesh Water Development Board, Bangladesh Inland Water Transport Authority, National River Conservation Commission, and the ministry of shipping and water resources – and the general indifference to rivers are becoming harder to explain, and accept.

Consider, for example, how the demarcation pillars installed along the embankments of many rivers, including Buriganga and Turag, have been rendered pointless over the years. These are not mere signs determining the boundaries of rivers. These are meant to act as a deterrent against any encroachment attempt, and for the authorities to intervene if it happens. Unfortunately, according to a report by The Daily Star, these pillars are increasingly becoming a forgotten relic as the case of a demarcation pillar in south Keraniganj – standing about 100 feet inland from the nearest bank of Buriganga – shows. Garbage accumulated from indiscriminate disposal by citizens, industrial units and even responsible institutions is filling up the riverbanks, leading to their eventual encroachment. We have another report showing how, in Tongi and Gazipur, untreated waste is being discharged into interconnected waterbodies to the same effect.

Can we reimagine rivers before it is too late?

Rivers Day specials by other newspapers are also replete with such painful details. We come across a report describing how the Karnaphuli River in Chattogram is being suffocated with waste including plastic and polythene, brought in through the network of canals surrounding the city. At least 785 tonnes of waste are being discharged into the river every day, leading to its pollution and loss of navigability. This, according to experts, is largely due to the illegally built structures near the riverbanks. Closer to Dhaka, the contamination of Bangshi and Dhaleshwari rivers in Savar, mostly because of untreated industrial waste, has reached

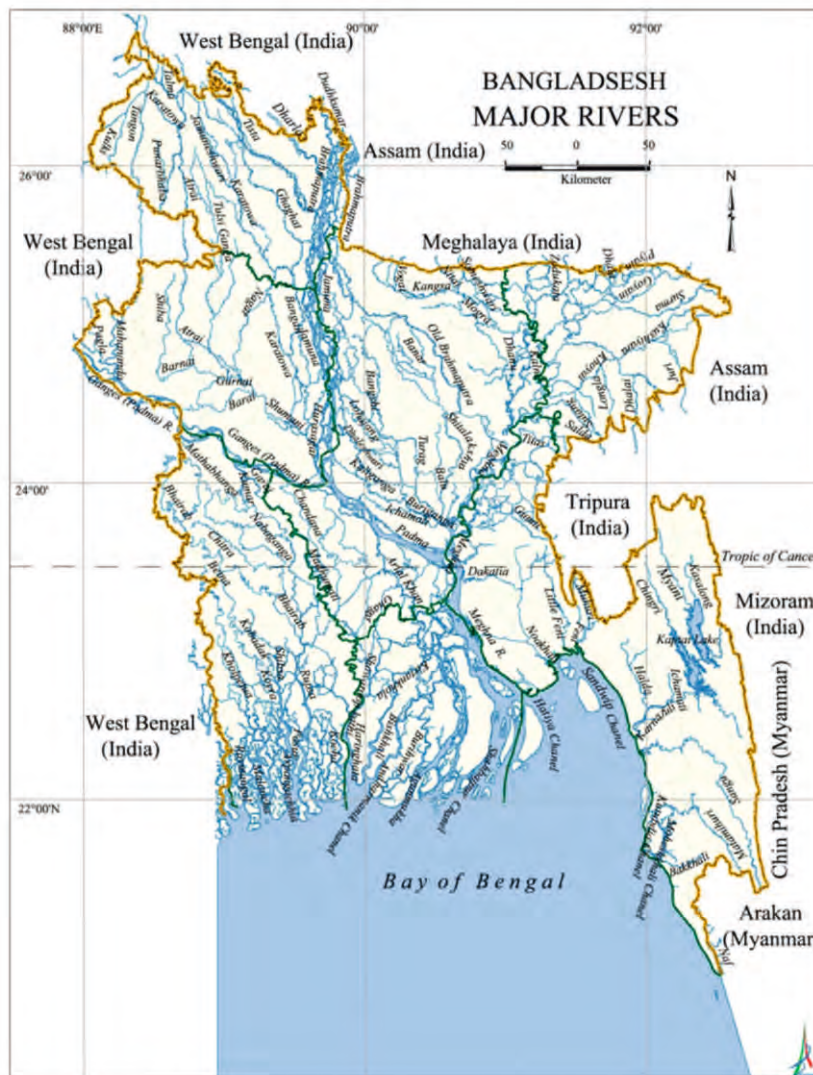
a level that no fish can be found in many areas. Many areas were also encroached with little resistance from the authorities. In Rajshahi, three rivers reportedly became extinct, and the same fate awaits several rivers connecting Thakurgaon, all because of encroachment, pollution, and lack of proper eviction and excavation drives.

Rivers need more than a legal status

Across the country, eviction and excavation remain two of the biggest challenges facing rivers. Reportedly, about 68 percent of the 57,390 illegal river grabbers listed by the National River Conservation Commission – ranging from

influential people, businessmen, politicians, and government agencies to even ordinary people – are yet to be evicted. In many cases, the evicted grabbed the land again later. In case of excavation (and re-excavation), the situation is equally bleak.

The overall situation has reached a point where only drastic action can protect what remains of our rivers or their health. The authorities must shed their present laissez-faire approach to rivers. They must address their plight with the urgency that it deserves.



Organization – Water And Land Management

Institute (WALMI)

Shri Vinod Hande - (M) 9423677795



“Water And Land Management Institute” (WALMI), Aurangabad is known as the first and foremost training Institute in Water and Land management all over the country. Atharva Ved describes the importance of land & water as “Let that earth put us into the same rich fortune which were enjoyed by our predecessor, upon which the oceans, great rivers, and other types of water, which causes and produces different kinds of grains and other vegetation, and which nourishes all the breathing and moving animals”.

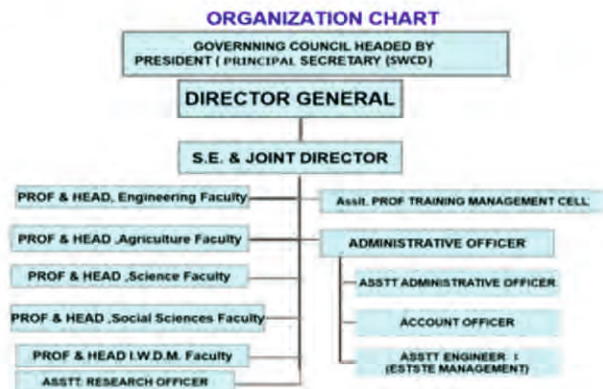
Based on above principles and objectives Maharashtra Govt. established “Water And Land Management Institute” which is also known as WALMI on 1st Oct. 1980. WALMI Aurangabad is an autonomous registered society under Irrigation Department. Main objectives of Institute are,

- To provide in-service training to staff engaged in irrigation water management and land development in irrigation and agriculture department.
- To undertake action and adaptive research pertaining to water resources project.
- To provide consultancy services, production of training materials (in print and electronic media), conducting seminars/workshops and organizing farmer's training programmes.

The vision of WALMI is to develop centre of excellence, research and consultancy services for improving irrigation water management through building and human resource development. To make water resources project sustainable and competitive through human resources development and capacity building of irrigation managers and stakeholders to meet future demand

by improved technological interventions for improving water use efficiency is mission of WALMI.

To talk about the setup of organization, Principal Secretary (Soil & Water Conservation Department), Government of Maharashtra is the President of Institute which is headed by Director General who is of the rank of Secretary. Director General is assisted by Joint Director. Nandkumar is the Principal secretary of WALMI. WALMI is an autonomous body under the Ministry of Soil & Water Conservation Department, Govt. of Maharashtra. WALMI is situated at Aurangabad just 6 km away on Aurangabad-Paithan road.



Training is imparted by highly qualified, experienced and well trained faculty members. WALMI also invites eminent scientists, professors and engineers from abroad and within the country for sharing their field experiences in workshops, seminars related to Irrigation Water Management. This helps in developing participants knowledge, attitude and skill of water management. Following are the five faculties for training and research at WALMI.

- Faculty of Engineering.
- Faculties of Agriculture.
- Faculties of social science.
- Faculties of Science (Computer Applications & Hydraulics).
- Faculties of Integrated Watershed Development & Management (IWMD)

Facilities & Capabilities



Total area of WALMI is of 178.17 ha.. Of which demonstration farm area is 25 ha. and 13 ha. is under social forestry. There are two minor irrigation tanks and Agro meteorological observatory also in their premises. Other than this campus equipped with improved surface irrigation system, sprinkler and drip irrigation system, soil and water conservation system, land forming techniques, computer system, Indoor irrigation laboratory, library with 25000 books and 108 periodical, farmer’s training cell, soil and water testing service laboratory. Training centre of WALMI is having a hostel to accommodate 180 trainees, A.C meeting hall and seminar hall having a capacity of 200 seats.

The institute conducts about 152 training courses of 1-15 weeks duration every year for different target groups. For progressive farming there is weeklong training, 2-3 days course for farmers in irrigation project and 2-3 days courses for women farmers. In addition to this WALMI also organizes specially designed courses on demand from other states or organizations. The institution also organizes Nation and International seminars.

Training Courses conducted by WALMI

For officers and employees

Name of Course	Duration in weeks
Intensive Training Course	15
Induction Training course for directly recruited officers of Irrigation Department	12
Orientation course in IWM	2 to 4
Special training courses in IWM (Irrigation Water Management) 1 to3	
Workshop on computers/Drip and sprinkler etc	1

For Farmers

Name of Course	Duration in weeks
Training course for Progressive farmers	5 days.
Training course for farmers in command area of Irrigation projects	1 to 3 days
Training course for women farmers in command area of Irrigation projects	1 to 3 days
Training course for Progressive women farmers	2 days.

The rich and varied experience possessed by the institute, well trained and highly qualified faculties members of all disciplines related to irrigation water management are capable of undertaking consultancy works relating to following fields,

- Socio-Economic Survey.
- Design and organization of different training programmes in Irrigation Water Management and related subject.
- Action and adaptive research to develop solutions to field problems.
- Development of software related to Irrigation Water Management.
- Production of Audio visual aids such as slide, video films related to Irrigation Water Management.
- Planning and design of Pipe distribution network.
- Water harvesting.
- Crop water Requirements.

Following is the list of consultancy work completed by WALMI,

- Design for lift irrigation scheme at Nhavi on Hatnoor Canals for irrigating 1000 ha.
- Planning and design of sprinkler irrigation system for teak wood nursery of Maharashtra Forest Development Corporation Nasik and Nagpur.
- Development of Computer software for irrigation assessment.
- Planning and design of lift irrigation system for Deogiri co-operative sugar factory.
- Koyana Hydro Electric project stage-IV.
- Pest and disease management of mango.
- Strengthening of irrigation projects in earthquake affected areas of latur and Osmanabad.
- Crop diversification in kokan area , four films.
- Women participation in Agriculture.
- Planning and design of PVC pipe distribution network for gravity irrigation in Nagothana.

On going works

- Production of seven interactive CDs and video films & four CDs on agricultural subject.
- Video film on Ghatghar Hydro-Electric project.
- Planning and design of lift irrigation schemes for individual farmers.
- Planning and design of drip and sprinkler irrigation system of individual farmers.
- Soil analysis for water absorbing capacity and water consumption of trees and plants at the site of Foster's India Ltd. Waluj, Aurangabad.

List of completed research studies done by WALMI is very long out of which few are listed as below ,

- Action Research Programme , Pusad Dist. Yavatmal.
- Comparative Study of Flow Measuring Devices for small device- WALMI campus Aurangabad.
- Adaptive research on Loni minor irrigation scheme, village Loni, taluka –Khultabad Dist. Aurangabad.
- Performance evaluation of water user's co-op. societies from Maharashtra. Command area of irrigation project in Maharashtra.
- Performance evaluation studies of Itiadh

Irrigation Projects.

- Estimation of crop water requirement and net irrigation requirement for proposed Lower Penganga Irrigation Projects at Taluka Ghantanji.
- Crop water requirement for suggested cropping pattern for Medium Irrigation Project, Taluka Chopada, Dist. Jalgaon.
- A study of water use efficiency and transportation losses from canals of different irrigation project in Maharashtra.
- Reducing conveyance losses in irrigation conveyance system by providing piped water distribution.
- Studies on cropping pattern & salt affected soils in Jalgaon irrigation projects- taluka Nandura dist. Buldhana.

One to four weeks duration period training programmes are being conducted at WALMI for Graduate and Post Graduate students from various Universities of state . A practical training is also given to students. This helps in updating their knowledge, attitude and job oriented skills in water management. Students coming for in-plant training have to pay nominal training fees at the rate approved by institute time to time which includes lodging and boarding.

Training faculties at WALMI

- Design, Management, Operation, Maintenance of Irrigation system.
- Irrigation Water management on farm.
- Land development.
- Drainage Engineering and use of surface and ground water.
- Planning of storage and reservoir operation.
- Preliminary Irrigation Program (PIP) and water auditing.
- Operation and maintenance of canal.
- Pressurized irrigation systems.
- Lift irrigation systems.
- Modern controls in irrigation system.
- Research studies related to irrigation efficiency.

At WALMI there is facilities of Indoor and Outdoor irrigation laboratory to demonstrate various surface and pressurized irrigation system. There are also facilities to demonstrate infiltration,

farm efficiencies etc. . Research facilities are also available in agriculture engineering for estimation of crop water requirement, irrigation scheduling, cropping pattern studies and soil & water analysis for irrigation and crop production purposes.



At WALMI there are facilities of 'demonstration farms'. Agriculture faculty of WALMI organizes demonstration on different irrigated crops with flow as well as pressurized irrigation system for the benefit of visiting farmers and trainee officers. In this 6 ha. area faculty members are arranging demonstration on improved crop and water management practice on crops like Wheat, Gram, Soybean, Groundnut, Sugarcane, Banana, Cotton etc. . This faculty has planted various trees on field boundaries to improve environment.

There is soil science laboratory at WALMI for practical and demonstrations of soil and water analytical parameters of irrigation, drainage and crop production to the trainees of various courses. This laboratory is also open to the farmers for testing their soil and water samples at nominal rates.



There is another laboratory called crop science laboratory. This laboratory displays photos of different irrigated crops grown with different irrigation and crop production practices at WALMI 'demonstration farm'. This laboratory has also number of charts, posters and plant samples indicating different irrigated crops and plant samples projecting root depths of different irrigated crops actually studied by the institute.

In this chain of laboratories there is third laboratory also at WALMI, and that is Agro Metrological Laboratory. It is established in 1983 at the demonstration farm of WALMI for recording daily weather data with respect to weather parameters such as maximum and minimum air temperature, relative humidity, bright sunshine hours, wind speed at 2 meters height, rainfall and

evaporation. These weather data are utilized for deciding crop water requirement and irrigating schedules of the crops grown on demo farm of WALMI. These recorded weather data at laboratory is also supplied to the users on nominal charges.

Apart from weather data WALMI sale their publications to public. Following is the list,

- History and practice of Management of Irrigation



water in Maharashtra.

- Table for Hydraulics Design of field channels.
- Report on visit to training Institutions Abroad.
- Irrigation and Gravity Methods and efficiencies.
- Operation and Management of irrigation system in Maharashtra.
- Application of soil survey in Irrigation Water Management.
- Water distribution practices in Maharashtra state.
- Report on Diagnostic Analysis of Nirgudi Minor irrigation scheme.
- Crop Water Requirement.
- National Seminar on crop yield response to water.
- Drip Irrigation.
- National workshop on phad system.
- Dams in Maharashtra.
- सिंचन विकासाची वाटचाल (In Marathi) etc.

There are few informative books for farmers available in Marathi and they are,

- गव्हाची लागवड • ऊसाची शेती • बागायची ज्वारी • भात शेती • डाळिंबाची लागवड • कडधान्य पिकांची लागवड व पाणी व्यवस्थापन • रब्बी व उन्हाळी हंगामातील सिंचन व्यवस्थापन • चारा पिके • सूर्यफुलाची लागवड • महिला शेतकरी प्रशिक्षण • भाजीपाला पिकांची लागवड व सिंचन व्यवस्थापन. इत्यादी

Achievement of WALMI Aurangabad Maharashtra upto March 2018 are summarised as below,

Total training courses for professionals	2220
Officers and staff trained	88879
Farmer's training courses	493
Farmers trained	59768
Training for trainers (National Level)	3
Seminars/ workshops organized	626
Publications in English and Marathi	78
Video films produced	116
VCDs produced	20
Computer Software Developed	29
Action Research Developed	23
Consultancy Jobs Completed	52

Apart from above,

- WALMI increased awareness about adoption of integrated approach to IWM in the area of irrigation.
- By adopting scientific water application method there is increase in yield of major irrigated crops by 35 to 95%.
- During last ten years institution has given training to 44421 farmers and about 70000 farmers visited institution.
- Drip irrigation area increased from 430 ha. in 1986 to 193000 ha. in 2001.
- Crop diversification in Pench irrigation project. Rabbi paddy was replaced by crops like Wheat, Gram, Mustard etc.. In minor irrigation projects of Sindhurg Dist. Rabbi paddy replaced by Groundnut and Pulses.
- WALMI has developed 29 computer related programmes related to Preliminary Irrigation Programme, Rotational water Supply, Flow Measurement, Assessment and Design, Canal Design, Estimation of Crop Water Requirement etc.

Further details and information about training course and their duration can be obtained from WALMI's address and from their website.

Address and other details,
Water and Land Management Institute,
Kanchanwadi, Post Box 504,
Paithan Road, Aurangabad- 431005 (Maharashtra)
Phone- 91-0240-2379159 to 61
Email-admn@walmi.org
www.walmi.org

Techie Starts Organic Farming Despite Family

Opposition, Now Earns Rs 1 Crore/Year



Karnataka's Roja Reddy left her corporate job to pursue organic farming on ancestral land that had been left barren due to years of chemical farming. Today, she earns crores through her successful venture, Nisarga Native Farms.

Working for a tech giant in a metro city is a dream come true for many, but it wasn't for Roja Reddy, who grew up in Donnehalli, a rural village in Karnataka.

With an undying love for agriculture, the 26-year-old dreamt of becoming a farmer. On the contrary, her family, who had been farmers for generations, wanted her to get a well-paying job in the city rather than toil in the soil.

In accordance with her family's wish, Roja pursued BE and got herself a job in a reputed company in Bengaluru. She continued with her corporate job and kept her desire aside for a while, until the COVID-19 pandemic hit in 2020.

When her company switched to work-from-home mode, she returned home and decided to finally try her hand at organic farming.

"My father and brother are full-time farmers, but due to huge losses, they were at the verge of giving up altogether. I wanted to do something about this, even though they didn't want me to farm. So I took it up as a challenge to

revive our family farm through organic methods, and started working in the field post 4 pm, after my official work hours," Roja tells The Better India.

"My family wasn't convinced that I could revive the land in an organic way, as they had been using only chemical fertilisers for years. But in fact, chemicals were the major reason for the decline in our farm's produce. After a lot of hard work, I was able to prove them wrong," says the 26-year-old.

Today, Roja has quit her job and works as a full-time farmer, growing organic vegetables on 50 acres of sprawling land. She now earns around Rs 1 crore in revenue annually, she says.

The essential switch to organic farming :

Roja says that when she took up organic farming in 2020, her family, especially her father and brother, opposed her decision. Her relatives and villagers also questioned why she would take up farming when she had a high-paying corporate job in hand.

"The villagers believed that only chemical farming would give them better yield, which was in fact the opposite. Growing up, I saw my grandfather practicing organic farming but my father and brother used chemicals for so long that the quality of the soil had decreased drastically, resulting in very less productivity," she explains.

Out of the 20 acres of farm land at Donnehalli village in the drought-prone Chitradurga district, only six were used by her family to grow pomegranates. The rest was left unused due to difficulty in irrigation.

Roja requested her family to let her do farming on the unused land and set up her organic vegetable farm on six acres.



Organically cultivated cabbage in Roja's farm at Donnehalli village.

When she first started farming, she was "ridiculed for adopting organic farming techniques by her relatives, other farmers, villagers, and even the officials of the department of horticulture", she says.

"I thoroughly studied organic farming on the internet and contacted several other farmers who have been doing it successfully. With their guidance, I was able to grow my own organic vegetable farm within a few months," she says, adding that she initially grew around 40 different varieties of vegetables including beans, brinjals, and capsicum.

She also made organic fertilisers and pesticides like jeevamrut, neemastra, agniastra and so on for her crops

Creating her own luck :



Ridge gourd and spinach at Roja's organic farm.

Though she proved that it's quite possible to turn a chemical-laden land into a flourishing organic farm, Roja says that she faced the real challenge while marketing her produce.

"I never expected it to be this hard to market organic produce. Though I harvested hundreds of kilos of vegetables, I struggled to find a market," she says. "People in my village and the nearby areas were not aware of organic farming or produce. They didn't know the quality or its benefits and hence there was no market."

Roja travelled to different places across the state to market her produce, she says. "I travelled to different taluks and formed a group of eight organic farmers from Chitradurga first. We then spoke to local authorities in each taluk to provide us some space to set up a market for our produce. We even visited houses to create awareness about organic vegetables and invited them to our market, which we started conducting weekly in different areas," she elaborates.

Eventually, her network expanded as more organic farmers joined from across the state. Roja expanded her market to different districts like Udupi, Dakshina Kannada, and so on.



Scenes from the organic vegetable markets

"Currently, there are around 500 farmers in my network across Karnataka. We have been setting up organic markets across the state for a year. We also started getting huge orders from cities like Bengaluru," says Roja, who established her own brand under the name Nisarga Native Farms, which has also tied up with a few retail outlets in Bengaluru.

Thus within a year, she not only managed to revive her family land into a flourishing organic farm, but also created a market opportunity to sell her produce.

After proving her mettle, she says that her family was convinced about her passion and expertise, so she quit her corporate job to be a full-time farmer.

Another challenge she faced was the issue of irrigation. Because Chitradurga is a drought prone district, irrigation has always been tough in the area, she explains.

“One of the best things about organic farming is that it requires very less water when compared to inorganic farming methods. But it was essential to find a practical solution for irrigation. So other than the three borewells on my land, I dug two ponds for rainwater harvesting,” says Roja,



who has set up a drip irrigation system for her farm. As a pioneer in organic farming in her village, today several farmers, including those who mocked her, started approaching her to learn organic farming.

“So far, around 25 farmers in my village have shifted to organic farming under my guidance. I also help them sell their produce through the markets, directly, without any middlemen thereby earning them a decent amount,” she adds.

From six acres of land, Roja now expanded her farm to 50 acres and grows around 20 varieties of vegetables including varieties of tomatoes, beans, carrots, brinjal, ladies fingers, bottle gourds, bitter gourds, chillies, and cucumbers.

“I harvest around 500 kg to 700 kg of vegetables every day and earn around Rs 1 crore annually,” says Roja, adding that she also provides employment to around 10 villagers on her farm.

For more information, contact Nisarga Native Farms at 8088064510

Edited by Divya Sethu

NATIONAL GREEN TRIBUNAL ACT 2010

Adv Nitin Kamble

(M) : 9890690440

AN EFFORT TO PROTECT THE GREEN COVER AND ENVIRONMENT

The National Green Tribunal Act 2010 was enacted in order to address the issues about environment and further prescribe stringent penalties for the violators in its framework and thereby protecting the environment.

The Act was primarily passed in the Parliament and was made applicable to whole of India. The National Green Tribunal Act 2010 primarily establishes a Tribunal for settlement of disputes

pertaining to environment. The tribunals have been established in 4 major cities having jurisdiction over the disputes in East, West, North and South side of the country. The Western bench is established in Pune and has jurisdiction over a range of subjects for e.g. violation of Water Pollution Act, Air Pollution Act, Forest Conservation Act, Environment Protection Act, Biological Diversity Act etc, which goes to show that, the exclusive jurisdiction with respect to the environment and pollution have been conferred upon the green tribunal.

The Green Tribunal is a very powerful tribunal with one Chairperson and two members which include Environmental Expert and a Judicial Member. The Chair person or Judicial Member of the tribunal is a retired Supreme Court Judge or a Chief Justice of High Court or a Judge of High Court. the Expert Member shall also be qualified to be a member who has doctorate degree or Master of Engineering or Master of Technology. This goes to show that, the disputes about the environment are adjudicated by well qualified tribunal by a process which is settled by the Act.

The disputes may be filed by any citizen of India or an NGO or any Company and put forth a case of actions resulting into derogations or degradation of environment for e.g. rampant cutting of trees or forests for whatsoever reason including passage of road through the forest. The issue was decided by NGT pertaining to passage of road through Mudumalai Wildlife Sanctuary even though sanction had been given by the appropriate government. The issue of release of effluents in the rivers was also decided by the tribunal and injunction orders were issued against the government agencies against pollution resulting from release of effluents. Before passage of this law the remedy against pollution or degradation of environment was available to general public under writ jurisdictions of the High Court. The classic example being M C Mehta V/s State regarding pollution Yamuna river and air pollution around Taj Mahal at Agra.

Any instances on environmental damage can be brought forward before the tribunal. The tribunal essentially functions in public interest and orders of injunction and compensation have been passed by the Green Tribunal. The limitation for filing a petition is prescribed as 5 years from the date of which the cause or relief first arose. As such, a extended period of limitation has been prescribed in public interest as public causes are not taken to the court as vigilantly as the private causes. The Act also further prescribes that the tribunal has to apply certain principles while passing any order. Such as, principle of sustainable

development, precautionary principles and polluter pays principle which essentially dictates the balance between law and public policy. The Green Tribunal since its establishment has thrived and passed several judgments in the interest of public at large and has taken on the Government as well as big corporations. The tribunal has played a key role in protecting the environment and has come out as a blessing to the common man addressing effectively the disputes about environmental degradation.

We have evidenced several changes in policy of the Government such as cleaning up the rivers, planting more trees, plastic ban, creating corridors for wildlife, prescribing heavy penalties for air and water pollution etc due to which there is a slow but sure change in the attitude towards the environment. India as a developing country has several miles to go on the pathways of the environmental protection. However, this legislation has acted as a right filter against mindless economic development and environmental degradation.



Medha Patkar was wrong about the Narmada Project

Swaminathan S Anklesaria Aiyar

Inaugurating several projects including a canal bringing Narmada water to Kutch, Prime Minister Modi said last week that Medha Patkar and her Urban Naxal friends had opposed and delayed the Narmada Project that had generally benefited Gujrat. In fact, the project was opposed by a very wide range of critics including the World Bank's Morse Commission which was anything but urban Naxal.

However, Medha and her fellow critics have proved dead wrong. In 1989 I attended a talk by Medha opposing the Sardar Sarovar Dam, the first of many dams planned on the Narmada. Her Narmada Bachao Andolan, ARCH Vahini and other activists had convinced a tribunal to award land as compensation to the tribal oustees, not just cash compensation that would be frittered away. The tribunal awarded 5 acres per adult male oustee plus additional cash compensation. Nevertheless, she said, the simple tribals had a unique way of life and would fail to cope with commercial life in resettlement villages. They would get trapped in debt, lose their land, and become paupers in urban slums, with their women becoming prostitutes. This must be stopped.

Medha also pooh-poohed the supposed project benefits claimed by all Gujrat parties. The project aimed to provide millions with irrigation and drinking water reaching arid and desert areas in Saurashtra, Kutch, and even Rajasthan. But, she said, experience showed that rich farmers near the canal head hogged the water in such projects, so no water would reach needy farmers in distant arid areas like Kutch. The Gujrat government had given up World Bank funding because on onerous conditions, and was funding the project itself

through very high - interest loans that would bankrupt the state.

I found Medha's arguments persuasive, and wrote an article opposing the project. Today it is clear I was wrong. She made a fool of not just me but thousands of concerned humanists who should also be angry at being taken for a ride.

Narmada water reached Saurashtra, Kutch and Rajasthan over a decade ago, benefiting millions. Water sold to municipalities and industries at commercial rates has made the project financially viable despite many delays and cost escalations. With land prices going sky-high, farmers refused to give up their land for constructing distributaries. So, the water is now being distributed under pressure through underground pipes. This is costly but means the irrigation is done through sprinklers and drip irrigation, far more efficient than conventional canal irrigation.

I had read of major travails in resettling tribals ousted by the dam. But others said resettlement was a success. To test this, Neeraj Kaushal of Columbia University and I planned a research project, funded by the London School of Economics, comparing living conditions of resettled tribals with those of their former neighbours still in the forest. In some villages tribals at lower elevations were resettled while those at higher elevations stayed in the forest, providing a good comparison.

The result was an eye - opener. Resettled tribals were far better off in ownership of land, dwellings, tractors, bore wells, TVs, motorcycles, cell phones, and other parameters. They had better access to schools, hospitals, drinking water,

electricity and government offices. They said their tribal culture and traditions were intact despite resettlement. Even so, 54% said they would rather be back in the forest, material goods are clearly not everything.

We also asked their former neighbours and a second forest group whether, having seen the progress of resettlement, they would like to be ousted with the same compensations package, Yes, said 52 % and 31% of the tribal groups respectively. They want to quit the jungle.

High ownership of motorcycles (31%) and cellphones (59%) in one forest group shows it was outrageous for Medha and other supposed intellectuals to claim that tribals would be devastated by contact with mainstream life and, hence, should be protected in the jungle. On the contrary, tribals need to be supported with property rights (land title and legal access to forest produce including bamboo). In research papers for the Cato Institute and Economic and Political Weekly we have given full survey results plus an account of how 31 tribals

villages in Narmada district supplied Rs.32 crore of bamboo plantation owners, not a projected jungle species.

Land prices in the resettlement areas were up to Rs. 30 lakh per acre by 2019. Many tribals with five acres are now crorepatists, not paupers as predicted by Medha and other intellectuals. Will they please apologise ?

Note : While designing the issue of Jalsamvad - English we find very interesting news, information and articles specially on water and its management. That tempts us to include the same in our issues. Getting formal permission for this inclusion is that way difficult. Therefore our effort is to print them as it is in our magazine. We may kindly be excused for such inclusions. We express a deep sense of gratitude to the original writers.

Thanks.



The Women Behind India's Most Exquisite

Stepwells Built For The Loves of Their Lives

(News)



The etymology of stepwells includes forgotten civilisations in the form of exquisite artistry. Many of these were commissioned and built by queens and women in history.

When we think about the monuments built worldwide in memories of wives, mistresses or love interests, one unforgettable name is the Taj Mahal built by Shah Jahan in memory of his wife, Mumtaz.

But the list of 'love' monuments is endless with tragic stories such as that of Boldt Castle and Dobroyd Castle. Have we ever thought of sculptures made by women in memory of their husbands or love interests? If you look closely at the history of Western India's stepwells – ancient water stores, also known as stepped well/staircases – you'll find many of them were commissioned and patronised by women. The intriguing part is they were built in memory of their loved ones.

The etymology of stepwells includes forgotten civilisations in the form of exquisite artistry. In the Indian subcontinent, stepwells have been used since the Indus Valley civilisations about 5,000 years ago. Ancient Great Bath with stairs excavated at the Mohenjo Daro is the most famous example of the stepwells. Since they are more profound, these stepwells collect water during the seasonal

monsoons and evaporate slowly. Historically, such water wells provided necessities such as drinking water for the semi-arid regions of India.



When we look at the history of stepwells built on the Western side of India, we find the patrons or inspirations of at least a quarter of Gujarat's stepwells have been queens, mothers, daughters, mistresses, or goddesses.

"It is now also come to light that many of the stepwells were built by women – queens, wives of affluent traders, ordinary women and servant girls. Not only did women commission stepwells as patrons, but they also frequently served as an inspiration. Stepwells are often built in honour of a virtuous wife, a benevolent mother, a beloved mistress or a local goddess. The articulation and embellishment inside these structures are often expressive of this feminine character creating a delicate spatial filigree." (Purnima Mehta Bhatt, Her Space Her Story)

Relation between stepwells and women

'Water is female; they are the maternal, procreative aspect of the absolute'. (Zimmer, Myth and Symbols in Indian art and Civilisation)



It is not the first time that nature has been associated with feminine entities. Throughout history, the earth has been associated with muliebrity. Water is often equated with fertility and abundance in semi-arid landscapes, both literally and symbolically. In ancient times, giving water for public use was considered one of the most extraordinary acts of charity. Routines and rituals, however, linked women directly to the stepwell. In many villages of the region, fetching water, washing, and cleaning from wells are still everyday routines.

Historically, at the stepwells, women could socialise freely without being observed by men in the open spaces of village squares (chowk) or royal courts (darbar). It was a place where women would find solace in exchanging household stories, discussing politics, and seeking the company of other women.

Socially, they offered women a way to transition from the domestic sphere into the public domain when they were deprived of this opportunity for the most part. Furthermore, it sends the message that networking is essential for emotional support. With this brief window of freedom, the women could move away from their daily lives of constraints and oppression in a patriarchal society where they were treated as mere objects.

Folklore has it that in the Sabarkantha district of Gujarat, there is a stepwell known as Balasamudra; a woman unable to produce breast milk usually visits the well; a blouse or top is dipped in the water, after which when the cloth is worn,

the magical qualities of the water will enable her to nurse her child successfully.

In many stepwells today, shrines have been constructed, or stepwells have been converted into temples. In Gujarati, the Mother Goddess referred to as 'Maata' in these shrines and temples is always worshipped as an incarnation. Despite being recognised as a shrine it was acquitted of any kind of invasion by raiders. It's still a religious place but in terms of secular ethos.

Morna Livingston of Thomas Jefferson University writes, "After a thousand years, the wells may be near the end of their natural lives, and their decay too far advanced to be checked, but in most cases, the attention to the goddess can hold off the ruin of a stepwell a while longer."

Stepwell inscriptions provide valuable information related to stepwells, providing historians with insights into women donors who were otherwise obscure or overlooked in historical records of the time.

The practice of digging wells in remembrance of the dead was widely prevalent, corroborated by both epigraphic and oral traditions. Wells were built to honour a deceased relative. This act is referred to in Sanskrit text as 'istapurta' (a pious work or sacrifice which confers merit).

Notable Stepwells

Known as the Rani ki Vav or Queen's stepwell, the Patan monument placed on the list of World Heritage sites is a royal foundation, traditionally associated with Queen Udaymati, the widowed wife of Solanki ruler Bhimdeva 1 (1022-64). It was because it never served as a temple with outstanding treasury and had already fallen into disuse by the Muslim raiders that the Patan stepwell escaped detection.

Prabandh-Chintamani, composed by Jain Monk Mertunga in 1304, mentions that "the stepwell was commissioned in 1063 and was completed after 20 years".

The stepwell was later flooded by the Saraswati river and silted over. Construction of the stepwell followed the Maru-Gurjara style, reflecting the mastery of this complex technique and the beauty of detail and proportion. The

ornamentation of stepwell depicts the entire universe inhabited by gods and goddesses, nymphs, celestial beings; men and women; monks, priests and laity; animals, fishes and birds, including real and mythical ones; and plants and trees. Following the flooding of the Saraswati river, this stepwell was submerged for many years beneath the world.

After a long leap, the Archaeological Survey of India excavated and restored it in 1986. UNESCO designated it a World Heritage Site in 2014.

Adalaj stepwell, aka Rudabai stepwell, built in 1555 combining Hindu and Islamic elements is a unique waterwork. Platforms and galleries built into the stepwell's side make it stand out from the rest.

Its story is of unrequited love and events centred around it. Rana Veer Singh, a Hindu leader of the Vaghela dynasty, ruled this region, known as Dandai Desh (located around 20 km from modern-day Ahmedabad) in the 15th century.

Mahmud Begada, the ruler of a nearby kingdom, attacked Rana's kingdom. The Rana was killed in battle. The beauty of his wife Rani Rudabai made Mahmud fall in love with her. In grief at losing her husband, Rani agreed that Begada should first build the stepwell before proposing marriage to her. The well was built in record time after King Mahmud agreed to the contract. Upon the completion of the construction, he reminded Rani of her promise to marry him. On completion of the stepwell, Rudabai decided to end her life. Rani circumambulated the stepwell with prayers and jumped into the well as a mark of devotion to her husband. The well was left untouched by King Begada. To this day, each visitor prays for Rani Rudabai's spirit which some believe still haunts the well.

Bai Harir Sultani Stepwell, aka Dada Harir, located within the residential suburban area of Ahmedabad was commissioned in 1485 AD by Bai harir a Royal Nurse in Gujarat sultanate's court. It is said to have cost 3,29,000 mahmudis (the standard silver coin of the Gujarat sultanate) to refresh men, birds, insects and plants, and at last to please God

with its richly-carved walls, a small cupola on each side and, under them, spiral stairs leading down to the water. The well bears two inscriptions, one in Sanskrit on the south and one in Arabic on the north wall, of the first gallery.

As per the Sanskrit inscription engraved on the marble slab, "the general superintendent at the door of the king's harem and the powerful, religious, chief councillor of king Mahmud".

Forbes calls the stepwell 'the nurse's well', which corresponds with Blochmnn's translation of the Arabic inscription, which names the builder as 'Sri-Bai Harir, the royal (slave) nurse'.

The history behind these stepwells strongly beckons women across the centuries, in an era where historical interpretations have largely neglected women.

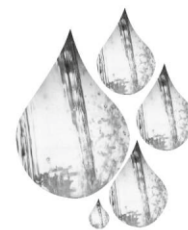
(Written by Ardent Geroy; Edited by Yoshita Rao)Sources:

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Zimmer, Myth and Symbols in Indian art and Civilization



In Eastern Africa, over 50 million to face

acute food insecurity in 2022

(News)

The latest IGAD Regional Focus on Food Crises report sounds the alarm on escalating food insecurity and malnutrition in the region

Addis Ababa, Ethiopia, 22 July 2022: Over 50 million people are expected to face high levels of acute food insecurity (IPC Phase 3 or above*) this year across seven IGAD countries (Djibouti, Ethiopia, Kenya, Somalia, South Sudan, Sudan, Uganda) according to the 2022 edition of the IGAD Regional Focus on Food Crises released today.

Ethiopia, Kenya, Somalia, South Sudan, and Sudan are facing the largest food crises in the region. About 300,000 people are projected to face Catastrophe (IPC Phase 5*) in Somalia and South Sudan in 2022, with a Risk of Famine occurring in eight areas of Somalia through September in the event of widespread crop and livestock production failures, spiraling food costs, and in the absence of scaled-up humanitarian assistance.

The situation in 2022, with 50 – 51 million people expected to face Crisis or worse (IPC Phase 3 or above*), marks a dramatic increase from 2021 when 42 million people suffered from high levels of acute food insecurity. Last year, the IGAD region accounted for nearly 22 per cent of the global number of people in Crisis or worse (IPC Phase 3 or above*), with an estimated 10 million children under the age of 5 suffering from acute malnutrition. In addition, 24 per cent of the world's 51 million internally displaced people were also in IGAD countries, mainly Ethiopia, Somalia, South Sudan, and Sudan.

"Our region has been hit like never before", says Workneh Gebeyehu, Executive Secretary of the Inter-Governmental Authority on Development (IGAD). "The combination of climate

extremes, conflict, and macroeconomic challenges makes it almost impossible for our otherwise very resilient communities to sustain multiple shocks. The figures we are releasing today are heartbreaking, and I'm very worried they could increase even more as the outlook for the October to December rainy season is bleak."

"The current food security situation across the Horn of Africa (Ethiopia, Kenya, and Somalia) is dire after four consecutive rainy seasons have failed, a climatic event not seen in at least 40 years, or since the beginning of the satellite era", notes Dr. Chimimba David Phiri, FAO Subregional Coordinator for Eastern Africa and FAO Representative to the African Union and UNECA. "Now more than ever, we must implement short-term livelihood-saving responses with long-term resilience building aimed at addressing the root causes of food crises in our region".


Climate change and La Niña have caused an unprecedented multi-season drought, punctuated by one of the worst March-to-May rains in 70 years. The latest forecast by IGAD's Climate Prediction and Applications Centre (ICPAC) is for a fifth consecutive failed rainy season across the region, with the latest long-term forecasts for the 2022 October–December rainfall season indicating an increased chance of below-average rains.

"Conflict, climate extremes, economic shocks, rising costs and now the impact of the conflict in Ukraine on food and energy prices are pushing millions towards starvation in Eastern Africa," says Michael Dunford, the World Food Programme's Regional Director for Eastern Africa. "Sadly, there is a very real risk of famine in the region, and we must do everything possible to

prevent this from happening. At the same time, together we must start building the capacity to prepare and respond to future shocks which are increasingly inevitable because of a changing climate.”

The fourth edition of the IGAD Regional Focus on Food Crises continues to provide essential information, analyses, and insights to collectively address the causes and consequences of escalating acute food insecurity and malnutrition in Eastern Africa.

It is a by-product of the annual Global Report on Food Crises (GRFC 2022), which is the result of a complex, multi-partner, consensus-based process involving commitment and contributions from a multitude of agencies and individuals. It is facilitated by the Food Security Information Network (FSIN) in the framework of the Global Network Against Food Crises.

<p>Stockholm Water Prize-2005 Gajanan Deshpande, Pune +91 9822754768</p>	
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Centre for Science and Environment under the directorship of Sunita Narain, India

(An article series has been launched in August 2020 to learn more about the World Water Prize winners and their work.)

The 2005 Stockholm Water Prize was awarded to Centre for Science and Environment, New Delhi, headed by Sunita Narayan. It highlights the growing challenges of water management in many regions of South Asia and the need for new approaches to provide local food and water security to diverse communities. The CSE, through its publications and the traditional systems of water management, advocates a new idea as to how it could become a starting point for eradicating rural poverty in many parts of the world, once it is

revived.

Sunita Narayan says that improving the productivity of rain-fed and marginalized lands is a serious challenge facing the world. In this challenge, water can transform a large portion of the country's currently



dry land into productive land, reducing poverty and increasing incomes where it is needed most. CSE has demonstrated through its work that local water management is a cost-effective business. More importantly, harvesting the rain water where it actually falls and local water management is important and can only be done through community participation.

CSE's work has highlighted that water cannot become the concern of everyone until there is a fundamental change in the way water is handled. While making the policy, one has to bear in mind that water management involving communities and families, must become the world's largest cooperative enterprise. For this, the organization has strongly argued that the prevailing mindset that 'water management is the sole responsibility of the government', should now be changed. This powerful concept is now gaining ground in policy and implementation in many areas of the world.

It is clear that in many parts of the world 'water scarcity' is not the problem but 'water management' is the real problem. CSE's work on rainwater harvesting has shown many innovative ways, through which people have learned to live with water scarcity. That water is being used to recharge ground for irrigation and drinking water needs in millions of storage systems like tanks, ponds, step-wells and even roofs implemented in different regions in different ways.

The 2005 award recognized CSE's contribution to creating a water-literate society which values every drop of rain to create a water-wise world and inspires society to learn from the frugal habits of our ancestors. This movement has the potential to change the future of the world's water. Two books, published by CSE viz: "Dying Wisdom : Rise, Fall and Potential of India's Water Harvesting System" (1997) and "Making Water Everybody's Business" (2001), were eye-openers in the field of water management. They helped reinvent practical, traditional and cheap techniques in water management, helping to ease pressure on India's inefficient, centralized water systems.

But the work of CSE is not limited to water only. The organization has tackled issues ranging from global climate change to scrutiny of various Indian industries. It has always been their mission to check something on hard facts before announcing it. This philosophy has given the center great social standing and support for policy change in civil society, politics and the media. CSE uses media effectively to disseminate and support their information. CSE Center produces and publishes fortnightly and other effective educational materials like 'Down to Earth' along with several fortnightly and magazines. Their journals have become an important voice for scholars seeking hope and change.

Jeevitnadi : Activiies for the Month Of August 2022

Smt Subha Kulkarni
(M) : 9930809046



Awareness :

- Session with Dnyan Prabodhini's प्रज्ञा मानस संशोधिका, was done by Aditi Deodhar, on August 13th.
- Jeevitnadi was invited as a panelist for Delhi Akashwani's The Green Crusaders Program, and



program was broadcast on August 30th.

- Awareness session at Rabindranath Tagore School for students from 8th to 10th std was taken on 10th August, where we spoke to them about Sustainability, river conservation and work done at Jeevitnadi.
- Another session on 'Toxin Free Lifestyle' was conducted on August 11th at the corporate office of Concentrix, on August 11th.



- Session on Ganesh festival awareness was done at Orchid school on 22nd August. We connected with kids from 6th to 12th std.
- Session organized by 'Women for Water' foundation based in Ahmedabad was an interactive session on roles of women in water.



- Visit to Narayangaon on August 25th to appeal to citizens during their Ganesh festival meeting. Toxic waters of Meena nadi and how it is impacting the health of citizens of Narayangaon was highlighted. There was also a decision to start the निर्मल मिनाई अभियान.

- Pune this year campaigned together to recycle the clay from Ganesh idols and send it back to the artisans. Jeevitnadi was among the 12 NGOs that worked together along with PMC and helped this turn into a reality.

Regular activities:

Monday Munching/ Musing With Women for Water
 Session 12 | 29th August 2022 | 5:00 to 6:00 pm

In conversation with



Shailaja Deshpande

To Join: <https://us06web.zoom.us/j/86718310735>

wicci.wrc@gmail.com

@WICCIWRC @WICCIWaterResCon @wicci.waterrescon @WICCIWaterResCon



Ac
tio
n:



- Though our regular cleans were interrupted due to therains, the teams were able to do the activities on some weekends. Also we were able to witness some fishing at the Mula river, due to strongly flowing river after the rains!

Awards and felicitation:

Jeevitnadi and Studio Roots received an Award of Excellence from Asia Pacific International Federation of Landscape Architects – for Unbuilt projects, Analysis and Planning.

World Water Day-2007

Water And Culture

Gajanan Deshpande, Pune - (M) : 9822754768



(A new article series has been launched from August 2021 to learn more about the importance of World Water Day and the various water awareness programs implemented every year.)

On the occasion of World Water Day-2007, the special theme 'Coping with Water Scarcity' was chosen for global water awareness. An attempt was made to impress upon the global community that water is becoming scarce while realizing that the availability of water per capita is decreasing due to the continuous increase in world population. Water bodies are static; no growth is possible in them. Therefore, it was hoped that efforts should be made to create a feeling and awareness in the society that water should be used sparingly.

Water scarcity is one of the major problems facing the world in the 21st century. Water scarcity is generally defined as a situation when the availability of water in a country or region is below 1000 cubic meters per person per year. However, many regions of the world experience even more severe water scarcity, where less than 500 cum of water per person per year is available and can be considered acute water scarcity. 2000 cum per person per year is considered as the threshold limit and it indicates that a region is water stressed and water scarcity causes huge problems in overpopulated regions.

If we consider Maharashtra, the average annual availability of natural water from only one seasonal monsoon is very different in different basins and sub-basins. 13% of the total area of Maharashtra lay in water scarcity sub-basins. 32% of the area is in deficit sub-basins, 34%

of the area is of general availability and only 6% of the area is of abundance and 15% of the area is of superabundance. The natural annual average per capita availability of water in the sub-basins of the drought-prone regions such as Girna, Agrani, Man, Yerala is very low. Considering the water required for food grains, vegetables, dairy farming and sanitation, the accumulated experience so far is that when the availability of water is more than 1000 cum per capita, it becomes easier for that community to set up a system of various water uses. But when such availability is less than 500 cum per capita, there has to be strictness and coordination in water use. In such regions, it becomes very efficient to combine the water required for nature-based activities, such as agriculture, dairy farming, harvesting of forest products etc, with the water required for modern industrial and urban systems; and to create sufficient water security throughout the year for human habitation as well as domestic animals and wildlife.

Compared to the natural annual availability, the domestic water requirement for human settlement activities is actually not very high even in drought-prone regions. The experience of the Southern Plateau so far is that even in a dry year, 20% of the water is received as compared to an average rainy year. It should not be difficult to meet the minimum drinking water needs of human habitations and animal life. What is needed is the careful management of public affairs in that valley.

The cycle of nature is not static, it is oscillating. It changes as time and place changes.

Therefore, the natural availability of water keeps changing every year. It is difficult to get all the required water from a single source every year as per criteria. Therefore, integrated planning and conservation of all available resources like surface water, rivers, lakes, ground water, recycling and utilization in a more complementary manner becomes more feasible in water-scarce regions.

In regions where population growth is many times greater than the sustainable use capacity of natural resources, the available water is insufficient to produce enough food to alleviate hunger and poverty. Water scarcity makes industrial, urban and tourism development unable to supply sufficient water without restricting water use and allocation policies for other user sectors; especially agriculture and there is limited capacity to deal with such increased demands.

Many regions of the world are already experiencing acute shortages, causing enormous problems for local populations and societies as a whole. Not enough water is available to produce the food grains needed to eradicate poverty and hunger. Water scarcity also hinders industrial, urban and tourism development, which in turn constrains other sectors; especially agriculture. It causes water conflicts in stressed areas.

In water-scarce regions, water resources are already degraded, or both water quantity and quality are deteriorating, further increasing water scarcity. Health problems are usually more related to scarcity. Water borne

diseases are increasing due to depletion of groundwater and surface water, as well as lack of proper water distribution and sewage system. Poverty makes it difficult to develop proper water distribution and sewage systems. Poverty related to water scarcity increases the number of people migrating within the country or to other countries, where they hope to find a better life; however, they are not well received there.

In regions where water is always scarce, cultures arose that successfully coped with water scarcity. These societies developed institutional solutions, water technology and management skills within the local cultural environment, allowing appropriate water use for domestic use, food production and local industrial purpose.

Changes in lifestyle and development over the past decade have created new water needs, conflicting expectations on cultural and institutional issues and a sharp increase in water demand. Because of this, the existing balance between demand and supply is disturbed. Hence, to bring a new balance in this aspect has become necessary. It should primarily be adapted to local culture, environment and institutions using modern technology and management tools. Finding such a new balance is a challenge for communities living in water-stressed areas and for many scientific and technological professionals who influence the cultural, social and ecological aspects of water resources.

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जलसंवाद हे मासिक मालक व प्रकाशक डॉ. दत्ता
देशकर यांनी
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Melting glaciers, water scarcity,

Exodus: How climate change reality is biting Ladakh villages

Global warming has been leading to melting glaciers in the Hindu Kush Himalayan Range, where Ladakh's located. This has caused a water crisis in region.



Abandoned houses and fields in Upper Kulum | Praveen Jain | ThePrint

Kulum, Leh: "There's no water," said Sonam Chondol, an erstwhile resident of a ghost hamlet in Leh district, flatly. "There's no grass to feed our livestock, not enough to irrigate our fields. Why would we go back?"

Chondol, along with 6 other families from her village of Upper Kulum, decided to leave their homes over 10 years ago and migrate to the nearby town of Upshi — about 5 km away — for a better chance of securing their livelihoods. Chondol set up a confectionary shop on the road that takes tourists towards the Puga hot springs, and ekes out a living from the footfall her shop receives.

Small as the number of residents that left is, the experience of water scarcity in Kulum has been enough to alarm Ladakh's district authorities and NGOs, serving as a warning for what the future of the region could hold if measures to mitigate climate change are not immediately put in place.

Like most of Ladakh, Kulum is glacier-fed, depending on the water that dribbles down the mountains from snowmelt. But over the last few decades, the source of this water has been waning because of global heating.

The Hindu Kush Himalayan Region — in which Ladakh is located — is also called the third pole because of the volume of glacial ice it stores. These glaciers, which are the source of 10 major river systems, are warming much faster than the global

average.

According to the Ministry of Earth Sciences, the mean retreat of glaciers in the HKHR is 14.9-15.1 metre per annum.

Shakeel ul Rahman is a sub-divisional officer of agriculture in Leh district working on increasing climate-resilient agriculture in the region to cope with changes in the water supply.

"There is a lot of stress on Ladakh's water sources, and the melting or erosion of glaciers is going to become a huge challenge. If we don't act now, there will be more out-migration, more abandoned villages," he told ThePrint, gazing at Leh's snow-capped peaks from his office window. An exodus

The most obvious sign of global warming in



Snow-capped peaks seen from Igoo village | Praveen Jain | ThePrint

Ladakh is the changing face of the mountains themselves.

Seventy-three-year-old Tsering Angchuk, who also abandoned his home in Upper Kullum, pointed to his shins, just below his knee, and said: “More than 15-20 years ago, when it snowed, it would come up to here. But now, it’s barely a few inches. The mountains barely have any snow on them”.



Tsering Angchuk in his village, Kulum, in Ladakh | Praveen Jain | ThePrint

Angchuk is not mistaken. Scientists have recorded a retreat in both snowfall and glacial mass in Ladakh over the last few decades. Snowmelt and

rainfall in the months of March and April would irrigate their fields enough to sow barley, wheat, peas, and potatoes. But with lower levels of snowfall, the sowing season has gone awry.

“We have observed that snowmelt is happening much earlier, and so the peak of discharge is happening in spring, leading to a shortage in the summer season. There’s also a reduction in soil moisture, which can cause springs to dry,” Dr. Anil Kulkarni, a glaciologist and distinguished scientist at the Indian Institute of Science, told ThePrint.

Angchuk says he’s the first to have led the exodus from Upper Kulum in 2012, two years after the devastating cloudburst of 2010 damaged part of a glacier-fed spring supplying their village with water, eventually leading it to dry up. The lack of spring water and the shift in the monsoon season towards the winter made agriculture completely unviable, he said.

But even within the range of a few kilometers, topography in the village varies greatly. In Lower Kulum, a settlement of four households about a kilometre-and-a-half downstream of Upper Kulum, residents are slightly better off. The spring supplying Lower Kulum with water hasn’t fully dried up yet, allowing for some subsistence farming.

“We didn’t leave because we could manage with whatever little water we got from the spring. But it has been increasingly difficult. We don’t have as much of a yield as we did before 2010,” said Urgan Chosdol, a resident of Lower Kulum.

Climate resilience and adaptation

In the neighboring village of Igoo, concerns about water scarcity are mounting.

“The water flow is erratic. The glacier that supplies our village has reduced a lot in size. Water

that used to flow till September has now waned around mid-August,” Tsering Gurmet, a village leader, told ThePrint, adding: “It rains at odd times, which makes farming difficult”.

A 2016 study by scientists from Jawaharlal Nehru University (JNU) found that climatic changes in Leh showed a “warming trend” with varied precipitation that suggests “overall the region is receiving more rainfall than the arid region is used to”.

According to Tashi Nurbu, another resident of the village, a 20-year-old scheme created small bunds or dams below the glacier supplying the village with water, which caused sheets of ice to freeze, creating a reservoir. This ice reservoir, Nurbu said, supplied water even in the summer months, but the bunds broke some years ago.

“This dam system should be rebuilt because it really helped keep the supply of water regular when we need it the most, After it broke, the ice hasn’t formed like it used to,” he said.



Tsering Gurmet (L), Sonam Phunchok (C), Tashi Nurbu (R) in Igoo village | Praveen Jain | ThePrint

The idea of creating a reservoir of ice up in the mountains — called an artificial glacier — is credited to Chewang Norphel, a civil engineer who invented the model in the 1980s after observing how droplets of water from a tap froze once they hit the ground.

A newer prototype, called an ice stupa, was pioneered by engineer Sonam Wangchuk in 2013. The conical shape of the glacier means less surface

area is exposed to the sun, further regulating the water downstream.

The ice stupa consists of a pipe that draws water from a glacier or stream and is taken to a suitable location at an elevation. There, water is slowly released through a sprinkler, which forms a base of ice. As the water continues to be sprayed, the ice builds and builds, till it resembles a vertical glacier. This glacier is designed to melt through the early summer months, to make up for the shortfall in recent decades.

In 2019, this model was implemented by the Ministry of Tribal Affairs alongside Wangchuk’s organisation, the Students’ Educational and Cultural Movement of Ladakh (SECMOL) in Lower Kulum.

“We tried it in 2019, but it failed because we made it too close to the village and it melted away too quickly. We were only successful this winter, in 2022. It takes a lot of trial and error, and to make the stupa we had to trek 5- 6 kilometers uphill from here where temperatures are lower and the ice can properly form,” said Chosdol.

Though the intervention has been found to mitigate the effects of water scarcity, it is expensive and high maintenance, prone to pipes getting jammed due to freezing temperatures. It has also given rise to other unforeseen consequences — in the village of Phayang, for example, 20 km away from Leh, the diversion of water to form an ice stupa led to resource conflicts with a neighbouring village.

Earlier this year, Leh’s agriculture department decided to implement a scheme called the Special Development Package in Lower Kullum, which includes installing a solar-powered borewell to draw groundwater for micro irrigation — technology that Rahman says was not necessary till recently. Micro irrigation involves methods that use less water, through drippers, sprinklers, and foggers.

“Initially, the residents were skeptical about whether micro irrigation will work, but this year they have grown a good amount of potatoes

and summer squash. Villagers in Upper Kullum are also now considering letting us implement it there,” Rahman told ThePrint, who added that the scheme would be implemented in a dozen other villages.

Lowering emissions

Despite its vulnerability to climate change, weather and climate data from the Ladakh region has been limited, says Dr. Subrat Sharma, head of the regional GB Pant National Institute of Himalayan Environment, which opened in Ladakh only 3 years ago.

“Instrumental evidence of climate change has been very little in this area, but there is other, indirect evidence of climate change in the region, like the increasing frequency of cloud bursts,” he told ThePrint.



Sonam Chondol (L) with her niece Dechen Spaldon at their shop in Upshi | Praveen Jain | ThePrint

Average temperatures across the globe have warmed up by 1.1 degrees celsius since pre-industrial times, according to the Intergovernmental Panel on Climate Change’s recent reports. Efforts across the world are on to limit global warming to 1.5 degrees celsius — at which point Ladakh, which is especially vulnerable to climate change, is likely to warm up by 2.23 degrees.

At such temperatures, weather patterns are likely to change even more dramatically than they already have, scientific evidence suggests.

“There will be a lifespan to interventions like artificial glaciers. We need more scientific scrutiny to see in which conditions they will succeed and fail,” said Kulkarni, adding: “The

elephant in the room here is greenhouse gas emissions. The only permanent solution is to cut emissions”.

For Angchuk, moving back to Upper Kullum — where houses and fields lie abandoned — will take a lot of convincing, even if irrigation schemes and artificial glaciers help the flow of water along.

“Will the water really come? I didn’t even know about borewells until recently. They say they will install it. Maybe I’ll consider moving back if it works,” he said.

(Edited by Uttara Ramaswamy)



A R45m reservoir later, and still no water:

Lenasia South residents' 'stressful and sickening' predicament

The newly built reservoir in Lenasia South, Johannesburg. Residents still face water cuts despite the new reservoir. (Photo: Shiraz Mohamed)



Residents of Lenasia South outside Johannesburg had hoped that, with the construction of a R45-million reservoir, their water woes of almost five years would come to an end. But there are still water outages twice a day.

Joy Govender, committee member for infrastructure and service delivery in Lenasia South's Ward 120, didn't have to wait two months before she knew the new reservoir hadn't solved the problem. Govender told Daily Maverick she had stepped out of the launch to verify the promise of a regular water supply made by Johannesburg Executive Mayor Mpho Phalatse and MMC for Environment and Infrastructure Michael Sun, who were at the event.

Govender opened her taps and they were dry, which they usually were at that time due to water cuts. And they remained dry.



Sierra Nevada Primary School principal Dale Abrahams walks past three JoJo tanks that the school installed to overcome the water crisis. (Photo: Shiraz Mohamed)

Said Phalatse at the launch: "The opening of the new Lenasia reservoir is one of many infrastructure upgrade projects that the Joburg multiparty government is undertaking to ensure access to quality, sustainable, basic services to all six million residents.

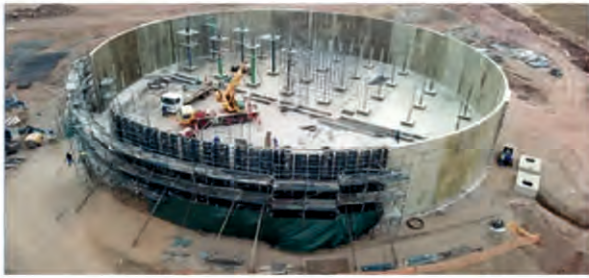
"The overall objectives of this project have been to not only improve storage capacity of the Lenasia high-level reservoir, but ensure reliability of supply, so that when a resident opens a tap, they enjoy clean water ... a basic right for us all," said Phalatse at the time.

She added that the R45-million project hadn't been cheap, but that residents could expect value for money.

Lenasia South has been experiencing water cuts for almost five years, with the taps being turned off by Johannesburg Water from 1pm until 5pm and then again from about 9pm or earlier to 3am the following morning. The cycle is repeated every day.

Sometimes the water is cut for longer. At times, it's not cut at all. But for more than 90% of the time, the area experiences water shedding.

According to the invitation to the launch of the new reservoir: "The new 15 ML Lenasia High-Level Reservoir was constructed to supplement the existing 6 ML Lenasia High-Level Reservoir, which had insufficient capacity to supply the area dependent on it."



INVITATION
JOHANNESBURG WATER TO LAUNCH THE NEWLY CONSTRUCTED LENASIA RESERVOIR

The Executive Mayor of the City of Johannesburg, Cllr Mpho Phahlele, will on the 30th June 2022, launch the newly constructed Lenasia High Level Reservoir. She will be accompanied by MMAC for Environment and Infrastructure Michael Sun and Johannesburg Water's Managing Director Ntshavheni Mulozwana.

The new 15 ML Lenasia High Level Reservoir was constructed to supplement the existing 6ML Lenasia High Level Reservoir, which had insufficient capacity to supply the area dependent on it.

Event Details:
Date: Thursday, 30 June 2022
Time: 12h30 - 15h00
Venue: Lenasia High Level Reservoir, Roadepoort 302-Ja, 1834
GPS Coordinates: 28°22'30.8"S 27°51'40.5"E
RSVP: nea.labelthe@jwater.co.za or kenelwe.tamotlabe@jwater.co.za



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Johannesburg Water communications officer Puleng Mopeli told Daily Maverick that housing density, increased backroom dwellers in Vlakkfontein and illegal connections due to land invasions in Univille informal settlement were causing the water outages.

"Although the new reservoir has been commissioned, the supply line from Rand Water supplying the new reservoir does not have enough water to cater for the existing water demands within the affected areas," Mopeli said.

Govender, meanwhile, approached the City of Joburg, as well as Johannesburg Water, to find out why the new reservoir had not solved the problem. She is still waiting for answers.

Other residents Daily Maverick spoke to had also reached out to officials but were frustrated by the lack of response.

"My personal take on this is simple ... they just came to open the reservoir to shut people up. But in actual fact, they have created a bigger hullabaloo because everyone now asks what is the purpose of the new reservoir when they still don't have water," said Govender.

"As a leader in this community, I feel so incompetent because I cannot deliver on my duties (of addressing people's concerns)," Govender said. "We are failing dismally to serve our community ... leaders must be able to deliver, to answer."

On arriving in Lenasia South, this reporter saw roads that had been damaged as a result of burst water pipes and meters that had been broken by the water supply so frequently being turned on and off.



Preetham Mangar besides his water tank. (Photo: Shiraaz Mohamed)

Preetham Mangar, a retiree living in Lenasia South for almost 40 years, told Daily Maverick that on hearing of the reservoir's launch, he thought, "Knowing this country, we won't have water. And we didn't have water."

He had considered getting a JoJo tank, but friends in the government told him there was no need as the reservoir would soon be completed. Mangar now stores water in several containers at his home.

“We can’t live like this. It’s very inconvenient, especially during peak hours,” said Mangar.

“We understood that with the increased population, resources would be stretched. But with the new reservoir, we still have the same problem and no one can tell us what is going on.” He said people were relocating from Lenasia South not because of the crime, but because of the water shortages.



Alice Kunze carries two buckets of water that will be stored for later. (Photo: Shiraz Mohamed)

Samantha Naidoo’s home has a “For sale” sign on the lawn. She said the water crisis contributed to her decision to move from the area.

Naidoo said her family has had to replace their geyser three times in the past 18 months, with pipes and toilets leaking as a result of the water being turned on and off.

“The mayor was here to open the new reservoir and God knows what she did there because there ain’t nothing happening here,” said Naidoo, who has lived in the area for 36 years.

Mopeli said the City’s water department was currently investigating water losses through illegal connections.

“The completion of the investigations are dependent on challenges encountered. The duration of required remedial work shall be determined by the investigation’s outcome,” she said.

Mopeli said there was a project, still in the design stage, to upgrade the water supply. The project is expected to be completed by 2028.



Anne Naidoo navigates her way past stored water containers that she keeps in her garage. (Photo: Shiraz Mohamed)

MMC Michael Sun said in a statement on 1 September: “After opening the reservoir in June, residents of Lenasia continue to suffer outages at an alarming rate... This is unacceptable and we will ensure that all efforts are made to speedily resolve snags and ensure residents enjoy the benefits of this new infrastructure as a matter of urgency.”

While Johannesburg Water concludes its investigation and Sun “speedily resolves snags”, residents like Naidoo have to rush to finish all chores that require water by 1pm before the water is cut off, and hold her breath that dinner guests finish eating before the evening outage so the dishes can be washed. Naidoo has resorted to using paper cups and plates to avoid dishes piling up.

“An inconvenience is an understatement. I don’t think humans should live like this ... it’s pathetic,” Naidoo said. “It’s stressful. Physically, it’s draining. Emotionally, it’s sickening.”

“Our whole life is worked around water cuts. Nothing else. Not work, studies or personal things ... It revolves around water. Every day for the last four years.”

Minister of Water and Sanitation, Senzo Mchunu, recently completed a year in office, emphasising the mantra of his department: “Water is life, sanitation is dignity.” This clearly hasn’t filtered down to the people of Lenasia.

For Farhana Basha, her period is the most stressful time. Basha told Daily Maverick it was very unhygienic to not be able to clean herself properly as a result of water cuts throughout the day.

“When we got word about the reservoir being ready, it was a lie. We were all so excited... They came here and opened what reservoir? For who? We are suffering every day ... especially with hygiene,” said Basha, who has lived in Lenasia South for 21 years.

Initially, the water cuts had been once a day but this increased to twice a day two years ago, Basha said. She added that residents had been told the outages were a temporary measure.

“It’s like a lucky packet when we open the tap and there’s water. Do we have to get excited for necessities and services that we are paying for?”



Resident Nkosinathi Phakade recently had a funeral and needed to drive out of the area for water. (Photo: Shiraz Mohamed)

Nkosinathi Phakade told Daily Maverick that Johannesburg Water had recently upgraded the water meter at his home. Although the supply is intermittent, he still pays full rates for a service that barely functions, leaving him and his family of five high and dry.

“It’s difficult to maintain hygiene in the house. I especially underline the toilet part,” said Phakade, adding that it was a headache with kids around the house.

“In 2020, we had to borrow water from friends with bigger containers so that we could store more water [during a family member’s funeral]. That was very inconvenient.”



Zerina Sulliman says the water crisis has an adverse effect of her daily prayers. (Photo: Shiraz Mohamed)

Zerina Sulliman (71) told Daily Maverick the intermittent water supply had a negative effect on her daily life and her spirituality. The Islamic practice of salah – praying five times a day – requires self-purification.


“We have a little place in the bathroom where you can open the tap, sit and wash yourself... Before you pray, you need to wash and, because there’s no water, you can’t wash.”

She said her children installed a JoJo tank a year ago. She now keeps water in a purified bottle to wash her hands and face.

“Water is a basic necessity ... You can live without electricity, but you cannot live without water. I’m 71 years old – we lived in the township where we had the bucket system, but we always had water.

“We are supposed to be living a better life now, but it seems things are not going forward; it’s all going backwards,” said Sulliman.





Different concepts related to the quality of water :



Biological Oxygen Demand (BOD):

The bacteria that maintains the quality of water must get the required amount of oxygen in water. If it is reduced, the bacteria will not be able to survive. Nature always supplies oxygen to the flowing water. When water and oxygen come in contact, the oxygen gets dissolved in it. Standards are however set for how much it should be. If this amount is 1 to 2 mg. per liter, then water is said to be very good. It is considered satisfactory if it is 3 to 5 mg. But if it is between 6 to 9 , it is considered to contain polluting organic matter. BOD levels of water required for agriculture and industries are also higher.

Chemical Oxygen Demand (COD)

The chemical oxygen requirements of water is examined from the point of view of checking the efficiency of the sewage treatment plant. If the COD of water is high, it is considered to be harmful to the aquatic organisms. If more organic matter is dissolved in water, then COD is higher. A mechanism is set up to reduce it. With the help of this system, it is beneficial to reduce the COD in the waste water and then dump it in the river. Most of the cities do not have such systems. That is why the rivers of our country are found to be in the grip of pollution. COD in water should not exceed 250 mg per liter.

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