India's Water Wealth

India's alleviation as a blue economy from water exports! Only if this resource was adorned with high important status central to the Indian base with 60 % of Indian economy being water driven. However treatment meted out to water management is extremely poor in India. Source of water for use in India is through ground and through taps. In remote inaccessible areas river or stream water is still in use which is one of the most tedious tasks. Inadequate infrastructure for storage , treatment and distribution of water stored from rivers or rain has led to groundwater playing a crucial role as a decentralized source of drinking water for millions rural and urban subjects. According to some estimates, it accounts for nearly 80 per cent of the rural domestic water needs, and 50 per cent of the urban water needs in India. To a certain extent India's % of World Population is 17.1% and that of water availability is 4%. The world per capita availability rank of water in India is 132 and that of water quality is 122. India receives average annual rainfall of 1160 mm , the world average being 1110 mm. Even after receiving rainfall which is above world average India's water availability rank remains only at 132 .This displays infrastructural deficiencies to hold water in India. India's reservoir capacity of 57% is held only in five states of Maharashtra , Madhya Pradesh, Karnataka, Odisha and Gujarat. There is an urgent need to build water storage capacity across India in form of reservoirs and dams especially in weak precipitation areas and link these reservoirs to reservoirs in higher precipitation areas via canals. It is found that reservoirs in excess precipitation areas discharge the extra water into rivers which is further wasted into sea. India being an agriculture based economy water is a huge economic value generator especially in the rural area. There is a huge rural demand for water which mainly grows water intensive crops like rice , pulses and wheat especially in the states of Haryana, Punjab and Rajasthan. The annual ground water demand inthese states well exceeds availability with other states approaching threshold breaching limits. Moreover, this is fuelled by more than 19 million electric and 10 million diesel pumpsets. More and more land is being pulled in for farming purposes with the water pump serving as a tool to pump out water from the underground streams. In spite of average or above average rainfall rural India lacks infrastructure to store rain water with a higher dependency on ground water mainly for two reasons one being avoidance due to divergence of agricultural space to water storage and secondly ease of operation using water pumps. Capacity building of such a water storage infrastructure has not been seriously looked at even when this exercise can be game changer for the Indian economy. Excessive use of ground water in absence of a feeder reservoir for underground streams leading to a near disaster resulting in deep as good as 600 feet deep wells with no water left to be pumped out. About decade back extensive network of canals was built around villages but these have been running dry due to excessive silting which is not cleared by authorities on one hand and on the other hand the share of water which needs to be flowing through these canals is being illegally diverted by political players. Such is the political oppression of water in dams that it has become an issue of criminalities. Lack of appropriate protection to the engineers managing dams has led to political honchos playing their strength. This has led to a necessity of a Water Regulatory authority that would be empowered as a tribunal to solve water disputes especially the ones belonging to water distribution. This water regulatory body should also be authorized to acquire land barren for agriculture to be used for rain water harvesting in form of small lakes and ponds. The Narmada River project in India which can be excellent example of how the excess water has been channelized to seasonal water basins making them perennial thus providing a healthy water table to the adjoin areas along their course. Nearly three states are benefitting out of this arrangement and at the same time there has been no conflict between due to smooth management of this operation. This mighty project has made electricity generation possible through hydro electricity generation plant lighting numerous homes. On the other side there have been instances of inefficient water management and regulation which has given rise to interstates water disputes of Cauvery in Karnataka and Tamil Nadu and the Ravi and Beas river water dispute between Punjab, Haryana, Himachal Pradesh, Rajasthan, Jammu and Kashmir and Delhi.

Water supply capacities are further hampered due to the indiscriminate water wastage especially due to leakages in the distribution systems and water contamination happening both at urban and rural areas. Wastage of water in an urban surrounding is much higher than a rural one and non treatment of used water adds to more worries. Groundwater is generally less susceptible to contamination and pollution when compared to surface water bodies. Also, the natural impurities in rainwater, which replenishes groundwater systems, get removed while infiltrating through soil strata. But, In India, where groundwater is used intensively for irrigation and industrial purposes, a variety of land and water-based human activities are causing pollution of this precious resource. Its over-exploitation is causing aquifer contamination in certain instances, while in certain others its unscientific development with insufficient knowledge of groundwater flow dynamic and geo-hydrochemical processes has led to its mineralization. In an urban setting untreated water mostly contaminates drinking water due to leakages in large pipes carrying freshly treated water. Instances of contamination of ground water in India are rampant.

The incidence of fluoride above permissible levels of 1.5ppm occur in 14 Indian states, namely, Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal affecting a total of 69 districts, according to some estimates. Iron content above permissible level of 0.3 ppm is found in 23 districts from 4 states, namely, Bihar, Rajasthan, Tripura and West Bengal and coastal Orissa and parts of Agartala valley in Tripura. High levels of arsenic above the permissible levels of 50 parts per billion (ppb) are found in the alluvial plains of Ganges covering six districts of West Bengal. Presence of heavy metals in groundwater is found in 40 districts from 13 states, viz., Andhra Pradesh, Assam, Bihar, Haryana, Himachal Pradesh, Karnataka, Madhya Pradesh, Orissa, Punjab, Rajasthan, Tamil

Nadu, Uttar Pradesh, West Bengal, and five blocks of Delhi. Non-point pollution caused by fertilizers and pesticides used in agriculture, often dispersed over large areas, is a great threat to fresh groundwater ecosystems. Intensive use of chemical fertilizers in farms and indiscriminate disposal of human and animal waste on land result in leaching of the residual nitrate causing high nitrate concentrations in groundwater. Nitrate concentration is above the permissible level of 45 ppm in 11 states, covering 95 districts and two blocks of Delhi. DDT, BHC, carbamate, Endosulfan, etc. are the most common pesticides used in India. Pollution of groundwater due to industrial effluents and municipal waste in water bodies is another major concern in many cities and industrial clusters in India. A 1995 survey undertaken by Central Pollution Control Board identified 22 sites in 16 states of India as critical for groundwater pollution, the primary cause being industrial effluents. A recent survey undertaken by Centre for Science and Environment from eight places in Gujarat, Andhra Pradesh and Haryana reported traces of heavy metals such as lead, cadmium, zinc and mercury. Shallow aquifer in Ludhiana city, the only source of its drinking water, is polluted by a stream which receives effluents from 1300 industries. Excessive withdrawal of groundwater from coastal aquifers has led to induced pollution in the form of seawater intrusion in Kachchh and Saurashtra in Gujarat, Chennai in Tamil Nadu and Calicut in Kerala. Mercury is reported to cause impairment of brain functions, neurological disorders, retardation of growth in children, abortion and disruption of the endocrine system, whereas pesticides are toxic or carcinogenic. Generally, pesticides damage the liver and nervous system. Tumour formation in liver has also been reported. The presence of fluoride in water cannot be detected without the help of water quality testing equipment. High fluoride content is often detected from such symptoms on human beings as yellowing of teeth, damaged joints and bone deformities, which occur from long years of exposure to fluoride containing water. Due to this reason, by the time the community realises the “menace”, a large section of the population is already affected. A recent survey by the International Water Management Institute (IWMI) in north Gujarat showed 42 per cent of the people covered in the sample survey (28,425) were affected; while 25.7 per cent were affected by dental fluorosis, 6.2 per cent were affected by muscular skeletal fluorosis and 10 per cent by both. The potential biological and toxicological effects of using fluoride contaminated water are also dangerous. Study on fluorotic populations of north Gujarat revealed an increase in frequency of sister chromatic exchange in fluorotic individuals indicating that fluoride might have genotoxic effect. Fluoride had been reported to cause depressions in DNA and RNA synthesis in cultured cells. Conditions including ageing, cancer, and arteriosclerosis are associated with DNA damage and its disrepair. Prolonged exposure to water containing salts (TDS above 500ppm) can cause kidney stone, a phenomenon widely reported from north and coastal Gujarat. Arsenic contamination of drinking water causes a disease called arsenicosis, for which there is no effective treatment, though consumption of arsenic free water could help affected people at early stages of ailment to get rid of the symptoms of arsenic toxicity. Arsenic contamination is by far the biggest mass poisoning case in the world putting 20 million people from West Bengal and Bangladesh at risk though some other estimates put the figure at 36 million people.

India has been rampantly urbanized , however urbanization is not courting water security at the same pace forcing reliance on ground water for domestic use as the only measure relied upon . This has worsened the condition of residents. Mumbai is the only tier 1 city to have been secured with steady supply of water through five major lakes this feature being absent among other tier 1 cities of India. Extensive use of ground water for urban usage coupled with no treatment for sewage water will in future result into a monster which is going to be difficult crisis to handle. India consumes about 251 billion cubic meters of ground water annually against China and US using 112. India has been rising in its cities which will also increase industrial demand for water along with domestic one in the urban cities which is presently 2% compared to China’s 26%.Pressure on water resources will rise with growth and is expected to increase by 50% between 2000 and 2050 and these water withdrawals will be maximum in the emerging economies.

There is an urgent need to have separate national body and one at state level for water management to the status of Ministry which could relate to such issues. The prime objective of this body should be water management across states segregating the urban and rural needs. Rural needs with respect to water are drinking and irrigation where as urban needs vary to a large extent with water being required for many other purposes other than the drinking one.

The central authority in form of Ministry for Water needs to draw policy guidelines which could probably avoid wastage of water and promote recycling of used water. Treatment for industrial use of water needs to have a different set of rules for development of a policy framework. The first step towards evolving measures to prevent and cure groundwater quality deterioration is generating reliable and accurate information through water quality monitoring (WQM) to understand the actual source/cause, type and level of contamination. However, there are a few observation stations in the country that cover all the essential parameters for water quality and hence the data obtained are not decisive on the water quality status. Secondly, WQM involve expensive and sophisticated equipments that are difficult to operate and maintain and require substantial expertise in collecting, analyzing and managing data. Since water technology is still not advanced in India, it is very likely that the available data is less reliable. The existing methodology for WQM is inadequate to identify the various sources of pollution. Integration of data on water quality with data on water supplies, which is very important from the point of view of assessing water availability for meeting various social, economic and environmental objectives, is hardly done. And finally, in the absence of any stringent norms on water quality testing, results can change across agencies depending on sampling procedure, time of testing, and testing instruments and procedure.