Conservation of Fresh Water Resources: Natural And Other Concepts

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ABSTRACT

Water is life. Evolution of life is possible only because of water. Flora and Fauna all depends on it. It is impossible to live without water. We need water on every moment of action. The consumption of water increasing day by day but availability became shorter. Nowadays scarcity of clean and safe water is a major problem worldwide. The amount of water is always maintain by the process of water cycle on earth. Rain is the only source by which the water shortage can be completed. So it is very important to handle the rain water in a proper way. Through various techniques we can conserve and reuse water. As we know water is renewable resource, so by proper handle and care we get rid from this scarcity.

KEYWORDS

Rain water harvesting, Conserve, Reuse

INTRODUCTION

Our earth is said as blue planet because from the space it appears blue due to amount of water that the earth have. For the existence of life on earth water is a vital component. 70% of our body made up of water. Protoplasm contains most of water. It is the most important natural resources. Water is a precious gift of nature and a survival element for living thing. All will be perish without water. On earth more animals lived in water in comparison to land animals. Nowadays water scarcity become a major problem. Day by day situation going worst and measurable. Due to our carelessness it depleted and polluted. So it become essential to conserve them. Nature maintain its water naturally. This amount of water is always sustain by the process of water cycle. Our activities affect the natural supply (rain) of water.

WATER CYCLE

The cycle of evaporation, condensation and precipitation is known as water cycle which continuously goes on and maintain water. Water exist on earth in three forms – solid, liquid and gaseous and this cycle consist all the forms. There are many water sources such as ocean, snow, sea, lake, river, pond or the other small resources from which the water gets evaporate.

In average per day 865sq km water vaporized in atmosphere from which 775sq km water back through rain. From lithosphere 160sq km water vaporized in atmosphere. In round figure 760sq km water comes on lithosphere through rain from which 100sq km drain into ocean.

WATER CONSERVATION

Water conservation refers to the conservation of water by preventing, controlling or managing the water system. As prevention of water pollution, controlling the water wastage and managing the water by reusing it.

AVAIBILITY OF WATER

Two- third area of earth covered with water. There is no possibility of any reduction in the abundance available in the world. The area of water is 1460 million sq km. But the water available here is not suitable for fully utilization. The very small fraction of this water is useful for us.

The water basically divided into two parts – Saline water and fresh water. Water containing a large amount of dissolved salts is called saline water. Fresh water is needed to run the life. Among 71% of water covered earth's surface, oceans hold about 96.5% which is saline water and rest is only 3.5% which is useful for our daily needs. Fresh water exist in rivers, lakes, ponds, aquifers and glaciers. Rain and ground water meet the needs.

FRESH WATER SOURCES

Fresh water is primarily found from the following sources :-

1. Rain
2. Ground water – a) Reservoir
   b) River and his streams
   c) Ponds, lake and springs

3. Underground water – a) Well, tube well and hand pump
   b) Water falls
   c) A typical coupe (not found in India)

UNEVEN DISTRIBUTION

Water resources are unevenly distributed over the earth. Other thing is the water is not available in same amount everywhere. In some countries the amount of water is very low. The rain is also not the same everywhere. India holds 2nd place in the world's highest rainfall countries where rain falls 1150 mm yearly. But we use only ¼ of this rain water, else goes in sea and ocean. Apart from this, many parts of country where water crisis is frightful.

NEED OF WATER CONSERVATION

There is very little fresh water on earth. Only 0.77% is fresh water that founds in lake, rivers, wetlands, ground water,bista, soil and atmosphere which can be used for daily activities. The remaining portion of fresh water is frozen in polar ice- caps and glaciers.

Water demand increasing day by day. Due to growth of population we need more fresh water. The uses of water become 45 times bigger then we used three centuries ago. Normally a person required 100 litres of water per day. In India estimation of essential waterfor a person used has been accepted 40 litres by 'The National Water Policy'. If we go through the chart of water consumption of a family in urban areas than the matter is drastic.

Water Consumption (family of 4-5 members) :-

For brush – 2 L (per person)
In flush – 15 L
Washing hand on running tap – 5 L
Washing cloth – 20 L
Utensils clean – 10 L
House cleaning – 15 L
Cooking – 10 L
For drinking – 3 L (per person)
Shower or tub- bath – 200- 300 L
Seep Tap – 10 L
Extra – 10 L
Normal utilization = 100 L
Tub culture = 300 L
But accepted parameter by government = 40 L

The consumption of water is high rather than it found. It increasing day by day but availability is not in that line.

As the luxuries our life is as the wastage of water happening. Water is wasted highly in industries, agriculture and urban areas. These all led towards the shortage of water. In near future we are going to face a big water scarcity.

WATER SCARCITY

Shortage of used water is refers to water scarcity. Water scarcity become a major problem. There is scarcity of clean and safe drinking water worldwide. It is such a huge that all countries are unite on this issues. It raises on the International platform. For this UNO declared 2003 as the 'International year of fresh water'.

REASON

There are lots of reason behind increasing of water scarcity. Some are as follow :-

1. Growing population
2. Uneven water distribution
3. Mass construction of Dams and Anicuts
4. Excess uses of water
5. Wastage of water
6. Water pollution
7. Inability in checking rain water

Water scarcity is already a major problem in many densely populated areas of the world and many more are likely to face this problem in the near future. It is estimated that by 2025 about 4 billion people will have an insufficient supply of water. Northern and Southern Africa, Western and Central Asia, North-Eastern China, Western USA, parts of Mexico, South America and most of Australia already have water shortage. Comparatively India has sufficient water resources, however it is unevenly distributed.

There are two major causes which are directly responsible for water scarcity :-

1. Water pollution
2. Depletion of water

WATER POLLUTION

Water pollution is very harmful for man as well as other living bodies. Basically water pollution caused by

a) Domestic wastes
b) Untreated sewage
c) Industrial wastes – including harmful chemicals and compounds

The major case of water pollution are the city sewage and waste of industries discharged into river directly without doing any treatment. In India only 10% waste water would be treated which is very compassionate state.

To meet the need of population fertilizers and pesticides were used to grow crops which polluted the underground water and by draining it enters into rivers or lakes. Plastics, bottles, Canes and electronic items are major wastes thrown into water bodies. Soaps and detergent are another major pollutant container. Mostly cleaning products are made by petrochemical industries which are harmful.

Steps should be taken :-

1. Treatment plant - Before dumping the waste material of industries and sewage system into river directly, first do treatment of all

and after that allow them to enter into river or any other water bodies. We have to installed sewage treatment plant.

2. Avoid – Keep non- biodegradable elements state away from the water bodies or direct contact of soil.
3. Grow – Some plants like water Hyacinth filter out toxic substances like lead compounds from industrial wastes. We should grow these.
4. Reuse – As far as possible reuse all sort of things.

DEPLETION OF WATER

Both surface and ground water are getting depleted because of immeasurable uses of water. The nature can't able to replace it as fast as it uses. Our activities affect the natural supply (rain) of water. For example, while we count down trees the process of transpiration get reduced. Due to this, in atmosphere water vapour get lesser released which reduced the cloud formation which is responsible for less rainfall.

Steps should be taken :-

1. Plantation – Tree plantation is a major way to surplus underground water. Vegetation helps to increase groundwater level as plants root holds the water, reduce surface run- off and allow water to reach into the ground level.
2. Afforestation – Afforestation is a major and important source to maintain water- cycle on earth. In ancient time forest to be believed as a mother of rivers, so they worshiped as a God.
3. Various ways – The depletion of water can be solved in various ways :-

a) Stop wasting water.
b) Reusing waste water.
c) Water storage.
d) Water direction – Take the water through various passes in that place where water scarcity is been.
e) Rain water harvesting system.
f) Stop using groundwater like tube well, submersible pump etc. Only use hand pump or well.
g) For domestic uses government has to process water supply in every houses and restrict own personal water pumps.
h) Some organic and inorganic material compost or debris reduce evaporation and maintain moisture into soil.
i) Agriculture field must not be left bare. It always be covered by crops because it minimise evaporation and slow down water run- off. At the edge of field trees and bushes must be planted.
j) In hilly and lowland areas contour farming is beneficial.
k) We must have to encourage to grow salt resistant varieties of crops because it can easily grow in saline areas.
l) We should take the help from technologies such as distillation, electro- dialysis and reverse osmosis.

PEOPLE'S ATTITUDE AND HABBITS

We have to change the habits of people and their attitude towards water. First of all they have to think that water is sacred and have to conserve every drop of it. Nature has everything for our need but not for greed. So use water as per need. Never use it for joy. People's little steps can make a huge difference, like

1. Make all pipeline leakage free.
2. Use Indian toilet because it consume less water comparison to cum board toilet.
3. Use bucketfull water instead of hosepipe.
4. After washing vegetables or any items in kitchen used it to watering plants.
5. If you have kitchen garden than make pipeline from the kitchen.
6. New advanced technology purifier also wastes lots of water, replace it with any other which doesn't waste water.
7. Avoid tub bath culture.
8. Try to set up rain water harvesting.

RAIN WATER HARVESTING

Rain water harvesting is a technique where we can collect the rain water and stored and kept it for our uses. As we know rain is the only source by which the water shortage can be completed on the earth. So it is very important to handle the rain water in a proper way. Rain water harvesting is the only way to reach the demand of water. It is very reliable, cost affecting and popular. This technique is also found in ancient times.

The oldest water harvesting system found in 'Naneghat' situated in the Western Ghats which is 130 km away from Pune. There a large number of tanks were cut in the rocks for storing rain water.

A well planned city of Dholavira of Gujarat is a finest example of rain water harvesting.

In Indus Valley civilization at Mohanjodaro and Harrapa we found underground system to restore the rain water. The rain water is collected in a large chamber through holes made all over the city. They used it throughout year.

In many ancient forts they have its own water supply system through rain harvesting. In

Burhanpur (Madhya Pradesh) underground baked earthen pipes and tunnels were built. It maintain the flow of water and carried from one place to another. This is an unique water supply system which is working till now. This type of system also found in Maharastra (Aurangabad) and Golkund and Bijapur forts of Karnataka.

SOME OTHER TRADITIONAL TECHNIQUES

- In hilly areas people built a channels which passes the rain water downwards. These channels are known as 'Guls' or 'Kuls' in Western Himalayas. Later it is used for agriculture and their daily needs.
- In eastern region people made channel through bamboo. They cut the bamboo into two parts and use it like a pipe. From the top of the mountain to the ground they make pipeline of these bamboo and meet their demand of water.
- In Bengal region were floods are too frequent people developed inundation channels to irrigate their fields.
- In Rajasthan the 'Bawadi' a very deep well made to stored water. The shapes of these Bawadis are in 'V' which stored more water and allow lessevaporation.
- The covered well also used in Rajasthan. The roof top Rain Water Harvesting projects are well known for Rajasthan. In the small cities of Rajasthan like Bikaner, Barmer and Phalodi 'Tankas' are used for water conservation. Small Tanks built underground with fine holes and with polished lime, where the rainwater get collected and stays cools.
- For agriculture people converted their fields to store rain water. This is known as 'Khadims' in Jaisalmer and 'Johads' in other parts of Rajasthan, 'Jal talais' in Uttar Pradesh, 'Ahar' in Bihar.

Like ancient time, we also have to regulate our own water system by storing rain water than the problem of water scarcity gone off.

DAMS

According to Jawaharlal Nehru Dams are the 'Temple of modern India' because it is beneficial for the agriculture and we can get the water all over the year for utilities. It also control floods.

We can regularise water and stop the wastage into sea and ocean. Through the channels made on dams water will be reached in the interior where it needed most.

STORAGE OF FLOOD WATER

If we stop flood water to flows into river and stored than we can able to use it for our needs and secondly it can seep into the ground and underground water system would be recharged.

ROOFTOP RAIN WATER HARVESTING

In Rooftop Rain Water Harvesting the rain water is stored in a underground tank through the pipe connected from the roof of houses and buildings. It is practised mainly in Rajasthan but now it spread everywhere.

Some steps has been taken by government initially. In Delhi, Rajasthan, Gujarat and Karnataka has already taken it and rest of states are willing to do so. Offices and buildings have been started Roof top rain water harvesting.

In Indore 6% of property tax taken by the government in interest of developing Rainwater harvesting.

Government should make mandatory for all new making structures, like houses, buildings or offices have Rooftop rain water harvesting system. Old structure should also do provisions for storing rain water. It is the best water resource for domestic use.

RECYCLED WATER SYSTEM

In many countries recycled water system has been installed. As the ground level has been decreasing it is the best option to reuse and conserve water.

Venice a city in Italy built over more than 100 small islands in Adriatic sea and have about 150 canals as it do not have roads to walk on. Venice has a very unique sewer system of two types. One is the old system and other is the modern one. But even today many of them rely on the historical sever system. In the old sewer system the waste water travels from the house and floats down making its way to the underground canal. It reaches the underground sewer system and released into masonry tunnels. Masonry tunnels are built with bricks or natural stones and their main purpose is to waterproof the water bearing areas in building elements. From these tunnels it flows into the canal and twice a day this waste water is washed out into the ocean, with the tides in return with fresh water. In modern system septic tanksare used to treat sewage water before draining it into the canal.

United states of America have also taken many steps for water recycling such as America Water Works Association (AWWA), Safe Drinking Water Act (SDWA) and many more launched in 20th century.

The treatment plant treats the sewage water in septic tanks where some waste are disposed

underground and then cleaned and supplied to the homes again or are discharged to the nearest water bodies.

List of some largest waste water treatment plant throughout the world are :-

1. Gabal el Asfar WWTP – Egypt
2. Beckton STP – UK (1864)
3. Western TP – Australia (1897)
4. Hyperion STP – USA (1925)
5. Stickney Water Reclamation Plant – USA (1930)
6. Blue Plains Advanced WWTP – USA (1930)
7. Scine Aval WWTP – France (1940)
8. Detroit WWTP – USA (1940)
9. Kuryanovo WWTP – Russia (1950)
10. Morigasaki Water Reclamation Centre – Japan (1966)
11. Deer Island WWTP – (1968)
12. Jean-R-Marcotte WWTP – Canada (1984)
13. Bailonggang WWTP – China (1999)
14. Stonecutters Island ST – China (2001)
15. Shanghai Zhuyan WWTP – China (2004)
16. Atotonilco de Tula Plant – Mexico (2015)

COVERTING SALT (OCEAN) WATER

As we know 97% of the total available water is salt water. With the help of technology we can convert it into fresh water. Some countries like Saudi Arabia desalinate ocean and sea water through treatment plant.

Israel from 50 to 60 years has been converting salt water into drinking water. 50% of water is desalinated water they used. It has world's largest desalination plant.

Scientist has discovered new way of desalination i.e. using solar power.

CONCLUSION

For water conservation we have to work in three direction–

A. Home utilities
B. Agriculture
C. Projects

Home utilities :-

1. We need only two cups of water to cook one cup of rice but for washing utensil of it we need 3-4 litres. That's the fact we consume more water than we need to run our life.
2. From the water uses at home more than 70% we use in bathroom. It is estimated that average we use 4 gallons per flush.

   In Leh (Jammu & Kashmir) there is a toilet but no need of water. A small chamber is made under the toilet room. They put mixture of animal dung and soil instead of using water. After a year it is used as compost.
3. A modern tap system culture is very much responsible for wastage of water. The old system of pitching is good for water conservation. From well, pond and hand-pump we take water only for our need but through tape system we waste water according to our greed.
4. We have to reduce lawn culture and encourage growing big plants because they can hold water into ground.
5. We can use appliances which save water.
6. We can avoid water wastage by repairing dripping home taps because it would waste lots of water.
7. We must avoid too much cemented area because it stops rain waterto seep inside the ground and all drained into sewer.

Agriculture :-

1. We have to use advanced technology for agriculture so that less water has been used to grow crops.
2. Drip irrigation – It is a system in which the water reaches directly to the root of the plant through tiny holes in pipes. We can use drip irrigation in the place of sprinkler system as it waste lots of water. Drip irrigation save 50-60% water in comparison to sprinkler system.
3. Commonly underground water is the only source of water in arid regions. It is necessary to recharge ground water and increase level. We can divert canals and introduce some other projects in this region.
4. Used covered wells to reduce evaporation.
5. Stop using tube-well for irrigation because it decreases underground level highly.
6. Use reservoirs and canals for agriculture.

Projects :-

1. We can reuse drained water.
2. Rain barrels – We can store rain water in it.
3. Dams – Dams and many more projects are created to save water or to make it pollution free. The current step is of making Ganga river clean, but many more steps has yet to be taken.

   At the starting point Dams and Anicents shows lots of productivity and fulfilling their work after so many disaster and local scarcity of water we forced to think. In

Bangladesh because of dams and diversions of the Ganga river it is estimated that local groundwater levels has been dropped nearly 3m.

We may store water and built small dams at local level.

4. Inter-linking water system – Once Atal Bihari Bajpaye said "Channelize all the river of India". If we able to connect all rivers present in India than the problem of water scarcity may go off. Government must have to do something in this prospect. Inter-linking water system surplus the demand.
5. Proper management of rain water –One of the highest rainfall received place Cherrapunji, Meghalaya suffering from water scarcity. In other hand area sides of river Ruparel in Rajasthan never have scarcity. It all because of proper management and water conservation which is absent in Cherrapunji. This area received below half of the rainfall comparison to Cherrapunji. But due to proper provision water continuously feed the people. This situation is not the same before four decades. By 1980's there was a drought like situation. With the help of NGO's they built round ponds named Johads and dams, conserve water and soon they able to revive the water in river.
6. Stop water pollution – Water pollution is hazard towards living organism. We all effected from it. We must stop it or control through various aspects and techniques.
7. We have to adopt some strategies to raise groundwater level. It can be fulfil by adding more water from outside which can be possible only by rain. So we have to conserve every drop of rain water.

Water is an important substance of life. The evidence of first life founded in water. When we look back we see that civilization started near bank of rivers. So not only it is essential for our daily life but it has a cultural value also. The option of water cannot be found ever after reaching the extreme limits of science. It is a reassign resource which can be avoided if proper protection is done.

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