

# ***Clean Water & Assured Supply***

## ***Key Note Address***

**S V Ahuja, CE (Retd.), GWSSB**

**Introduction:** Water is a vital environmental factor to all forms of life. It also has a great role to play in the socio-economic development of human population. Water intended for human consumption should be safe, clean and wholesome, i.e. it should be a) free from pathogens, b) free from harmful chemicals, c) pleasant to taste and d) free from turbidity. It should be available in the required quantity; otherwise people may go for the inferior quality.

Water Pollution does not occur in nature in pure form but is derived from atmosphere, catchment area, and soil. It contains dissolved gases, minerals, suspended impurities and microscopic organisms. Different types of impurities are found depending on the source of water. Suspended and organic impurities are found in surface water, Dissolved salts, gases and inorganic minerals are found in sub surface / underground water while dissolved gases are found in rain water when directly collected. Therefore, the water which we get is to be converted in clean potable water by providing the different types of treatments. In terms of quality, the water sources face increasing stress from sewerage and industrial effluent pollution, dumping of solid waste and agricultural runoff.

**Water Facts:** Let us think of the few water facts detailed below:

- Access to safe and sufficient water is human right under international law
- 90% of rural Indians and 30% of the urban population depend on ground water for drinking and domestic purpose
- 1.2 billion people have no access to safe drinking water
- In West Asia water is most precious and limited natural source
- India has some 20 million tube wells and this number increases by 1 million every year
- Fluoride effected states in India are increasing day by day. At present Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, TamilNadu and Uttar Pradesh are having fluoride problems
- America consumes water twice the rate of other industrialized Nations, 6.8 Billion gallons of water are flushed down the American toilets, while 1.2 billion people have no access to safe drinking water
- 43.5 Million people in 1.42 lakh habitations are facing health risks in India due to excessive fluoride, arsenic, salinity, iron and chemical pesticides & insecticides
- Everyday 25000 people die from use of water. It is said to be the third biggest killer.

The water engineer is supposed to find out the permanent solution of each of the problem.

### **Water, the killer**

**Diarrhea:** 1.8 million people die every year from diarrheal diseases (including cholera); 90% are children under 5, mostly in developing countries. 88% of diarrheal disease is attributed to unsafe water supply, inadequate sanitation and hygiene. Improved water supply reduces Diarrhea morbidity by 21% and improved sanitation reduces Diarrhea morbidity by 37.5%. The simple act of

washing hands at critical times can reduce the number of diarrheal cases by up to 35%. Additional improvement of drinking-water quality, such as point of use disinfections, would lead to a reduction of Diarrhea episodes of 45%.

**Malaria:** 1.2 million people die of malaria each year, 90% of whom are children under 5. There are 396 million episodes of malaria every year; most of the disease burden is in Africa and south of the Sahara. Intensified irrigation, dams and other water related projects contribute importantly to this disease burden. Better management of water resources reduces transmission of malaria and other vector-borne diseases.

**Arsenic:** Arsenic contamination of ground water has been found in many countries, including Argentina, Bangladesh, Chile, China, India, Mexico, Thailand and the United States. The key to prevention is reducing consumption in drinking-water with elevated levels of arsenic and identifying alternative low arsenic water sources or by using arsenic removal systems.

**Fluorosis:** Over 26 million people in China suffer from dental fluorosis due to elevated fluoride in their drinking water. In China, over 1 million cases of skeletal fluorosis are thought to be attributable to drinking-water. The principal mitigation strategies include exploitation of deep-seated water, use of river water, reservoir construction and defluoridation. The People of Lathi & Lilya of Amreli District in Gujarat suffer from Dental & skeleton fluorosis.

**Availability of fresh water:** The fresh Water availability per capita in India has fallen from 5200 cum per year in 1951 to 1300 cum/year in 2011. This is a 75% drop that India has witnessed in the last 60 years, primarily due to increasing population. The corresponding figures for Gujarat are 3000 and 950 cum/year. It is estimated that the fresh water availability in 2025 will be 1150 and 650 cum/year for India & Gujarat respectively. Globally speaking the total quantum of water is the same as was available million years ago but the per capita availability of fresh water is reducing year by year.

For much of India's 'water history', the focus has been on large scale surface water projects to provide access, neglecting sources within the city and in the sub urban areas. Over time an enormous informal groundwater market has arisen in several cities to bridge the demand-supply gap. We know the scarcity problem of Rajkot city, the major city of Saurashtra, was solved in 1998 by drilling 120 DTH bores in Wankaner area. While this has been a critical coping strategy, it is very problematic as a long-term solution. More recently, rainwater harvesting and artificial recharges are being seen as an alternative source to bridge this gap.

As per the 74th constitutional amendment in 1994, the local bodies are responsible to manage their water supply projects, however Water is a State subject; the State Government has the primary responsibility of the management and deployment of this resource to meet lifeline needs. So far as the urban towns are concerned they have totally neglected the underground water availability. Most of the local bodies including corporations do not even employ the Geo hydrologist as staff.

Water as a subject is dealt by State Governments and the Local bodies that are responsible for the supply and demand. In the context of a scarce natural resource and limited financial resources, the Government/Local bodies have to make decisions of priorities, institutional arrangements, cost-recovery; tariff structures etc. and meet the needs of all citizens, not just those who can afford it but for poor also.

The authorities often operate without reliable data to aid their understanding of their own operations and the context they operate in. The authorities should have the knowledge of (i) sources with capacity and the sustainability of the source; (ii) wastage in leakages etc. (iii) bench

marks of the water services (iv) geography of the area and its growth, (v) the possibilities of rain water harvesting and recharging, (v) waste water treatment and recycle and reuse of treated waste.

**Water Service:** The “water service” is a public service like health, education, sanitation, road & rail transportation, electricity, banking, postal service etc. The public services are to be notified by the Govt. Service provider, the functionary, should visualize that:

- The services are according to the **need**, are **realistic, specific** and **acceptable** to people at large.
- The people are **ready to pay** for the services and in case of default the services can be terminated.
- The services should be **measurable** with reference to quantity & quality and in case of failure to perform, the service provider should be answerable.
- The services should be **time bound** i.e. to be provided at specified time.
- All persons have right to Public Services i.e. he has right to access, to receive in transparent manner and according to the standards prescribed, to demand and to hold the authority accountable for service deficiency.
- All the public services should clearly define the detailed Facilities to be provided by the service provider
- Performance Standards should be clear for the type and level of service to be performed from quantity and quality point of view
- The Rights & Duties of the functionary with clear terms, conditions and limitations should be clear. The public service authority should lay down the policies, plans and guidelines for effective service delivery.
- The minimum performance standards should be defined, say water will be provided of such and such standard with minimum specified quantity and at specified pressure at specified time
- These performance standard should fulfill the prescribed objectives for providing the services
- The authority is bound to adhere to these standards and should be accountable to social & financial auditing of the public services
- Similarly the rights & duties of the service taker should also be defined.

**Bench Marks in Water Services:** Following are some of the physical and the quality performance standards which should be adhered by the authorities.

**Physical Standards:**

- ✓ The minimum and maximum supply can be mentioned depending upon the reliability of source. The seasonal variation in supply can also be dictated in standards. The allowable percentage variations should be specified. The standard can be area specific and different standards for different locations within the state.
- ✓ The situations to be mentioned which may affect the performance standard viz. scarcity of water, breakage in pipe line / pumping machinery, non availability of power etc...
- ✓ Actions to be taken by the service provider, if client does not pay or delays the payment of services, should be clearly narrated with the procedure of re-introduction of services

- ✓ Judicial actions against defaulter and towards the anti social elements. The provision of a clause that in case of uncontrolled anti social interference, the services can be terminated for the group / individual
- ✓ The wastage of water by the client can be charged at penal rates. The incentive can be provided for the judicial use of water.

**Quality Standards:**

- ✓ The quality standards can be mentioned depending upon the type of source. The seasonal variation in quality can also be dictated in standards. The allowable variations should be specified. The standard can be area specific and different standards for different locations within the state. The standards can be different for surface and for underground source.
- ✓ The situations to be mentioned which may affect the quality performance standard viz. scarcity of water, seasonal quality variations in the chemical parameters in the underground water.
- ✓ Actions to be taken by the service provider if water gets polluted through outside source.
- ✓ Judicial actions against defaulter and towards the anti social elements if the pollution is due to them.
- ✓ The clause can be inserted specifying that if necessary, the water from different sources can be blended provided the quality parameters are not deviated.

**Plan & Manage from the available resources:** In order to have the assured water supply certain points need to be kept in mind such as (i) Ascertain the available resources – surface water as well as underground water (Note that surface water have the physical impurities while the underground waters have the chemical impurities), (ii) Project should be techno-economically viable (Priority be given to nearer source), (iii) Go for multiple sources (surface plus ground water), (iv) Apply dual water supply system strategy wherever feasible (un-potable water can be used for other than drinking purpose), (v) Plan the project considering that there will be scarce rainfall for 2 consecutive years, (vi) If the source is underground, go for recharging on massive scale (Presently the levels are depleting at 2 to 3 M per year), (vii) Go for foolproof technology, minimum wastage of water and (viii) Go for automation, specially for urban areas.

**Efficient & Sustainable project management:** The project should be efficient and sustainable.

**Environmental Sustainability:** All the care should be taken to protect the source from (i) internal environments e.g. domestic waste, solid waste etc, reuse of waste water after treatment, (ii) external environments e.g. Industrial wastes, Pesticides, Fertilizers etc, (iii) recycling & reuse and (iv) water budgeting

**Institutional Sustainability:** The services often suffer because of the deficiency in the managing institute. The actions need to be enhanced towards building the capacity of Pani Samiti/Local body, continuity after transfer of power (transfer of staff, changes in electoral body) and in Institutional Maturity, Institutional reforms and External supports.

**Technical Sustainability:** The project should be Flexible in designs, should have absence of orthodox approach, readiness to acceptance of new technologies and acquiring/Hiring external expertise.

**Financial Sustainability:** The managing institute should be responsible and accountable to maintain and revise the accounts of the Water tariff structure, income – expenditure balancing, fund flow and depreciation surplus etc.

The theme of 'Clean Water & Assured Supply' will try to address the above questions and the attendant requirements and surface more questions and needs.