

# Critical Assessment of Water with Reference to Sustainable Development in India

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**Abstract** The congruous and sustainable development of any nation/region is dependent on several ingredients of development being given their right and judicious due / consideration in overall planning and implementation. India over a period of a couple of centuries has witnessed the highest level of exploitation of natural wealth and resources because of so-called development and population explosion. The industrial manufacturing activities and even exploitive agricultural practices initially saw the extinction of large and dense forests followed by pollution and contamination of air, water, and land. The severity of air pollution is not felt in one geographical locale but ill effects of water and land pollution are immediately noticeable in a land entity characterized as a nation, India over a period of time has polluted its almost all freshwater reservoir and resources leading to an unprecedented crisis. In this paper, a qualitative research method has been used. The systematic literature review has been explored through the internet and secondary data from relevant published academic literature from journal articles and research papers. The present paper critically examines the dismal scenario of water with reference to the comprehensive sustainable development in India.

**Keywords:** water, sustainable development, environment, India

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## 1. Introduction

'Water, water everywhere nor any drop to drink' [1], This couplet in the poem 'The Rime of the Ancient Mariners' by Samuel Taylor Coleridge were obviously referring to sea's saline water, but after 222 years this may even be taken as a reference to the Indo-Gangetic or Yellow-Yangsiyang rivers flood planes and the likes of it all over the world. The reckless development that the world has seen over the last more than two centuries has witnessed deforestation at an unprecedented rate leading to flooding by perennial rivers and seasonal rivers and rivulets alike making potable drinking water fit for human consumption literally potable in various tradable brands of packaged drinking water in the garb of mineral water. The Indian ethos of treating even strangers and passersby with cool and clean water has gone for a toss. Globally speaking countries will have to bear the brunt of this unmindful and grotesque urbanization more severely for obvious reasons. Ill-prepared and ill-equipped either to reverse the dangerous trend by providing painful employment to the rural masses in rural areas itself or to initiate measures for all round sustainable development in full swing, the country is precariously posed for major disasters and natural hazards to wreak havoc. Urban

magnets like Mumbai, Delhi, Kolkata, Chennai, Bangalore, Hyderabad, whose infrastructure in already under stress become more vulnerable to disasters as precious natural resources like water in these mega cities are very scares. This study is aimed to probe the constraints in congruous development and possibilities of making sustainable development a reality in this country.

## 2. Environment Management and Policies

The Environment Management and Policies (EMP) ensure the development of a country in a sustainable manner. It translates into management, optional and judicious utilization, augmentation (if possible) and exercising control on all the natural resources and wealth such as air, water, land, flora, fauna, forests, minerals and hydrocarbons under sea and land massed so on and so forth.

## 3. Sustainability and Water Conservation

Water is one of the core essential and basic necessity; 1) for the life forms-living things on the biosphere, 2) for the natural processes, 3) for the communities, 4) for the society, 5) for the economy of the country and 6) for on-

coming generations. It is utmost necessity for the humans to take care of the water resources, usage pattern and sustainable management/conservation at great importance.

More than 650 million people in almost 40 countries suffer from water scarcity. Among them particularly, 36 countries face extremely high water stress, including several countries in the Sub-Saharan region, Middle East, Indian deserts contributes to the looming crisis from African and Asian continents. Due to water shortage, the energy production and economic development in India and China has been affected seriously. Water scarcity is very severe in fast developing country like India, along with decreased energy production, the water quality with respect to chemical and biological contamination

Consequently, water conservation can be achieved 1) through logical policy, 2) from existing resources, 3) by mechanical auditing, 4) by rain water harvesting, 5) increase de-salination projects (to get additional sustainable water from ocean), 6) water re-use and 7) stringent regulations to adopt safe and conservative water adaptation policy by individuals in order to save the earth and improve the quality and quantity of the sustainable water [2].

#### 4. Fresh Water - A Basic Necessity

Fresh drinking water supply is a necessity and therefore must be ensured, therefore, be ensured for all in sufficient quantity. Sanitation is another area which needs immediate attention along with hygiene education to prevent, among others, the debilitating and disabling water -borne diseases but maintaining the economic pursuits in the manufacturing and agricultural sectors at optimum level for sustainable growth of economy. Man-made water -bodies, filled with unpolluted water, are needed also to promote inland pisciculture, fisheries and aquaculture. As the all-round sustainable development depends much on augmenting and improving the quality and quantity of international waters, an international priority action program is also called for.

#### 5. Optimal Use of Water as a Scarce Natural Resource

Fresh water is necessary for life on earth and important for social economic pursuits. Sustainable development can be ensured through judicious use of water resources. Importance of water for industry, agriculture, power generation, inland water transport, and congruous urban development cannot be underscored. [2] However, the all pervasive paucity of fresh water and more so the ground water in India is a huge problem as the earlier findings of the scientists at National Geophysical Research Institute (NGRI) would reveal. Their survey reveals the alarming status of rapidly declining groundwater table in Chennai. Mumbai, Delhi, Bangalore, Hyderabad as also in several other regions in northern India. They apprehend that because of speedy decline in the water table Hyderabad would be next Chennai. Highlighting the catastrophic phenomenon, Dr. Mrinal Kanti Sen, Ex-director of N. G. R.I said, "History shows us civilizations have vanished

once water is also gone. Water carries people and we need to wake up now and do something before it is too late." [3] Who can understand this phenomenon better than architects-planners, geographers-archeologists who have been sulking over the slow but sure demise of city like Fatehpur Sikri and extremely sad but sudden deaths of 15000 people in the city of Hyderabad in 1908 on the banks of flooding river Musi,. [4] Scientists and hydro-geologist at NGRI predict that with cities paved with concrete and other impervious material a very meagre rain water percolates in the land mass to replenish ground water table. As against the desirable condition of minimum of 16% barely less than half of it seeps into the ground to reach and replenish ground water in Chennai, Hyderabad, Delhi and Mumbai. "This is very alarming...." opines Dr. S.N. Rai, a scientist from NGRI and also then Vice President of International Association of Hydro-geologists. Sounding the alarm bell in most unmistakable terms, "...There is a bleak future in store for other metros." [5]. Worst is the case with surface water where rivers are the main water-bodies catering to more than half of the requirement of potable water for human consumption as also for the purposes of irrigation. Every Indian river is highly polluted.

#### 6. River Yamuna - Life Line of Delhi

The dozen and half big drains (Nallahs) carrying volumes of sewage and domestic waste daily pour a huge quantity of their contents in river Yamuna, in Delhi, as either the capacity of sewage treatment plants installed for the purpose falls far short of taking that volume of load or some of them remain idle and defunct or work just at a fraction of their capacity, most of the time for want of timely repair. A few of these Nallahs open up directly on to the river emptying their load in it. This is the situation in Delhi -the National Capital Region of the country. The end result is that river Yamuna in Delhi continues to be a big stinking Nallah even after huge spending of several thousand crores on the Yamuna Action Plan and that in spite of the intervention of the Hon'ble Supreme Court of India, who sought details of the Plan from the Government.

The Ex-chief of NGT Justice Swatantra Kumar heading a bench of Supreme court earlier had summoned details of the 12000 crore Yamuna River Action Plan in Delhi from government specially with respect to untreated effluent discharged into the river [6]. And if one thought that the things could be better with the most sacred of all the rivers- the Ganges-, then think again. A prestigious website has this to say about Ganga Action Plan, another ambitious plan for cleaning the highly polluted Ganga waters. Country's plan to clean river Ganga failed because of inordinate delays. Mr. Vijay Panjavani, legal counsel of the CPCB shockingly accepted the fact that the Ganges water was far from clean even after spending Rs. 20000 crores for the same [7]. Inordinate delays and flawed implementation of GAP has resulted into a situation where it has become necessary to review the whole plan all over again otherwise GAP will remain unfulfilled both literally and colloquially.

Industrial hub of Uttar Pradesh, Kanpur continued to discharge industrial waste loaded with chromium despite

availability of a Government established treatment plant owing to its non-functioning because of non-installation of pits to separate chromium discharge by tanneries so observed Rakesh Jaisawal, an environmentalist lamenting about its delay to the tune of one and half decade. Dr. Padma Vanker, a scientist from IIT Kanpur entrusted with the testing of Ganga water at Kanpur reported presence of chrome and iron in the sample which according to her was the basic cause of all kind of deceases. [8]

## 7. Comptroller and Auditor General Report on the Ganga Action Plan

Just to bring the water of the river Ganges to bathing levels an ambitious Ganga Action Plan was initiated in 1985 only to achieve less than 40% of its reduced target owing to faulty design, obsolete technology, apathetic administration and mismanagement. [9] Lackluster performance coupled with inadequate maintenance and lack of SOP with the implementation agencies has further compounded the problems. Technologically advanced equipment, closely monitored financial and administrative control was needed to be exercised. Author's observation: The C.A.G. report clearly mentions that the target objective of the plan is to "bringing water quality of river Ganga and its tributaries to bathing levels" as against making it fit for human consumption, which would remain a far cry perhaps for decades to come.

From the above account it would be clear that not even 50% of the domestic waste, sewage and industrial effluent daily discharged into the rivers anywhere in India gets treated before the discharge for one reason or the other in spite of heavy spending of the tax-payers money on the various central and state governments' projects and plans. Scientists have found traces of solid waste and faecal matters as high upstream Ganga as at Rishikesh. Many Save Ganga activists- Swami Nigambodhanand, Dr. Agarwal, Swami Poornanand and water man of India Dr. Rajendra Singh to name a few modern day Bhagiraths- have been protesting against quarrying and stone- crushing in the ecologically sensitive areas along the river which makes it still more vulnerable to abuse and pollution.

The polluted water is also carrier of many diseases. Almost 4 out of 5 of the known diseases in the country are caused by water borne pathogen. "Diseases caused by microbiological pollution of water supplies transmitted by water -associated vectors, or related to inadequate sanitation and absence of clean water are widespread". All this compounded with fast growing urban population leading to grater requirement of clean water leads to consumption of such contaminated water [10]. Here also the main culprit is grotesque and ugly urbanization on which the politicians of the country had embarked upon headlong in the name of 'economic development.'

## 8. Water-The Resource Crunch

It is an established fact that in the wake of resource and monitory crunch the fresh water sources reservoir and channels have not been protected against damage and degeneration. Creation of new clean and safe routinely

available water for human consumption, agriculture, industry, fishery, inland water transport, recreation etc. etc. naturally suffered because of paucity of funds and their real time monitoring. There should be increased awareness among stakeholders and policy-planners regarding the scarcity value of this precious commodity and the imperative need for conservation, preservation, quality control, augmentation of its resources and their efficient use without, in any way, offending the ecosystem.

The misuse and abuse of ground water by urban and rural folk alike is another worry some aspect which need immediate attention of policy planners and administrators. Human settlements and large sub cities wholly dependent on ground water for their housed millions often disrespect this precious commodity which to their understanding comes free. Terrace top water tanks, charged by ground water often overflow discharging huge amount of potable water in the drains. Policies of government often protect and reward farmers cultivating paddy and sugarcane crops in the areas where there is depleted ground water reserves. Agriculture scientist and policy planners should recommend and enforce raising of such crop in the tarai (lower Himalayas) region of the country instead of ground water deficient areas of Punjab western Uttar Pradesh. Maharashtra and Telangana.

As would appear from the above account, that the fresh water resources are woefully slender world over particularly so in India where there is an acute shortage in most regions. Inland fresh water bodies and perennial rivers and reevaluates need to be given protection on the same lines as national forest reserves have been given. This would arrest the degeneration of aquatic ecosystem to some extent. This analogy is presented for the consideration planners and policy planners of the country.

## 9. Role of High-Rise Dams in Sustainable Development

While the role played by high-rise dams in sustainable development should not be disparaged, a peculiar situation had cropped up with regard to water conservation and preservation in high -rise dams for irrigation and hydropower generation. The case in point, which experts and commoners both agreed was Tehri dam which was embroiled in a serious controversy. While the anti-dam activists and some geo-scientists pointed out that during the past two hundred years some 116 earthquakes of the magnitude above four point in Richter scale have hit Uttaranchal, and given the ongoing tectonic activities, a quake of much higher magnitude, may strike the region any time. PC Mandal, former Geological Survey of India (GSI) Chief is on record to have observed, "Only vested interests are causing a fear among the people that Tehri dam was unsafe as it lies in a quake-prone region." (A report carried by the Times News Network in November 2002). While the controversy is now done with and over, it underlines the need of larger and far more intensive global participation by all the developing nations of the world with the common target of achieving water augmentation and further improvement in its quality by strict monitoring and management.

An international body of prominent and renowned Geo-scientists should be better equipped to allay the fears and apprehensions of the local people. The need of sufficient number of water -bodies in the form of all types of dams, particularly the high-rise ones, in our country, cannot be over-emphasized. Prominent among the other projects is Narmada Valley Project which consists of two projects: 1. Sardar Sarovar (SSP) in Gujrat and 2. Narmada Sagar (NSP) in Madhya Pradesh. They are targeted to irrigate 109 million hectares (MH) in addition to generating total of 2450 megawatt of power for the national power grid. It is, however, an admitted fact that small scale irrigation schemes and projects are environment -friendly and do not cause harm to eco-system and, therefore, far more conducive to sustainable development whereas environmental impact of big dams in terms of ecological loss due to submergence of forests and agricultural land, loss of wildlife, displacement of lakhs of people, emission of tons of ozone depleting greenhouse gases like methane and carbon dioxide and so forth make them a suspect in the eyes of those who root for sustainable development. Cases are not wanting where their cost -benefit ratio is not properly evaluated and assessed. Rampant corruption in all stages of their construction render these projects unacceptable.

## 10. Water Factor in Public Health and Hygiene

Sustainable development is nothing if it does not ensure good health for the people in the process of development. While easy availability of clean, fresh, potable water in plentiful quantity is sine qua non for reducing the incidences of water-borne diseases, particularly in tropical countries like India, which suffer hot and humid climate most part of a year, year-round vector control programmes' vigorous implementation is the need of the hour which shall require substantial upgradation of national capacities. A technology to prevent pollution and degeneration of perennial water resources such as glaciers has since been developed in India by the Defense Research and Development Organisation (DRDO). Based on biotechnology the microbes capable in surviving in sub-zero temperature are developed. These microbes can successfully destroy human waste. Speaking at the 18th National Convention of Chemical Engineers on the theme "Emerging Trends in Bio-technology" in Bangalore, Dr. V. K. Atre, Scientific Adviser to the Defense Minister had said, "The DRDO labs also plan to tackle and control metals especially iron contents in drinking water in the north -eastern region where the iron content is very high." (The Times News Network Report.)

No doubt, this groundbreaking work has international ramifications as the rivers flowing from water resources and in diverse regions do not recognize any man-made boundaries and divisions in the form of countries and provinces. The technology should be shared and further developed to its full potential through a meaningful, continual research and sharing by the eminent scientists of all nationalities, who should create a knowledge pool of the shared information and replication world over so the

human beings living on this planet may take its full advantage.

## 11. Water Augmentation and Quality Management Programs (WAQMP)

WAQMP require a certain minimum infrastructure and skilled technical staff to implement technical solutions, enforce regulatory actions and maintain the facilities. This Priority programme should explicitly focus on water quality improvement, its efficient use, water harvesting, small-scale irrigation schemes, water -logging and salinity control, drainage and recycling of sewage water for agricultural and industrial uses.

## 12. Conclusions

The above account indeed paints a grim picture of the current situation in the country. It is for the policy planners, experts of this domain, administrators and implementation agencies to take stock of the situation and work on possible course correction in the developmental strategies where not Mega-polis (soon turning into Necropolis) but rural and small town development in a holistic manner of region (which will arrest the migration of people from rural and hinterland to the opportunity offering large cities is arrested) is worked upon.

The Government of India should implement a stringent rules on peoples and industries along with surface water storage, conservation of rain water, ground water conservation such as artificial recharge and percolation tank method, catchment area protection (CAP), inter-basin transfer of water, adoption of drip sprinkler irrigation, management of growing pattern of crops such as selection of crop varieties, nutritional management, and role of antitranspirants, reducing evapotranspiration, reducing evaporation from various water bodies, recycling of water and conservation of water in domestic use, reduce the loss of water and reuse of wastewater and artificial recharge to groundwater [12].

The silver lining on the black cloud appears with the new government at the center taking stock of the situation with respect to Ganga Action Plan and clubbing the whole program with time bound targeted goals in the new version of the plan/project in the name and style of Namami Gange. Further critical appraisal of the subject, covering other aspects like air quality and ventilation, earth mass together with its ecosystem including forest covers and minerals and hydrocarbons that they cover, that factor in the pursuit of sustainable development, need to be researched and published for healthy criticism before implementation by concerned player/partners in sustainable development.

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