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WATER MANAGEMENT

DR. ASHA RATHI*
Asstt. Professor, Dept. of Bus. Admn., Faculty of Commerce & Mgmt. St., Jai Narain Vyas University, Jodhpur
**Corresponding Author, email: asharathi30@gmail.com*

Abstract - Water is basic need of all biotic even though human, animals and plants. It is fact that water can't be produce therefore it is necessary to optimum utilization of water. It is possible to proper management of available water. Water management is the management of water resources under set policies and regulations. When we read history, we see that every civilization had seat on the banks of river like - Indus valley civilization, Mesopotamian civilization, Egyptian civilization, and Chinese civilization so far it is more necessary to save water for saving life. On the earth surface 71% is covered by water and only 29% by land. Out of total water 97% is found in the ocean and it is salty, 2% was found in glaciers & ice sheet, only 1% of available water is found as fresh water on the surface & as underground stream. Therefore fresh water is a critical resource. Since independence, India has made significant progress in developing its water resources and supporting infrastructure. Post-independence years have witnessed large-scale investments in water storage structures which have contributed considerably in making India a self-sustaining economy. Some of the main issues faced by the water sector in India are - erratic distribution of rainfall, often leading to floods and droughts in various areas, water use inefficiency, unregulated groundwater extraction, water pollution and decreasing water quality due to poor waste management laws, inter-state river disputes, growing financial crunch for development of resources and scarce safe drinking water. We can manage the water by building dams, canal, lake, pond, rain water harvesting, underground water filtering, proper drainage system, etc. Here are links to articles that address water management subjects such as the optimization of water usage.

Keywords - Water, Water Management, Optimum utilization, Water availability, Resources, civilization, Critical issues & solution.

INTRODUCTION

Water is precious natural resource for sustaining life and environment. It is in a continuous process of movement between land, ocean and atmosphere as a cycle. Water is an infinite and useful resource; water today defines human's socio-economic development. Water resource management is an important parameter for the development of any nation as it directly relates to the development and growth of the economy. Unfortunately scarcity of water is a serious problem in India for both urban and rural communities.

When we read history, we see that every civilization had seat on the banks of river like - Indus valley civilization, Mesopotamian civilization, Egyptian civilization, Chinese civilization etc. The main reason of civilization set up near the river because there main occupation is Agriculture & herder and for both activities they need a huge requirement of water. 75% of Indian population is also depending on agriculture & herder at present time therefore it is most important to management of water.

Since independence, India has made significant progress in developing its water resources and supporting infrastructure. Post-independence years have witnessed large-scale investments in water storage structures which have contributed considerably in making India a self-sustaining economy. Today, India has the capacity to store about 200 BCM (Billion Cubic Meter) of water, an irrigated area of about 90 Mha (Million Hector), and an installed hydropower capacity of about 30,000 MW(Mega Watt). However, due to rapid development, increasing population and iniquitous distribution of water, the demand for this natural resource far outweighs its supply. In addition and for a while now, the water sector in India has faced significant and problematic issues related to water management. In spite of a sizeable water resource base and vast land resource, India continues to struggle to meet its water sector infrastructure requirements, including operation and maintenance costs. India has about 16 % of the world's population as compared to only 4 % of its water resources.

WATER AVAILABILITY

India is the second most populated country in the world with over 1.2 billion people (Census of India, 2011). Water in India is intricately intertwined with the cultural fabric of the country, and has both economic and social connotations. Several attempts have been made to estimate the country's available water resources and the total estimated water budget varies considerably. Official estimates of the Ministry of Water Resources (MoWR) have put total utilizable water at 1,123billion cubic meters (BCM) as against the current use of 634 BCM, reflecting a surplus scenario but Narsimhan committee calculated the water budget using an evapotranspiration rate of 65 per cent as against the 40 per cent used in official estimates. The utilizable water for human use thus comes out to be 654 BCM, which is very close to the current actual water use estimate of 634 BCM reflecting an alarming situation. . The per capita average annual water availability in the country is reducing progressively due to increase in population. The average annual per capita availability of water in the country taking into consideration. In 1951 per capita available water is 5177 Cubic meter which is reduces up to 1820 cubic meter in 2001 and the projections for the year 2025 and 2050 will be as under:-

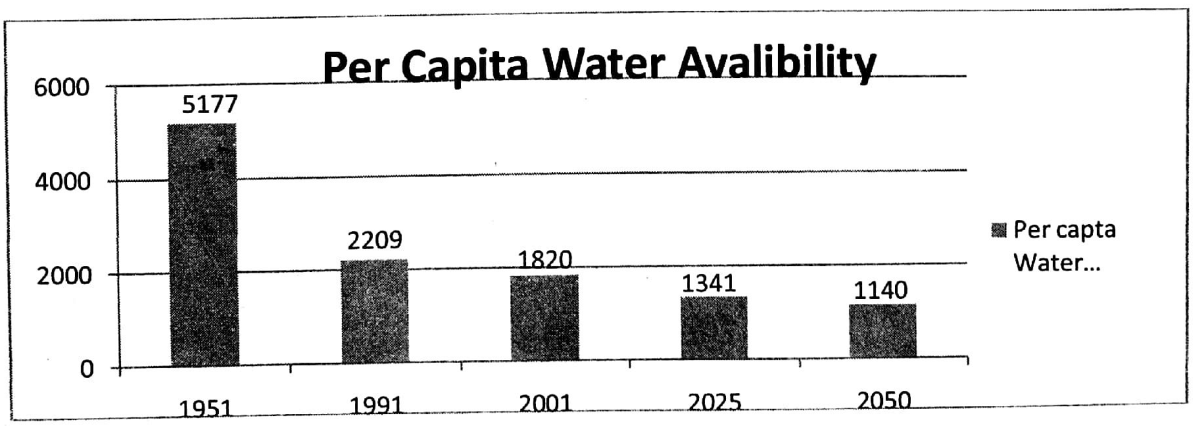

Figure 1. Per Capita Water Avalibility
Sources: Water Resources Development & Management in India, U.N. Panjiar

FRESH WATER RECOURSES

According to the National Environment Policy (NEP) 2006: "India's freshwater resources comprise the single most important class of natural endowments enabling its economy and its human settlement patterns. The freshwater resources comprise the river systems, groundwater, and wetlands. Each of these has a unique role and characteristic linkages to other environmental entities. " We begin with an overview of rainwater, and then move onto surface and groundwater resources.

Rainwater: The long -term average rainfall for the country is 1,160 mm, which is the highest in the world for a country of comparable size. Owing to physiographic factors, rainfall in India is highly variable. For example, in 2008, rainfall measured from about 500 mm in east and west Rajasthan to 3,798 mm in coastal Karnataka. India ranks first among rain-fed agricultural countries in terms of both extent (86 Mha) and value of produce. More than 80 per cent of the annual run-off of the rivers occurs in the monsoon months of June to September, often causing floods. However, acute water shortage is faced in many parts of India during the rest of the year. Even in areas such as Cherrapunjee in Meghalaya, where there is surplus rainfall, the soil may not be able to retain the water for long thereby causing water scarcity.

In India, rain-fed agro-ecologies contribute 56.7 per cent of the net shown area, 40 per cent of the food grain production, and 66 per cent of the livestock. About 85 per cent of coarse cereals, 83per cent pulses, 42 per cent rice, 70 per cent oilseeds and 65 per cent cotton are cultivated as rain-fed (CRIDA, 2011:31).

Table 1. Volume of Rainfall in the country

Volume of Rainfall in the country									
Rainfall	2001	2002	2003	2004	2005	2006	2007	2008	2009
Total (mm)	1110	930	1234	1086	1215	1161	1181	1117	954
Total Volume (BCM)	3648	3200	4057	3570	3996	3819	3882	3674	3136

Sources: Water Planning & Project wing, Central Water Commission.

Rivers: India is blessed with many rivers with varying catchment area and water resources potential. The catchment areas of these rivers are divided into 20 river basins. The major river basins are listed in Below Table:

Table 2. Major River Basins

S n.	River Basin	Catch ment Area (Sq. Km.)	Average Water Resources Potential	Utilizable Surface Water Resources
1	Ganga	861452	525.02	250.0
2.	Brahamputra	194413	537.24	24.0
3.	Barak	41723	48.36	--
4.	Indus	321289	73.31	46.0
5.	Godawari	312812	110.54	76.3
6.	Krishna	258948	78.12	58.0
7.	Mahanadi	141589	66.88	50.0
8.	Narmda	98796	45.64	34.5

Sources: Water Planning & Project wing, Central Water Commission

Underground Water: Total Underground Water potential of the country has been estimated as 433 BCM per year. Uttar Pradesh ranks first among the states in terms of ground water resources. Development of Ground Water in Delhi in percentage is the highest followed by Punjab and Rajasthan.

The other States where the percentage development is more than 50 % are Haryana, Gujarat, Uttar Pradesh, Uttarakhand, Karnataka and Tamil Nadu. The status of expansion of Hydrograph network in the country can be known from the distribution of ground water hydrograph network stations over the years.

Table 3. Annual Under Ground Water Resources

Annual Under Ground Water Resources	
State	**(BCM/Year)**
Andhra Pradesh	36.50

Assam	27.23
Bihar	29.19
Madhya Pradesh	37.19
Maharashtra	32.96
Orissa	23.09
Punjab	23.78
Tamil Nadu	23.07
Uttar Pradesh	76.35
West Bengal	30.36
Others	93.30

Sources: Water Planning & Project wing, Central Water Commission

Desalination: Desalination is an artificial process by which sea salty water is converted to fresh water. The most common desalination processes are distillation and reverse osmosis. Desalination is currently expensive compared to most alternative sources of water, and only a very small fraction of total human use is satisfied by desalination. It is only economically practical for household and industrial uses in arid areas.

Frozen Water: Several schemes have been proposed to make use of icebergs as a water source, however to date this has only been done for novelty purposes. Glacier runoff is considered to be surface water. it is also very costly therefore use in rear case only.

USES OF WATER

Water is used every field like agriculture, industrial, domestic in food, bathing, plantation, savage etc. Briefly we discuss as under:

Agricultural Use: It is estimated that 69% of worldwide water use is for irrigation, with 15-35% of irrigation withdrawals being unsustainable. It takes around 2,000 - 3,000 liters of water to produce enough food to satisfy one person's daily dietary need. This is a considerable amount, when compared to that required for drinking, which is between two and five liters. To produce food for the now over 7 billion people who inhabit the planet today requires the water that would fill a canal ten meters deep, 100 meters wide and 2100 kilometers long.

Industrial Use: It is estimated that 22% of worldwide water is used in industry. Major industrial users include hydroelectric dams, thermoelectric power plants, which use water for cooling ore and oil refineries, which use water in chemical processes, and manufacturing plants, which use water as a solvent. Water withdrawal can be very high for certain industries, but consumption is generally much lower than that of agriculture.

Water is used in renewable power generation. Hydroelectric power derives energy from the force of water flowing downhill, driving a turbine connected to a generator. This hydroelectricity is a low-cost, non-polluting, renewable energy source. Significantly, hydroelectric power can also be used for load following unlike most renewable energy sources which are intermittent. Ultimately, the energy in a hydroelectric power plant is supplied by the sun. Heat from the sun evaporates water, which condenses as rain in higher altitudes and flows downhill. Pumped-storage hydroelectric plants also exist, which use grid electricity to pump water uphill when demand is low, and use the stored water to produce electricity when demand is high.

Hydroelectric power plants generally require the creation of a large artificial lake. Evaporation from this lake is higher than evaporation from a river due to the larger surface area exposed to the elements, resulting in much higher water consumption. The process of driving water through the turbine and tunnels or pipes also briefly removes this water from the natural environment, creating water withdrawal. The impact of this withdrawal on wildlife varies greatly depending on the design of the power plant. Pressurized water is used in water blasting and water jet cutters. Also, very high pressure water guns are used for precise cutting. It works very well, is relatively safe, and is not harmful to the environment. It is also used in the cooling of machinery to prevent overheating, or prevent saw blades from overheating. This is generally a very small source of water consumption relative to other uses.

Water is also used in many large scale industrial processes, such as thermoelectric power production, oil refining, and fertilizer production and other chemical plant use, and natural gas extraction from shale rock. Discharge of untreated water from industrial uses is pollution. Pollution includes discharged solutes (chemical pollution) and increased water temperature (thermal pollution). Industry requires pure water for many applications and utilizes a variety of purification techniques both in water supply and discharge. Most of this pure water is generated on site, either from natural freshwater or from municipal grey water. Industrial consumption of water is generally much lower than withdrawal, due to laws requiring industrial grey water to be treated and returned to the environment.

Thermoelectric power plants using cooling towers have high consumption, nearly equal to their withdrawal, as most of the withdrawn water is evaporated as part of the cooling process. The withdrawal, however, is lower than in once-through cooling systems

Domestic Use: It is estimated that 8% of worldwide water use is for domestic purposes. These include drinking water, bathing, cooking, sanitation, and gardening. Basic household water requirements have been estimated by Peter Gerick at around 50 liters per person per day, excluding water for gardens. Drinking water is water that is of sufficiently high quality so that it can be consumed or used without risk of immediate or long term harm. Such water is commonly called potable water.

In most developed countries, the water supplied to households, commerce and industry is all of drinking water standard even though only a very small proportion is actually consumed or used in food preparation.

REASONS OF WATER CRISIS

The concept of water crisis is simple: According to the World Business Council for Sustainable Development, it applies to situations where there is not enough water for all uses, whether agricultural, industrial or domestic. Defining thresholds for stress in terms of available water per capita is more complex, however, entailing assumptions about water use and its efficiency. Nevertheless, it has been proposed that when annual per capita renewable freshwater availability is less than 1,700 cubic meters, countries begin to experience periodic or regular water stress. Below 1,000 cubic meters, water scarcity begins to hamper economic development and human health and well-being.

Population Growth : In 2000, the world population was 6.2 billion. The UN estimates that by 2050 there will be an additional 3.5 billion people with most of the growth in developing_countries that already suffer water stress. Thus, water demand will increase unless there are corresponding increases in water conservation and recycling of this vital resource. In building on the data presented here by the UN, the World Bank goes on to explain that access to water for producing food will be one of the main challenges in the decades to come. Access to water will need to be balanced with the importance of managing water itself in a sustainable way while taking into account the impact of climate change, and other environmental and social variables.

The population of India is increased Four Times since last 110 Years. The population of India grew only one and half time in first

50Year but increased 3 times in later 60 Years as shown in below table:

Table 4. Decadal Change in Population of India

Census Year	Population	Decadal Change	Percentage
1901	23,83,96,327	–	–
1911	25,20,93,390	1,36,97,063	5.75
1921	25,13,21,213	(7,72,177)	-0.31
1931	27,89,77,238	2,76,56,025	11.00
1941	31,86,60,580	3,96,83,342	14.22
1951	36,10,88,090	4,24,27,510	13.31
1961	43,92,34,771	7,81,46,681	21.64
1971	54,81,59,652	10,89,24,881	24.80
1981	63,33,29,097	8,51,69,445	15.54
1991	84,64,21,039	21,30,91,942	33.65
2001	1,02,87,37,436	18,23,16,397	21.54

Sources:http://censusindia.gov.in/2011- prov -esults/data_files/india/Final_PPT_2011_chapter 3.pdf

Expansion of Business Activity: Business activity ranging from industrialization to services such as tourism and entertainment continues to expand rapidly. This expansion requires increased water services including both supply and sanitation, which can lead to more pressure on water resources and natural ecosystem

Rapid Urbanization: The trend towards urbanization is accelerating. Small private wells and septic tanks that work well in low-density communities are not feasible within high-density urban areas. Urbanization requires significant investment in water infrastructure in order to deliver water to individuals and to process the concentrations of wastewater – both from individuals and from business. This polluted and contaminated water must be treated or they pose unacceptable public health risks. In 60% of European cities with more than 100,000 people, groundwater is being used at a faster rate than it can be replenished. Even if some water remains available, it costs more and more to capture it.

Climate Change: Climate change could have significant impacts on water resources around the world because of the close connections between the climate and hydrological cycle. Rising temperatures will increase evaporation and lead to increases in precipitation, though there will be regional variations in rainfall. Overall, the global supply of freshwater will increase. Both droughts and floods may become more frequent in different regions at different times, and dramatic changes in snowfall and snow melt are expected in mountainous areas.

Higher temperatures will also affect water quality in ways that are not well understood. Possible impacts include increased eutrophication. Climate change could also mean an increase in demand for farm irrigation, garden sprinklers, and perhaps even swimming pools. There is now ample evidence that increased hydrologic variability and change in climate has and will continue have a profound impact on the water sector through the hydrologic cycle, water availability, water demand, and water allocation at the global, regional, basin, and local levels.

Depletion of Aquifers: Due to the expanding human population, competition for water is growing such that many of the world's major aquifers are becoming depleted. This is due both for direct human consumption as well as agricultural irrigation by groundwater. Millions of pumps of all sizes are currently extracting groundwater throughout the world. Irrigation in dry areas such as northern China, Nepal and India is supplied by groundwater, and is being extracted at an unsustainable rate. Cities that have experienced aquifer drops between 10 to 50 meters include Mexico City, Bangkok, Manila, Beijing, Madras and Shanghai.

SCHEMES AND POLICIES SET UP BY GOVERNMENT

a. The National Conservation Strategy and

Policy Statement on Environment and Development (1992)

b. National Project for Repair, Renovation & Restoration (RRR) of water bodies directly linked to agriculture (2005)
c. Regional plan-2021, National Capital Region (NCR) (2005)
d. National Water Mission under National Action Plan on Climate Change (2009)
e. National Water Policy 2012

Salient Features of National Water Policy (2012)

1) Emphasis on the need for a national water framework law, comprehensive legislation for optimum development of inter-State rivers and river valleys.
2) Water, after meeting the pre-emptive needs for safe drinking water and sanitation, achieving food security, supporting poor people dependent on agriculture for their livelihood and high priority allocation for minimum eco-system needs, be treated as economic good so as to promote its conservation and efficient use.
3) Ecological needs of the river should be determined recognizing that river flows are characterized by low or no flows, small floods (freshets), large floods and flow variability and should accommodate development needs. A portion of river flows should be kept aside to meet ecological needs ensuring that the proportional low and high flow releases correspond in time closely to the natural flow regime.
4) Adaptation strategies in view of climate change for designing and management of water resources structures and review of acceptability criteria has been emphasized.
5) A system to evolve benchmarks for water uses for different purposes, i.e., water footprints, and water auditing be developed to ensure efficient use of water. Project financing has been suggested as a tool to incentivize efficient & economic use of water.
6) Setting up of Water Regulatory Authority has been recommended. Incentivization of recycle and re-use has been recommended.
7) Water Users Associations should be given statutory powers to collect and retain a portion of water charges, manage the volumetric quantum of water allotted to them and maintain the distribution system in their jurisdiction.
8) Removal of large disparity in stipulations for water supply in urban areas and in rural areas has been recommended.
9) Water resources projects and services should be managed with community participation. Wherever the State Governments or local governing bodies so decide, the private sector can be encouraged to become a service provider in public private partnership model to meet agreed terms of service delivery, including penalties for failure.
10) Adequate grants to the States to update technology, design practices, planning and management practices, preparation of annual water balances and accounts for the site and basin, preparation of hydrologic balances for water systems, and benchmarking and performance evaluation.

The Union Cabinet has decided to declare 2013 as 'Water Conservation Year' under which awareness programmes will be launched for conservation of the scarce natural resource. A number of mass awareness activities will be undertaken during Water Conservation Year 2013 with emphasis on sensitizing the masses on water related issues, encourage them to conserve and use it judiciously. The policies and programmes of the Ministry of Water Resources will be propagated to create a sustainable society and economy. An effective and sustained mass awareness programme will be launched with the involvement of all stakeholders to achieve the objectives identified in the National

Water Policy, 2012 and National Water Mission.

WATER MANAGEMENT

At present, the need is not only the development of water resources, but also their efficient management in a sustainable manner. The approach of integrated water management to meet the demand of water for agricultural use, drinking and industrial needs, were discussed below:

Interlinking of Rivers: Few decade ago M.Visveswarayya, K.L.Rao and D.T. Dastur had given an idea of interlinking rivers .Three years back, in response to the order of Supreme Court of India to complete this mega project costing about 5.6 lakhs crore, the then government appointed task force of scientists, engineers, economists, biologists and policy makers to make a detailed project report. The following major benefits may accrue to the country with the completion of massive project.

- Nearly 35 mha of agricultural land can be brought under irrigation additionally using 173 BCM of additional water created thus food security.
- Raise in ultimate irrigation potential from 113 million ha to 148.150 million ha.
- Transfer of water from surplus to deficit areas thus flood and drought problems may be mitigated.
- Production of 34 giga watts of inexpensive and eco-friendly hydropower may be expected.

Inter Basin Transfer : This project was formulated by National Water Development Agency (NWDA). As per the plan, the project is divided in to two broad components.

- Himalayan component with 14 river links.
- The peninsular component with 16 river links.

It is planned to transfer 141 km/yr through peninsular India and 33 km/yr Himalayan links essentially for redistribution in the Ganga basin and to Western India. Only small volume of water can be transferred from the Brahmaputra basin. Thus in totality 1660 km/yr of development water resource can be created which can take care of any exigencies. Water Harvesting and Groundwater Recharge: The ways of collecting the drops of rainfall, are as unending as the names of clouds and drops. The pot like the ocean is filled up drop by drop.

Rooftop Rainwater Harvesting: It is ancient idea, in this method the rain from rooftop is fed into tank through a pipe for meeting domestic needs. The building should be designed for this purpose and rooftop should be clean and free from dusty pesticides or corrosive materials etc. The water should go through a pipe into a community sump tank, which should be purified before supply. Harvesting of rooftop rainwater could meet over 60 per cent of domestic water needs. The potential for rooftop rainwater harvesting has been estimated to be 1 km/yr.

Water Harvesting: It is the collection and storage of rainfall runoff from any catchment or watershed followed by subsequent use. Rainwater harvesting in a given area depends on topography, soil type, depth and slope and vegetative cover etc. It largely depends on quantity and distribution of rainfall and will therefore, be more successful in areas where rainfall is sufficient. Recharge of groundwater, which is concept of rainwater harvesting, utilizes the structures like pits, trenches, dug wells, recharge wells/shafts, bore wells, check dams and percolation tanks. The water thus harvested through rainwater harvesting can be used for the following purposes:

i. Used primarily for supplemental irrigation during stress periods of crop growth or when there is a long gap between two rainfall events or to meet any other aberrations during monsoon period allows drought proofing.

ii. In the states like Punjab, Haryana, Himachal Pradesh and Eastern region, more than 200 water-harvesting dams were already constructed. The harvested rainwater is conveyed to agricultural fields through underground pipelines by gravity, thus there is no need of electric or diesel engines.

iii. It is an ideal solution of solving water problem in areas having inadequate water resources. Centre for Science and Environment (CSE) estimated that even if half of the average annual rainfall of 1190 mm is captured on 1.12 ha of land in each of the country's 5,87,226 villages, 6.57 million liters of rainwater thus collected in each village can meet the annual cooking and drinking needs of average population of 1200 per village.

iv. Harvested rainwater plays a greater role in sustaining surface water supplies on one hand and recharges aquifers on the other. It prevents the soil erosion.

Watershed Management: Watershed is a natural geo-hydrological unit. It is an area of land and water bounded by a drainage divide within which the surface runoff collects and flows out of the area through a single outlet into a river or other body of water. It must make drought proof the rural landscape by capturing each falling raindrop and save the crop, human beings and animals.

Recycling And Reuse of Municipal and Industrial Waste Water: 'Recycling' means internal use of water by the original user prior to discharge. While 'Reuse' refers to waste water that discharges from municipalities (75 per cent), industries and irrigation are withdrawn by users other than dischargers. After treatment, reclaimed water is diverted for irrigation. It is clearly evident in big cities like Delhi where the water scarcity is acute; the municipal sewage water is utilized for irrigating vegetable crops. In Tamil Nadu, industrial wastewater is being used for irrigating sugarcane crop.

Water used for domestic purposes (washing, cleaning and bathing etc.) should be collected, cleaned and recycled for non-drinking domestic and industrial purposes. Nearby holy places and temple towns, the water that is used for bathing and washing in tanks and ponds should be channelized towards agricultural fields in adjacent areas (e.g., Mahanadi in Kumool district of Andhra Pradesh). In Israel, water is used 4 to 5 times before it is let off to nature while, it is only once in India.

As of now, 75 per cent of drinking water is used for non-drinking purposes. It is proposed to supply potable water and non-drinking water separately to ease pressure on drinking water supply. Besides, water for non-drinking needs could be met by recycling domestic wastewater.

Improving Water Use Efficiency through Better Technology: Agriculture sector consumes more than 85 per cent of total water in the country. If we are able to save 7 per cent of it, we will be able to meet domestic and industrial demand. Hence it is imperative to adapt less water consuming or water saving methods of irrigations with an aim of producing more crops per drop.

Such methods include micro irrigation (drip, sprinkler, bubbler, spray and indigenous drip irrigation) methods. By using these methods, two to three times more area can be brought under irrigation with same quantity of water besides improving crop quality and doubling the productivity. At the same time, increasing salinity and alkalinity problems of irrigation water in coastal areas can be mitigated by using drip irrigation without any adverse effect on crop growth and productivity. Proper levelling of agricultural fields also help in avoiding water logging thus saves water. Scientists should breed HYVs, which are less water consuming, and drought resistant and such seeds should be made available for large section of farming community.

Reducing Seepage Losses: Poor maintenance of water bodies encourages water loss through seepage resulting in low water use efficiency of 25-40 per cent against the target of 65 per cent. Hence, proper lining of water retaining structures should be taken up. Simply constructing dams across rivers for storing water for subsequent use is not enough, periodical maintenance is also necessary. The main problem that most of them face is silting. Neglect of desalted dams and tanks will drastically reduce their storage capacity. A review of siltation across the country reveals the pitiable condition of these water-storing structures.

This is the common problem in most of the Indian dams and canals because of which tail end farmers are not receiving water following reduction in storage capacity. Hence steps should be initiated to desalt these Temples of Modern India. The canal banks and field channels should be provided with cement lining to prevent leakage and seepage, which account for about 30 per cent loss of water. If these measures are initiated, water could be put to better use in all four irrigation systems in India.

Arrest over Exploitation of Ground Water and Rationalized Water Rates: Few states are providing electricity free of cost to farming community. Even where it is not free, the charge for electricity is a fraction of the average cost, not based on metered use. No or under pricing led to over exploitation of groundwater and subsequently serious depletion of water table in many parts of the country. In order to reduce wastage, metered water pricing also should be implemented just like in big cities.

Avoid All Forms of Pollution: Industries based on chemicals, fertilizers, garments, skins, leather, textile, liquor, soft drinks, paper, jute, steels, alloys and coal release hot water, coloured water and waste material into nearby surface water bodies like rivers, lakes, ponds, tanks and wetlands thus making them unproductive and non-potable. Such water will become unfit for further use even after treatment. For instance:

- The great rivers like the Ganga, the Godavari, the Cauvery and the Yamuna have become polluted to a large extent.
- Many of the wetlands across the country have been under threat.
- Industries in Delhi release millions of gallons of waste, polluted and coloured water into sacred river, the Yamuna converting into sewage drain.

It should be made compulsory for all industries to have their own treatment plants and release effluents only after proper treatment. At the same time, concerned authority should be empowered to take severe action against those going against rules and regulations.

Deficiencies Allowed By Management: This is known as Deficiencies Allowed by Management (DAM). Generally, whenever there is inadequate water stored in tanks and reservoirs in a bad rainy year, usual practice is to limit the command area. The better method would be adopt 'DAM' concept and irrigate the total command area. This involves supply of reduced amount of water during non-critical stage of crop growth and supply full requirement of water during the critical flowering and yield formation periods. In this method, yield on individual field may be less by 5-10 per cent but overall production in the command area will be more by 50 per cent.

Participatory Irrigation Management: Despite massive expenditure on canal irrigation over the years, the water distribution remained inequitable and inefficient. Recognizing the need for decentralized irrigation management, the first national Water Policy (1987) called for farmers' participation in irrigation management.

CONCLUSION

Water is precious natural resource for sustaining life and environment. On the earth surface 71% is covered by water and only 29% by land. Out of total water 97% is found in the ocean and it is salty, 2% was found in glaciers & ice sheet, only 1% of available water is found as fresh water on the surface & as underground stream .Therefore fresh water is a critical resource, therefore it is necessary, not only the development of water resources, but also their efficient management in a sustainable manner. Water cannot be manufactured or produced so that we can use it efficient manner to save it. The future of every livelihood is depending on water means "Jal Hai To Kal Hai". We can't image of world without water .All above facts we have to need the Save Water, Save Life. Main reason of Water Crisis is Population Growth, Urbanization, Climate Change; Water Pollution etc. all these problems are created by human and must be control by themselves.

REFERENCE

http://en.wikipedia.org/wiki/Water_resources

UNICEF, FAO and Saci WATERs. 2013. Water in India: Situation and Prospects.

http://www.preservearticles.com/2012011320755/short-essay-on-water-management-india.html

Central Pollution Control Board, 1997, 'Status of Water Supply and wastewater Generation, Collection, Treatment and Disposal in Metro Cities", New Delhi

http://pib.nic.in/newsite/erelease.aspx?relid=98363

Mishra, V.N., 2003. Water - A threatened global resource. Proceedings International Conference on Water and Environment (WE-2003), Bhopal, India,

http://in.news.yahoo.com/government-decides-declare-2013-water-conservation-053817269.html

Water & Related Statistics ,water resources information Directorate ,Information system Organization ,Water Planning & Project Wing, Central Water Commission, December 2010.

http://cseindia.org/userfiles/CSE_PPP_meeting.pdf