



# Present & Future Scenario of Water Resources of India: An Evaluation

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## ABSTRACT

*The water has a vital significance for human survival, agriculture, forestry and base for industrial development. The year 2003, was declared as a year of fresh water. The present paper has reviewed the quantum of water in relation to present and future scenario. The multi-faceted problem of water has also been justified with statistical figures for different regions of India. Lastly, there are some of suggestions which have been recommended for improving the future situations of water in India. In this context, the focus has also been given to an active participation of the people, particularly in the rural areas, so that the water management strategies may be executed in accordance with the prevailing local conditions and become more responsiveness to the needs of the people. All these strategies to be adopted as a water saving devices will ensure to lead a sustainable position of water for the millions of people belong to rural and urban areas of India. Lastly, there some of positive suggestions which have been recommended for further improvement for making judicious use of water resources of India so that the fresh water may be available on sustainable basis for the people belong to rural and urban areas of India.*

**Keywords:** *Vital significance of water; multi-faceted problems; water conservation strategies; sustainability of water; suggestions for further improvements.*

**INTRODUCTION:** Water has a vital significance for human survival, agriculture, forestry and industries of the world. Earlier we believed that there is enough water for us to drink and spare, and even for squandering. Therefore no reason, we thought, to worry about its scarcity or unavailability any time in future. However, continuous and tremendous use of ground water now is to say the least of towering absurdity. Our water resource reserve is limited and any misuse of it would cause scarcity and problem which might not be easy to handle (Varsheney, R.S;

1990). Keeping in view the mythology relating to water, it has been observed that the religion, the oldest belief system of the world, has cared to give it a sort of godly place. It holds very significant position. In *Hinduism, Buddhism* and Islam, water has been considered as important, cleaning and purifying agent. Thus the water has been become an Omni-present phenomenon; as a symbol of purity for every religious faith practiced by the people of every part of the world. (Rakesh Kumar, R.D.Singh, K.D.Sharma, 2005).

Reviewing the present scenario of water of the world, it has been observed that there are forty percent of the world population now faces chronic shortage of fresh water for daily needs. Half of world's wet lands have been lost and one fifth of 10,000 fresh water *species* is *extinct*. Contaminated water kills around 2.2 million people every year. As the human rights tribune highlights the water attributes in a different perspectives. In this context, various studies indicates that there is 70 per cent of all available fresh water is used in agriculture, but due to faulty irrigation system, 60 per cent of the water is wasted in agronomic practices by the farmers (Hand book of Water Resources).

Further, it has also been observed that there is 97.5 per cent of the global water; only 2.55 per cent of fresh water is available in the glaciers, fresh water lakes and snow-fed rivers. The ground water is also available in all the

developed and developing countries, but a considerable percentage of sub-surface water is either saline or become contaminated due to rapid growth of urbanization and industrialization; a water depletion problem has aggravated the water crisis situation; particularly in the developing countries. It has also been observed that there are over 6 billion people in this world, at least 1.2 million do not have access to safe drinking water. It has been *projected* that by 2025, nearly two third of the world population will live in the *water stress* region (Hand Book of Water Resources).

For the country like India, the situation of water is far from satisfactory too. In this context, as we observe from various records that the *chronic population pressure* on water resources has given rise to develop the water crisis in the rural and urban areas of the country. Although India occupies only 3.29 million square KM geographical area which constitutes 2.4 per cent of the world area, she supports about 1/6<sup>th</sup> of world population, 1/50<sup>th</sup> of the world's land and 1/25<sup>th</sup> of the world water resources (Institution of Engineers, 2003). In this context, as we observe from various texts, that the *chronic population pressure* on water resources, steady growing population of rural and urban areas, rapid growth of agriculture and industries in India, mis-utilization of fresh water. It is because of non of concrete policy on '*water management*' in the country, it has been given rise to *water crises* particularly in *Bundelkhand* of U.P, *Vidhabha region* and *Latur* district of *Maharashtra*, most of the districts of *Telangana* and *Andhra Pradesh* have been severely affected by the problem of water crisis and developed a severe

drought-like conditions during this year. But thanks for adequate rainfall during later period which has been relieved to a considerable extent to the people who live within these regions. It is therefore, it becomes imperative to carry-out such type of periodic regional study, so that the *right strategy* may be chalk out to combat the water stress in accordance with the prevailing local conditions, so that a sustainable development position may be development to meet the growing demand for growing population of India.

#### **OBJECTIVES OF THE STUDY**

The present study is aimed at the objectives which are as follows:

- To review the present and future scenario of water resources of the world with special reference to India;
- To review the multiple problems of water resources in relation to changing demand and supply of water;
- To suggest some of recommendations for further improvement for existing and future demand for future scenario of population of India.

#### **METHODS & MATERIAL**

Keeping in view the present water resources of India, it become imperative to have a periodic review of the updated information of water resources of the country so that a sustainable position of water resources may take place for growing demand for water in India. The present study is based on *secondary sources* of information, which have been collected from different sources. All the sources



which mainly include National Water Commission, World Water Council, Ministry of Agriculture and some of NGOs working on water management. In this context, some of religious scripts have also been consulted to justify the significance of water in different contemporary societies. In order to project the anticipating problems of water, different published statistical figures have also been reviewed. Apart from the publications, the reports of various seminars and conferences have also been reviewed to know the objective and subjective views on water crisis faced by the people living in some of *affected* and *vulnerable* pockets in India.

#### RESULTS AND DISCUSSION

On the basis of some of statistical figures of water resources of the country, it has been observed that the global situation will face the '*Grim-situation*' in the coming years. In this context, the '*World Water Council*' has given a warning that-by the year 2025, much of world population will suffer water-scarcity,' and sadly bad *omens* have begun to manifest themselves right now. The Vice-President of the *World-Bank* had perhaps this in view when he said, "*The wars of this century will be about water.*" It has been estimated that there is three fourth of the earth is water, but a very small part, the fresh water which is found in our rivers (2.5 per cent) under the ground (30 per cent) and in the form of snow and ice (60 per cent). Meaning thereby, that the total useable water supply to eco-system and humans from the river- systems; lakes; wetlands; soil moisture and shallow ground water is less than 1 per cent of all the fresh water (0.01 per cent of the total water on the earth) As per the World Health

Organization (WHO) estimates, only 0.007 per cent of water on the earth is readily available for human consumption globally."

It is obvious from the various reports of CWRD&WM that the per capita availability of fresh water is declining rapidly. If the present consumption pattern continuous, says an official report, two out of every three persons on this earth will live in the water stress conditions-moderate or severe water shortage-by the year 2025, which is not too far from today. In India, the per capita average annual fresh water availability has gone down from 5177 Cubic Meters in 1951 to about 1860 Cubic Meters in today; 2016. And it is estimated to further come down to 1341 Cubic Meters in 2025 and 1140 Cubic Meters in 2050 (Centre for Water Resources Development and Water Management, Kozhikode, 2016).

#### THE RIVER SYSTEM AND WATER DISTRIBUTION:

There are two major river system which are snow and rain fed, and ii) the peninsular rivers system comprises the *Indus*, including its tributaries, the *Jhelum*, *Chenab*, *Ravi*, *Beas* and *Sutlej* and *Ganga-Brahmaputa-Meghna (Barak)* system. Peninsular river system comprises the west *Mahanadi*; *Godavari*; *Krishna*; *Pennar* and *Cauvery*. Besides these, there are numerous of several hundreds of coastal rivers which are, in most of the lasses, small. For the decades after the Independence, Indian planning ignored the need for sustainability and equity in water resources development and management. There was just one way forwarded, that harnessing the bounty in our rivers system and below the ground. It was only in 1990s that serious questions began to be raised on our understanding and approach to rivers (Mihir Shah and P.S.Vijay Shankar, 2016). It is therefore, it

becomes very essential to linking the northern side rivers to the central and South Indian Rivers. It is expected to pave the way to re-distribute the regional water in a judicious ways, provided the Inter-state disputes on water are to be discussed in a harmonious ways. It is also requires a completely over come *vested political interests* on waters, flowing in different states of India.

### GROUND WATER

#### STATUS OF INDIA

There is a considerable regional disparity of water resources distribution in India. It has been estimated that the *Ganga-Brahampura- Meghana*

basin contribution is 60 per cent of the total water resources of India. The contribution of other river is only 11 per cent. The currently, the utilization of surface and sub-surface water resources is 63 per cent and 37 per cent respectively of the total utilized water resources.

The purpose-wise distribution of the consumption of the water resources of different regions of India is unevenly distributed. In this context, there has been considerable seasonal fluctuation of water resources throughout the country too. In this context, the purpose-wise utilization of water in all the states of the country is shown as follows:

#### DISTRIBUTION OF PURPOSE-WISE UTILIZATION OF WATER IN INDIA (2015-16)

PURPOSE OF WATER CONSUMPTION (Billion Cu. M)	UTILIZATION
Irrigation	502 (82.82)
Domestic	31 (4.96)
Industrial	21 (3.31)
Energy	19 (3.28)
Others	33 (5.63)
Total	606 (100)

Source: Ministry of Water Resources

\*Percentages are given in brackets

Keeping in view the tabulated figures of water consumption, it has been observed that the purpose of irrigation will be continue to be the major consumption sector of water in future. The share of consumption in agriculture is maximum; whereas the share of domestic, industrial and energy water use may rise due to rapid

growth of urbanization and industrialization. In this context, a tentative assessment for future requirement for consumption of various sectors, as assessed by the standing Sub-committee for assessing the availability and requirement of water uses in the country is as follows:

#### PERIODIC DISTRIBUTION OF UTILIZATION OF WATER IN INDIA

(1990-2025)

(Billion Cubic Meters)

Purpose of use of water	1990	2000	2010	2025
Domestic	32	30	56	73

Irrigation	438	502	689	914
Industry	--	21	12	22
Energy	--	2	5	17
Others	35	34	52	76
Total	-	589	814	1102

Source: Standing Sub-Committee, Ministry of Water Resources

Keeping in view the tabulated figures of past and projected figures of water of water utilization, it has been observed that there has been considerable deviation in projected figures of water consumption. However, it indicate a steadily growth after the year 2000 and onwards. It is obvious from the tabulated figures which indicate that the projected demands of water by 2025 only by exploiting almost all the 1102 Billion Cubic Meters of utilization of water by conventional means. It is obvious from the tabulated figures which indicate the retrospect and prospects of the water resource utilization in India. The temporal

dimensions of water availability in relation to demand and supply of the water resources for India, indicate a pressing problem of water availability for the increased population of India indicate a gravity of the problem of acute shortage of water which is projected for the year 2050. It is matter of serious thinking to save the water for future. Otherwise the present trends of demand and supply of water will create the uncontrolled situation, not only for human being, but for agriculture and industry too. Similarly, the trend of preceding years of population and per capita water availability is as follows:

**PERIODIC PER CAPITA WATER AVAILABILITY IN INDIA**  
(1951-2050)

YEAR	Population (In Millions)	Per Capita Water Availability (In Cubic Meters)
1951	363	5177
1955	396	4732
1991	847	2209
2001	1027	1820
2025	1396 (Projected)	1342
2050	1641 (Projected)	1141

Source: Ministry of Water Resources, Govt. of India

It is quite obvious from the tabulated figures of demand and supply of water resources for past and future which indicate a decreasing trend of per capita water availability as well as the projected population growth in the country, the

anticipated per capita availability of water in India, seems to be serious. And the probability of rising the problem of water crisis is seems to be very high. It is therefore, it becomes imperative to take up the problem seriously, so that we may meet



this challenge in the coming years. On reviewing the present trends of population growth and available sources of fresh water in the country, we may project in the demand for fresh water for the coming years. In order to meet the demand for fresh water; the strategies and policy formulation are to be incorporated with the below mentioned suggestions which are as follows:

- Development projects on water management should be planned in accordance with projected population growth, so that the per capita availability of fresh water may be precisely estimated for the coming years;
- In this context, an *integrated* and *multi-disciplinary* approach which should be adopted for planning and implementation of *water management strategies*. The other factors like ecological aspects and rehabilitation of the affected people, *command area development* are to be duly considered too. The planning should be strictly in accordance with the *regional character* of the area, where the project is to be implemented;
- There is an urgent need of revival the *traditional practices* of the *water conservation* in the rural and urban areas. The old and traditional water structure like *Bawdi*, the *step well*; the traditional *agronomic practices* by the farmers like *Ausra-bandi*, *mulching* of cultivable soils, *contouring* against the flow of water; making use of *organic* and *green manure*; *recharging* the ground water through old *wells* and soak *pits* in the rural areas are some of *water harvesting* and *conservation*

techniques which should be implemented in accordance with the prevailing *local conditions*, so that the plans may become *maximum responsive* in accordance with the *physiographic* and *topographical* conditions of the areas.

- To enhancing the irrigation facilities, the programme like *Pradhan Mantari Krishi Sichai Yojana* (PMKSY) has been formulated to provide *end-to-end* solution in irrigation supply chain, viz. water sources, and distribution net work and farm level applications. The PMKSY programme will focus on: i) ensuring access of water to every agriculture farm (*Har Khet KO Pani*). All efforts are to be made to ensuring a *holistic approach* by the way of preparation of comprehensive district and state irrigation plans.
- To managing the soils which have been affected by the *flood irrigation* system in the *green revolution* areas like Punjab; Haryana and western Uttar Pradesh, a *crop diversification* programme has been started in these '*Original Revolution States*'. It is because of these regions having been cultivated with rice as a *dominant crop* which require more water as compared with other grain and cash crops. As a result, millions of hectares of land has been converted in to *waste land* and developed a *water logging* problem as well as ground water *depletion* problem within these '*Green Revolution*' regions of north western part of India. It is therefore, it become very essential to execute this programme in an effective way, so that the further *water-logging* and ground *water depletion* may be

prevented at its source. It is therefore, it become an urgent need to apply this strategy for other water logged cultivable lands for other pockets of India too.

- Water source management for varied uses should be incorporated with *participatory approach* by involving not only the government agencies but also the users and other stake-holders, in an effective and decisive manner; in various aspects of design; planning; development and management of water too. It is very essential to take an active participation of the institutions like *Gram-Panchayats* and other *local self governments* for maintaining, operation and management of *water infrastructure* at the different levels.
- On the front of science and technology, it become very essential to incorporate to various aspects which include; Hydro meteorology; snow and lake hydrology; surface and ground water hydrology; river morphology and hydraulics; assessment of water resources; water harvesting; evaporation and seepage losses; recycling and reuse ; better water management practices and improvement in operational technology; crops and cropping systems; soil and material research; instrumentation advanced numerical analysis in structures and back analysis; seismology and seismic design of structures; the safety and longevity of water related structures; economical designs for water resources projects; risk analysis and disaster management; prevention of water logging & soil salinity, *reclamation* of water logged and saline lands. Lastly, *linking of rivers* is expected

to pave the way to make a *judicious redistribution* of water throughout the country.

- As an effective curative measure, the *watershed management* programme sponsored by the government of India or World Bank like "*Neerachal*" for watershed component (Erstwhile Integrated Watershed Programme) of *Pradhan Mantri Krishi Sinchai Yojana* should be implemented strictly with the guidelines issued by the Ministry of Water Resources; Government of India; so that the funding for these projects may be utilized in a judicious way and the all efforts may achieve the desired results for managing the water for agriculture development.
- Keeping in view the gravity of the problem, it becomes imperative to have a *constant vigilant*, fully transparency, multi-level accountability; responsiveness in accordance with the prevailing local conditions, *cost-effectiveness*; an active participation of the people from different strata of society; an active participation of the public representatives; and active support of the local self governments. Only then, water management will be ensured to lead the *sustainable development* positions for agriculture, drinking water, industrial and domestic need of the water in India.

## CONCLUSIONS

Keeping in view of the vital importance of water for human, animal and vegetation life, it becomes an urgent need to conserve and harvest the water resource at the best level. However, the tabulated figures of present and future scenario of

water resources of world revealed the situation of serious thinking for the world and particularly for India to find out sustainable strategies so that the growing demand for water may be ensured for the coming years. Keeping in view the demand and supply of the water resources, it become very essential to review the water related problematic areas in accordance with the prevailing local conditions. The planning of water resources should be formulated and implemented strictly in accordance with different *agro-ecological zones* of the country. As far as it is possible the water management strategies should based on *local resource-mobilizations*, so that a 'cost-effective' approach may be hold-good in the areas, where the water management projects are to be executed.

In order to formulate and implementation of water management policy, the people *participatory approach* with an active support of social, institution, political; legal and religious institutions is very essential for achieving the desired results of the water management. In addition, the role of local self governments, youths and related bodies and associations like NCC; NSS; YMCA ANS YWCAs & Scouts and considering the water management as a *social responsibility* by the 'Corporate Sectors' may act as a *value added strategy* to execute the water management projects in an effective ways.

Lastly, the role of NGOs, Voluntary organizations and organizing the fair like *clean water Expo 2017*; which held during May 14 last year, can play a significant role to mobilize the local human resources and creating awareness among the masses in a better way, so that the *water management* projects may prove

more effective and *responsive* in accordance with the *prevailing local conditions*. And it will ensure to get the water management results with more 'Economic *viability*' as well 'ecological *viability*' in accordance with the *regional character* of the areas. By adopting the *water management strategies* will certainly ensure to lead to 'sustainable development' of water *Economic* -management programmes to be executed in different regions of the country. Only then we can we can ensure fresh water for everyone in accordance with changing *ecological scenario* of population, agriculture, industries and other purposes of India.

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