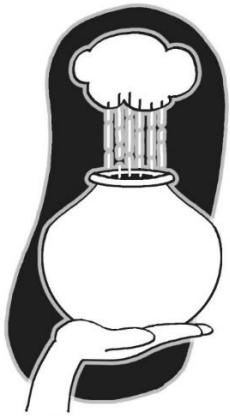
Water



Water is a compound and its chemical composition is H2O – Where H means hydrogen and O means Oxygen – Two atoms of hydrogen and one atom of oxygen come together to form water. It is the life of living things. Life is impossible without water. If you are thirsty and don't get water, you feel as if somebody is taking your life away. You will experience it, when you travel in a desert. A plant in a pot withers without water. But when you water it, it becomes fresh again. There is no life, without water. There will be desert everywhere. Hence water is regarded as life. We call it one of the '*Panch-Mahabhuta'* i.e. five basic powers or principles. We worship water. We also call it as blessing by 'water goddess or rain goddess.'

Human economic development and health is dependent solely on the availability of water. Water is the foundation of this human existence. However, not only in India but all over the world there has been a need to seriously think of the use of water. It is said, that the "third

World War may be on the issue of Water". This highlights the importance of water. 71 per cent of the Earth's portion is occupied by water, 97.1 per cent of it is the oceans and it is salty not available for direct human consumption. 2.2 per cent water is in the form of ice on the polar areas. Sweet water available is very limited just 0.8 per cent. Today both developed and developing countries are using this water unscrupulously and this is created a grave situation.

To illustrate the gravity of this situation let us recollect that during the past few summer months Latur, Amaravati, Oosmanabad and major part of Marathwada region are starving of water. Civic bodies are not able to supply drinking water in this area after a gap of two to three weeks. For Latur which is a district headquarter was required to supply drinking water through railway. One cannot imagine how the residents in this region are using drinking water. The following table indicates as to how the water quantity is being depleted all over world.

Yearly per capita availability of water (Cubic Meters.)

Country	1955	1990	2025
Russia (old)	28,714	19,428	1,586
United States	19,428	9,993	7,695
Pakistan	14,934	3,692	1,803
Japan	10,590	4,426	4,306
India	6,091	2,464	1,496
Sri Lanka	527	2,498	1,738
China	4,930	2,427	1,818
Egypt	4,597	1,123	630
England	2,561	2.090	1,992
Israel	2,344	461	264
Jordan	1,229	327	121

Source: Maharashtra Economic Survey 2008-09, Page 53

Here let me clarify that for this situation the growth in population is also responsible and this also highlights the need for population control.

While on this issue let me state the overall position of India on this score in greater details.

India is facing one of its major and most serious water crises[2]

After two consecutive years of weak monsoons, 330 million people — a quarter of the country's population — are affected by a severe drought. With nearly 50 per cent of India grappling with drought-like conditions, the situation has been particularly grim this year in western and southern states that received below average rainfall.

According to the Composite Water Management Index (CWMI) report released by the NITI Aayog in 2018, 21 major cities (Delhi, Bengaluru, Chennai, Hyderabad and others) are racing to reach zero groundwater levels by 2020, affecting access for 100 million people.

However, 12 per cent of India's population is already living the 'Day Zero' scenario, due to excessive groundwater pumping, an inefficient and wasteful water management system and years of deficient rains. The CWMI report also states that by 2030, the country's water demand is projected to be twice the available supply, implying severe water scarcity for hundreds of millions of people and an eventual six per cent loss in the country's GDP.

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[2] https://www.downtoearth.org.in/blog/water/india-s-water-crisis-the-clock-is-ticking-65217

The Union Government recently formed a new Jal Shakti (water) ministry, which aims at tackling water issues with a holistic and integrated perspective on the subject. The ministry has announced an ambitious plan to provide piped water connections to every household in India by 2024.

The ministry has set a tough target at a time when hundreds of millions don't have access to clean water. Aiming at laying huge pipeline networks for water supply means that yet again, we are giving more preference to infrastructure. Also, the moot questions are: what will happen if there is no water to supply? What will happen to all the wastewater that gets generated?

This indicates that there is a clear disconnect between water, society and economy. Currently, we are interested in laying large networks, constructing huge storage dams, fetching water from 150 kilometres and above, which involves a huge carbon footprint.

We are valuing land more than water, neglecting our local water bodies, which have either gone dry or encroached. Also, in many Indian cities, water is not properly distributed. Some areas of mega cities like Delhi and Mumbai are privileged to get more that than the standard municipal water norm of 150 litres per capita per day (lpcd) while other areas get 40-50 lpcd.

Aggravating the problem is that the water being supplied currently is of drinking water standards. The World Health Organization (WHO) states that an individual requires around 25 litres of water daily for meeting his/her basic hygiene and food needs. **(Against this back drop let me tell you we Puneites are using**

more than 165 ltrs. water per day through the Pune Municipal Corporation's Water supply. Undoubtedly Puneites should think this seriously). The rest is used for non-potable purposes like mopping and cleaning. This indicates that for most of the non-potable uses, a quality lower than drinking water is required. Thus, for economic efficiency and environmental sustainability, water must be treated and supplied according to usage.

On the top of it, are issues of leakage losses, water pricing and metering of water. Lack of proper maintenance of existing infrastructure causes further losses of almost 40 per cent of piped water in urban areas.

The Road ahead

Looking at the current situation, there is a need for a paradigm shift. We urgently require a transition from this 'supply-and-supply-more water' provision to measure which lead towards improving water use efficiency, reducing leakages, recharging/restoring local water bodies as well as applying for higher tariffs and ownership by various stakeholders.

A recovery-based closed loop system is the need of the hour. It is time to go back and start using our traditional practice of rainwater harvesting — catching water where it falls. Presently, India captures only eight per cent of its annual rainfall, among the lowest in the world.

Another aspect is the treatment and reuse of wastewater. About 80 per cent of the water that reaches households, leaves as waste and pollutes our water bodies and environment. There is a huge potential in reusing and

recycling this treated wastewater at least for non-potable purposes, which is cost effective.

All this leads to the fact that we need to promote a decentralised approach, with a key focus on water conservation, source sustainability, storage and reuse wherever possible.

It is important to understand that managing the water situation is not the job of only engineers but all stakeholders including hydro-geologists, economists, planners and most importantly, communities themselves. Emphasis on behavioural change is not getting enough attention because it is nuanced and complex. But locals/citizens/ communities have a huge part to play. By keeping in check our own usage and actions, we can contribute.

As for our decision-makers, they need to re-think: Are we being sold dreams or realities?

In the primitive ages, man was nomadic. Man used to wander in search of water and greenery. Man settled by building the settlements near the water sources to satisfy need of water for him and his domestic animals. Man used to do farming to produce food grains. Therefore, we see that human civilizations have developed on the banks of rivers, such as civilization of 'Mohenjo-Daro' and 'Harappa' in the 'Sindh Valley', Egyptian civilization in the 'Nile Valley', South American civilization in the 'Amazon Valley' and African civilization in the Congo Valley. In India, history tells us that human civilizations developed on the banks of Rivers 'Ganga, Yamuna, Brahmaputra, Narmada, Godavari, Krishna, Kaveri'. Man is so much attached to water sources that he named them after God and

Goddesses. As these sources are regarded as God and Goddesses, he built temples and pilgrim places on the banks of the water sources. All the sources of water like rivers, lakes, tanks, seas etc. are the inseparable parts of human civilization. In our body metabolism, water is important. It is also important in health treatment.

No farming is possible without water. We need water daily for innumerable purposes; we know the utmost importance of water in our life. Rain is the main source of water. We have studied the rain cycle of nature. Water from rivers, lakes, seas, oceans, gets heated due to the heat of the Sun, turns into vapour, and goes up. It cools and clouds are formed. These clouds have vapour. During the day, lands get heated fast and the air on the earth travels upwards. To fill the void, winds start blowing from sea to the land. Water gets heated slowly and cools slowly.

In comparison land heats and cools fast. Hence winds blow from land to the sea in the night. These winds carry clouds. These clouds are stopped by the mountains and it rains. Rainwater seeps through the mountain tops, into the ground and the sources of groundwater are formed. Rivers in the mountains, manmade lakes, wells are the main source of ground water. River water flows and meets the ocean and the water cycle continues to go on. Krishna, Bhima, Godavari, Tapi, Vainganga are the main rivers in Maharashtra. We mainly depend on these rivers for agriculture and drinking water.

No need to tell, how much we depend on water. Under the seasonal cycle we have season of monsoon. During this season the seasonal winds flow, these winds bring clouds. Hence, we have rain from June to September. The whole process is very complex. Due to this, the rainfall

can become heavy or less. If rainfall is less, we face drought condition, if it is more, we face floods. Rain gives water to the rivers. By constructing dams on the rivers for agriculture and drinking water, we can protect ourselves from the uncertain nature of rain. In Maharashtra, the annual average rainfall is not the uniform in different parts. It rains maximum in Konkan whereas it rains the minimum in Marathwada. Other places have medium rainfall. Nearly 112 lakh hectare land in Central Maharashtra and Marathwada is regarded as drought zone, where it rains minimum. Generally, Maharashtra faces drought after every six years

Maharashtra's Average Rainfall

Meteorological Divisions	Average annual rainfall (mm)
Konkan & Goa	3,005
Madhya Maharashtra	901
Marathwada	882
Vidarbh	1,034

Source: http://www.rainwaterharvesting.org/urban/rainfall.htm

The natural existence of water on earth that is nature i.e. regulated water cycle, is in danger because of man. Changes are taking place in rainfall due to global warming. They are harmful not only to human civilization but also to the nature. Time has come to think, "How is the current water condition? How do we use water? What are its consequences? What will be the effects?"

Rainwater is pure. But it may be polluted due to air pollution. The air in the area near Taj Mahal is so degraded due to smoke from the factories that it can cause acid rain.

It may adversely affect the historical structure of Taj Mahal. There has been such type of acid rains in some parts of the world. Our ancient sages and poets have imagined a bird called Chatak. This bird drinks only rain water and it eagerly waits for rain to fall. It may be drinking the rainwater as it is pure. If really such bird exists, then it will have to drink, the water polluted due to impure air. If the rainwater gets polluted or if there is acid rain, it can affect trees, forests, wild animals and even the aquatic animals. Their existence can be endangered.

In our childhood, we used to drink the water of river Krishna directly. Even if the river became dry in the summer, we would drink the water, after digging in the river bed. In the rainy season, the water would become muddy. We used to swirl alum, strain the water, to make it potable. Is it possible to drink river water today? River water is no more potable, unless it is purified. I started working in Katraj Dairy from 1985. Since then till 1990 we used to directly drink the water of Katraj Lake. Today we won't even dare to bath in that water. The quality of the water of the rivers and tanks has degraded. Why did this happen?

What measures can we take?

First of all, we should ask a question. "How much water does a man need to drink?" A person may be drinking four, five or ten litres of water daily. Let us think of the water supply of the city. In cities, generally 135 litres of water are supplied to a person on an average. In a city like Pune it is 205 litres per person.

Here I would like to give an example as to how we can save water beyond imagination. In Pune city there are

more than 15 lakhs people who are using toilet blocks with flush tanks. (This figure excludes toilets not using flush tanks, or dual flush tanks or flush tanks with bore connections etc.). The normal flush tank is of the 10 ltrs. storage capacity. Every person uses the flush tanks for at least 5 times for urinals and flushes 50 ltrs of water which is supplied by the Pune Municipal Corporation which is treated water. If the dual flush tank is used for urinals one will require 15 ltrs, water as against 50 ltrs. This means there will be 35 ltrs, water savings. If we multiply 35 x 15,00,000 = 5,25,00,000 litters per day. If we decide to change the present flush tanks with dual flush tanks an investment of less than Rs.1000/- is required. I therefore, feel that the Pune Municipal Corporation should come out with a proposal for one-time part subsidy for this change over it can save a huge water treatment cost as well as payment to the Government on this count. It may make it compulsory for the new toilet blocks to fit dual flush tank only, on the line's compulsion for rain water harvesting. Every Punite should remember that if we do not save water by radical measures a day will come in the near future that we will face the same plight as that of residents of Latur / Amarawati.

Further extension of this proposal will be to compel those societies which have either dug well or bore well to connect this water source to each flat in their bathroom as well as toilet and the toilet flush tanks be connected to this water source so that we can save lot of treated PMC water. Implementation of this suggestion requires political will and one should have a larger view above the party politics.

Even in the restaurants at the wash basins if we put sensors to the water tap one can save water. Only when hands are put beneath it, water will come down and the

moment the hands are taken out, the water will stop. I have seen such arrangements in the Indian hotels in Mumbai and elsewhere.

We should conduct awareness campaign in the urban places where water shortage is prevailing.

This water is made potable. From the water sources, through canals or closed pipelines, it is sent to the water treatment plant. After the purification process, it is supplied to the buildings. From the lower tanks, it is lifted to the overhead tanks and then it is supplied to houses. At some places this supply is for limited period and at some places, it is twenty-four hours. The point is that if ten litres of water per person are needed, then the rest one hundred twenty litres is used for other purposes like latrines, bathing, washing clothes and utensils, cleaning the floor, watering the plants etc. That means the water made clean and potable is made unclean by us. If such water is let in the river, then the river gets polluted. To avoid this, the sewage water should be processed and let in the river. But as many cities don't have the facility of processing the sewage water, it is let in the river as it is. As a result, the villages next to such places get impure and polluted water and the purification process has to be done again.

This means, 90% of the expenditure of the water purification done for the first time is wasted. Again, extra money has to be spent on the waste water treatment. Money is spent again and again for its purification. Due to the lack of proper planning, crores of rupees, spent for purifying the water are wasted. Can water supply be divided separately as drinking water and water for other purposes? Ten litres of water per person are needed for drinking and then only ten litres pure water should be

supplied from the purification plant. The rest 125 litres of water should be sent to houses just by filtering. Due to this, the expenditure on purifying water may get controlled. Money may be saved. Qualitative use of water may be increased. If there are no separate pipelines for pure water and water for other purposes, pure water can be - supplied through tankers or can be made available in five litre cans. On the level of local administration, water is purified at the plant but filter and other instruments are used in houses again for pure water. And money is spent again and again on the same thing. If such expenses are avoided the money saved can be used for the planning of two different pipelines. Using pure potable water for other purposes than drinking is the misuse of pure water. At present, we are following the wasteful cycle of purifying the water - 90% water getting polluted, again purifying the impure water. If we plan qualitative use of water and accordingly follow the principle of water supply, then the problem of misuse of water may be reduced to some extent.

In my childhood, there were old styled latrines. The waste from it was carried and then disposed off in the fields. Nobody will advocate the system of carrying waste on the head. This system is very improper. I don't say, it should be started again. Nobody may say that. The human waste put in the fields turned into a good fertilizer; which was even better than the cow-dung fertilizer, producing good quality agricultural product. Today we flush the waste in the toilet, which flows through the drainage polluting the water. This makes the water impure. This polluted water is let into the river and it pollutes the river. Farms also don't get fertilizer. If we follow the old method of disposing human waste with the help of machines, to the farms, then the farms will get manure. Research should be

done on it. This will avoid water pollution and agriculture also would be benefited.

People in the cities are very careless about the use of water. Nearly 40% of water supplied to the city of Pune is wasted through leakage. A new pipeline is put in a place, but the old one is kept as it is. Water keeps on flowing through public taps, given in the settlements of the poor. Nobody cares for the public taps. Many times, the taps are stolen and water simply flows away. In this way, water is wasted. Instead of public taps, if the connection is given in such houses, then it may save the wastage of water. In the house, the taps in the toilet, bathroom and kitchen are to be closed properly. The leaking taps are to be changed. While washing mouth, brushing teeth, shaving, the taps are kept open. Tanks in the houses leak. Showers are used for bathing. In some areas, water supply is for twenty-four hours. Yet utensils are kept filled with water. This water is not used. It is thrown as stale water. In the same way, water is wasted in the areas where water supply is made every morning and evening. Is it proper to make such careless use of water, when water scarcity is increasing? Everyone should think of it and should use water sparingly.

Stealing of water is one more important point. Illegal connections are given. The corporation and the officers from the corporation are responsible for this. These connections are not registered in the office. The pipelines of more capacity are installed illegally for e.g. one-inch connection is installed, in place of the permitted half inch. Naturally more water is taken.

This is theft of water. In big housing complexes or townships, swimming pools are built. Water is used for

washing vehicles, for watering lawns, gardens etc. It is an offence to misuse the water, made pure from the purification plant. Water for constructions is acquired illegally. Many factories in the city area make illegal use of water.

Nobody thinks of how the water is acquired for constructions, how many water connections are illegal. Water is stolen in the rural areas also. Canals are dug to carry water from the dams. This water is misused. Hence it is necessary to control the use of water. In cities, water supply is not equal. Some areas get twenty-four hours water, whereas some area only twenty-four minutes. This inequality in water distribution may cause social unrest. For this, the water meters should be used. A meter should be installed for every connection. The water used should be measured and the bill should be given accordingly. If the bills are given with the help of meters, careless use of water may get controlled. Users will know water is not a free of cost commodity. There should be rationing of the dam-water. In Israel, every drop of water is used carefully as there is severe shortage of water due to scanty rainfall. Hence, despite the adverse conditions, Israel has made much progress in the international trade of agricultural goods. The water of river Jordan flows in closed pipelines. Planning of farming is done on micro level. Planning is done as to which crop to grow. Such planning should be done in India. The areas with less water should be encouraged to grow crops requiring less water rather than growing sugarcane. Drip irrigation should be used.

In the olden days, there was a tradition of not saying no to someone who asks for water. People would feel that everyone should get water. Today there are disputes for water. Today villages argue for Water. There are

discussions on the stealing of water. People are not ready to get their daughters married in a village, which has no water. As rural areas lack water, people are flocking towards towns. These are the consequences of inequality in the distribution of water. Many projects regarding the joining of four five major rivers may get completed in time, with the black money formed after the sixty-five years of independence. This may avoid people leaving their cattle for the lack of water and migrate. We should think about it seriously. Today we hear the news of leopards and tigers entering the villages. These wild animals come in the human areas, mainly because the forests are destroyed and they don't get water. Animals also have the right to get water like the humans. Keeping this in mind, we should reserve water for them.

Storing water and making it available throughout the year and building dams are useful ways. People tend to build big dams. But I feel that instead of big dams, if small bunds are built in the valleys, innumerable litres of water can be stored. If small lakes are made, then the wild life can be safe. Water from the reservoirs will seepage in the ground and the wells in the areas will have water. Water coming from the mountain tops in the rainy season will be stored in these lakes. Thinking of bio-diversity, if we plant saplings of different trees on the mountains, the barren mountains will turn into green jungles. If the responsibility of preserving and growing the jungles is given to the local society and they would be allowed to take the forest produce, then employment will be created at the local level and more water will be available.

Today we see that many stone quarries are made by blasting the mountains. Rainwater may be collected in the closed mines. It can be used like small dams. This water

can be used to make up for the loss of environment. Pisciculture can also be grown in this water.

Today windmills are built on the mountain tops which probably have an adverse effect on the rain. The change in the speed of wind and direction due to windmills doesn't have much effect on the clouds. Effect on the rainfall should be found out and the policy should be decided accordingly.

The ground water level is getting depleted. It has two reasons first due to less rainfall and less percolating of water in the ground and secondly, excessive use of groundwater by the bore wells.

If the rainwater is channelized to the bore wells, it will seep into the ground and ground water level can increase. We have one such bore well in our Raghavnagar society. We have let the water falling on the terrace into the bore well by channelizing. We have been doing this task from last four to five years. There is no electric pump installed on the bore well, that means we don't take water from it. This is an effort to increase the ground water level. Such efforts can be useful. Why are big dams opposed? No doubt, more water will be stored; percolate into the ground, more areas will get water. Even today earth's crust is very hot. Due to this heat, ground water gets converted into vapour. Vapour needs more space than water. Hence perhaps it can become epicentre of the earthquake. If earthquake occurs in such place, there will be a great loss. Big dams displace the people. They lose their houses and lands. The problems of such people are not solved even today. Instead of displacing a large number of populations, small dams are useful anytime. In these small projects, people losing their lands can be rehabilitated in the same

area. If they are allowed to do fishing and any such measures, the questions of the livelihood of the displaced can be solved.

Water should be regarded as national wealth. But today people have selfish attitude towards water. Due to this river are getting polluted with human waste, dirt etc. Thus, cities pollute the rivers. This water doesn't remain fit for drinking to the next cities and villages. As the rivers are polluted, people have started going towards their origin. People on the plateau are getting ready to migrate to hilly regions. They are ready to invest there, thinking that they will get clean water and environment. Lavasa and Sahara cities project are the examples of this. No doubt, many such projects may come up in future. We should keep the water clean and use it sparingly. To keep rivers clean and safe is the responsibility as per law. Those breaking the rules should be strictly punished. Dead bodies are being floated in the Ganga so that the soul of the dead may get salvation. Such blind faiths should be banned by law.

Not only we, but the whole nature depends on water. Earth has 3/4th of water and 1/4th of land. But the water available for humans and other living things is only one to two per cent. Hence water is a precious and essential commodity. To preserve it and to take care of it is our duty.

Conclusion

The need of the hour is to conserve our natural sources of water for greater sustainability. If we fail in this regard the disaster is certain. Therefore, everyone should resolve that he/she will religiously try his/her best to save water for our future generation.

Surface water resources potential of river basins of India (Central Water Commission 2010)

Sl. No.	River Basin	Catchment area (sq.km)	Avg. Water Resources Potential (BCM)	Utilizable surface water resources (BCM)
1	Indus (up to border)	321289	73.31	46
2	a) Ganga	861452	525.02	250
	b) Brahmaputra	194413	537.24	24
	c) Barak & Others	41723	48.36	
3	Godavari	312812	110.54	76.3
4	Krishna	268948	78.12	58
5	Cauvery	81155	21.36	19
6	Subarnarekha	29196	12.37	6.8
7	Brahamani & Baitarni	51822	28.48	18.3
8	Mahanadi	141589	66.88	50
9	Pennar	55213	6.32	6.9
10	Mahi	34842	11.02	3.1
11	Sabarmati	21674	3.81	1.9
12	Narmada	98796	45.64	34.5
13	Tapi	65145	14.88	14.5
14	West flowing rivers From Tapi to Tadri	55940	87.41	11.9
15	West flowing rivers from Tardi to Kanyakumari	56177	113.53	24.3

Sl. No.	River Basin	Catchment area (sq.km)	Avg. Water Resources Potential (BCM)	Utilizable surface water resources (BCM)
16	East flowing rivers between Mahanadi & Pennar	86643	22.52	13.1
17	East flowing rivers between Pennar and Kanyakumari	100139	16.46	16.5
18	West flowing rivers of Kutch and Saurastra including Luni/td>	321851	15.1	15
19	Area of inland drainage of Rajasthan	36202	0	NA
20	Minor river basins draining in to Myanmar & Bangladesh		31	NA
	Total		1869.35	690.1

Source: https://www.adriindia.org/adri/india_water_facts

Quotes

"Pure water is the world's first medicine"

"Water is the driving force of all Nature"

"Water is life, don't waste it"

"The smell of rain, can reduce stress and improve your mood by up to 60 per cent"

"Save water, and it will save you."

“Water does not resist. Water flows. When you plunge your hand into it, all you feel is a caress. Water is not a solid wall; it will not stop you. But water always goes where it wants to go, and nothing in the end can stand against it. Water is patient. Dripping water wears away a stone. Remember that, my child. Remember you are half water. If you can't go through an obstacle, go around it. Water does.”

— Margaret Atwood, The Penelopiad

“Human nature is like water. It takes the shape of its container.”

— Wallace Stevens

“High and fine literature is wine, and mine is only water; but everybody likes water.”

— Mark Twain

“No matter, how rich you are, you can’t live without water.”

“You never know the worth of water until the taps run dry.”

“Don’t forget to save water, otherwise, water will forget you one day.”