



FROM THE DESK OF CHAIRMAN

The **IDC Foundation**, as a part of its annual activity, had planned to celebrate Water Day on 22 March by organizing a series of talks by experts on the theme 'Climate and Water'. The planned event was cancelled in view of COVID19 advisory. Recognizing the importance of water for sustaining life, economic activity and environment, the Foundation is bringing out current issue of the IDC News Letter with focus on Water.

Water is one of the most essential natural resources, and India is among the world's most waterstressed countries. At the time of independence, India had 3,000-4,000 cubic meters of water per person. Today it has fallen to around 1,000 cubic meters. It is not surprising since India supports 17 % of the global population and has only 4 % of the world's water resources. In view of the rapid increase in population, urbanization, industrialization, and water intensive agriculture, the demand for water is continuously increasing. Depletion of ground water and deterioration of water quality are two other major concerns. Climate Change is going to further compound the problem.

It is heartening to see that Government of India has taken major initiative in water sector by forming Jal Shakti Ministry. It has launched 'Jal Shakti Abhiyan' with focus on five aspects- water conservation and rain water harvesting, renovation of traditional and other water bodies, reuse of water and recharging of structures, water-shade development and intensive farming.

Community participation is essential for the success of Jal Shakti Abhiyan. The IDC Foundation, having a pool of experts in the water sector, plans to actively participate in Jal Shakti Abhiyan.

Let us all work to save water.

Jai Hind

Air Vice Marshal (Dr) Ajit Tyagi

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India needs storage for meeting the requirement of water during the lean period. The need for storage of water increases with the demand of water. Efforts are already being made to replenish the depleted groundwater storage. The traditional site for storage has been the river valley.

Two questions arise from the above statements about quantity and location of storage: -

1. Does the demand of water need to increase in future or are there steps and technologies to counter increase in demand of water?
2. Does the storage of water in the hills be only in the river valley or is a better alternative of storing water off-stream available?

The management of demand of water is possible but it is not discussed in this article since it is not covered by the title. For undeniable storage of water, are dams appropriate now?

A copy of the satellite imagery of area near Srinagar in Uttarakhand is placed next which shows that a large number of bowls and gorges exist which provide the potential of storing water while avoiding any interference with the ecology and well-being of the river.

Calculations show that the bowl marked in the imagery, which is more than 500 m deep can store 2.87MCM up to 50 m and 17.1 MCM up to 100 m depth of water and the gorge which is nearly 700 m deep can store 1.29 MCM and 7.03 MCM up to 50 and 100 m depth of water respectively.

BOWLGORGE



The imagery covers an area of 19 km x 11.5 km, i.e. 218.5sq km in which it can be seen that there are nearly 10 bowls and 8 gorges of comparable size. The hilly area of similar terrain could be 40,000 sq km out of the total area of 53,483 sq km in Uttarakhand. Projecting the slide over entire hilly area of Uttarakhand, it can be guessed that by storing an average water depth of 100 m in the bowls and gorges, storage of 40 BCM can be available, which shall be more than 15 times the storage in the Tehri dam, which is 2.6 BCM.

The suggestion for Off-stream Storage of Water is apparently feasible and advantageous but it needs detailed examination of the various related aspects including the following: -

1. Hydrological feasibility based on rainfall and catchment and the possibility of additional catchment from which runoff can be diverted. The storage needed or flushing arrangement for sediment removal has also to be considered, especially for bowls.
2. Financial viability in terms of cost per unit volume of water and the cost/benefit ratio considering the costs of forest submergence, displacement and biodiversity in particular; and benefits related to water resources, social welfare and environment.
3. Environmental impacts both favourable, like rejuvenation of springs, flood attenuation and protection of river, as well as unfavourable, like reduction in river flow, risks of dam failure, etc.

It is also relevant to review the functions performed by dams other than storage, which mainly include: generation of hydropower, irrigation of agricultural fields, fishery in the reservoir, use of top of dam for transport across river and sightseeing and recreation.

Taking up the above points in serial order, it may be stated that hydropower is no more an economic source of energy when solar energy is available at a lower cost. Irrigation shall also be possible from off-stream storage sites which shall be near the fields to be irrigated in the hills. In the plains, where bulk of water is needed for irrigation, groundwater is the major source depended on and importance of recharge of depleted groundwater storage is already well understood. Fisheries will have equal or better opportunities in off-stream storage than river valley storage. Bridges can be constructed to cross the river where needed, which is better than having the facility to cross the river where dam is constructed. As in the case of fisheries, opportunities for sightseeing and recreation may even be better available to people in the case of off-stream storage than near the dams. Thus, dams do not appear to be needed any more.

The next and final question is what to do with the dams under construction and those which are existing? From the aforesaid discussions, it can be concluded that an evaluation is needed in each case based on environmental, ecological, social and economic parameters to decide whether to modify or scrap the dam under construction and when and how to remove the existing dams. Removal of dams has been done in many countries notably in France and the United States of America and time has come to think about removal of dams in India.

Editor's Comment: This is a bright new idea, which needs to be debated at national level. In so far as removal of old dams is concerned, some of them will become defunct in few years, as the live storages get filled with silt due to high soil erosion in the catchment areas.

Climate Change Impacts on Water Resources in India

Dr. Sushil. K. Tyagi
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If Climate Change is the Shark, then Water is its Teeth

A. Lakshmi Narayanan
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Water is not only vital for sustaining life on the planet, but is also important for economic development. The climate change has introduced a marked rise in precipitation intensity and variability, impacting different sectors. The Indian Institute of Tropical Meteorology (IITM), Pune has undertaken study on the assessment of impact of climate change in three major river basins: the Krishna, the Ganga, and the Godavari, which have high hydrological and economic importance. They reported that monsoon contributed 70 – 90% of rainfall in these basins, with rainfall becoming more intense. Though the total rainfall was found to increase, but simultaneously the drought frequency was also predicted to be higher.

Changes in precipitation can affect a variety of planning issues, such as: design of hydrological structures; flood control and drought management, and urban and industrial development etc. The climate change will have more deleterious impact on water quality, as the level of dissolved oxygen will get reduced due to rise in temperature of river and sea waters, affecting survival of aquatic life. High runoff will carry more nutrient load due to increased soil erosion, giving rise to algal blooms. To protect this beautiful Planet Earth from catastrophe, we should make every effort to halt further rise in greenhouse gas emissions.

Some Dimensions of Climate Change Impacts on Water

Dr. Leena Singh
Delhi University



- **The Water resources are critical towards Climate Change.** It is said that Carbon is the currency of Climate Change whereas Water is the teeth.
- Fresh water resources are crucial to human society, and climate change adding to the scarcity
- Higher temperatures and less predictable weather conditions are projected to affect availability and water quality
- More floods and severe droughts are predicted. Changes in water availability will also impact health and food security, and most affected would be poor people.
- Climate change will have its most direct impact on child survival through changing disease environments, greater food insecurity, and water security and sanitation. (UNICEF, 2019).
- So, ensuring that everyone has access to sustainable water and sanitation services is a critical climate change mitigation strategy.

The importance of freshwater to our life support system is widely recognized, as can be seen clearly in the international context (e.g., Agenda 21, the Millennium Ecosystem Assessment and the World Water Development Report). Freshwater is indispensable to all forms of life, and is needed, in large quantities, for almost all human activities. Climate, freshwater, biophysical systems and socio-economic systems, all are interconnected in complex ways. So, a change in any one of these systems induces a change in other systems. Anthropogenic climate change adds additional burden on the countries that are already confronting the issue of sustainable freshwater use.

The challenges related to freshwater are: having too much water, having too little water, having too much pollution. So far, the water resource issues have not been adequately addressed in climate change analyses and climate policy formulations.

Impacts of Climate Change in Relation to Water

Air and water temperature increases; Changing rainfall patterns; Droughts; Groundwater; Glacier melt; Sea level rise; Agriculture and food security; Water security; Health.

Effective Climate Action Agenda

Raise awareness: Not enough is understood and communicated about the devastating risk of climate change to the world's water resources, and much remains to be done to raise awareness in a comprehensive, accessible and action-oriented way. A globally recognized youth network has therefore dedicated its efforts towards awareness-raising.

Be an advocate: Young people are organizing and uniting the global community around the climate issue to raise awareness across all sectors. They must champion this cause more seriously and mobilize people for the climate-water cause.

Seek innovation: There are important scientific development like artificial intelligence, smart sensing and monitoring devices and blockchain technologies, which have increase the possibilities for tackling water issues have multiplied. Today's youths who get well accustomed with technology at an early age can very equipped to take advantages of these technologies. They can very well employ these new scientific tools in developing climate smart innovation to face multiple challenges in different sectors

What can be done

- The development of indicators of climate change impacts on fresh water, and operational systems to monitor them
- Impact studies of climate change at shorter spatial and temporal intervals.
- Speedy implementation of no-regret options to cope with climate change
- An integrated approach is needed, given the diversity of interests to arrive at sustainable solutions
- Improvements in irrigation systems, water harvesting techniques and more efficient agricultural water management can offset some of these risks

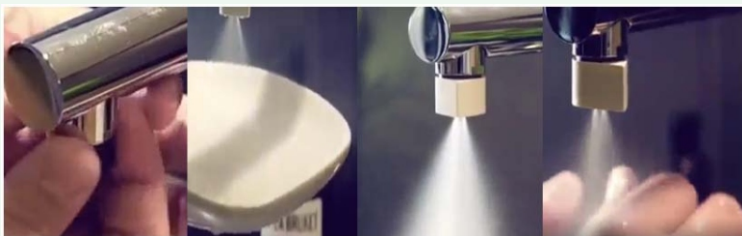
Prof S C Tyagi
Executive Director.
IDC Foundation



“The Earth provides enough to satisfy every man’s needs but not every man’s greed.” —Mahatma Gandhi

Saving water at home is another way to fight climate change. Wonder how? The clean water that’s pumped to our homes is treated, using lots of energy. So, when we use less water, we don’t need to treat and pump so much water. This means less money spent on energy, chemicals, additional reservoirs and boreholes. Lesser energy use in pumping water means lesser greenhouse gas emissions and lower heating of biosphere. It is also equally important to reduce wastage of water in your home or business, because to make this waste water reusable, we again need to use chemical and energy. To achieve this goal, get spray nozzles, which are available in the market, fixed on the faucets in your kitchen, wash basin and bath rooms; and make sure that leakages in your establishment are regularly fixed. There is growing load of chemicals in our streams and rivers and therefore the water that goes straight down the drain without being properly reused is adds to pollution in rivers. A better strategy would be to reuse rejected water for other uses, which have less stringent quality requirements like kitchen gardens and lawns.

Eating vegetarian food, which has low water footprints as compared to nonvegetarian diet, is another way to economize on water in your households. Remember, that in your daily life, 'you eat more water than you drink'



Adjustable automizer attachment for the faucet to save water

Quotable Quote on Water and Climate

If there is magic on this planet, it is contained in water

- Loren Eiseley

There is three fourth water and only one fourth land on this planet, so call it planet earth and not planet water. If mitigation is about carbon, then adaptation is about water

- John Slater

Anyone who believes in indefinite growth on a physically finite planet is either mad, or an economist.

- Sir David Attenborough.

FORTHCOMING EVENTS

Brainstorming Session on

“Are dams needed any more?”

Venue : India International Centre, New Delhi

National Workshop on "Island & Ocean Pollution: Problems and Solutions

Venue : Andaman & Nicobar Islands Institute of Medical Sciences, (ANIIMS) DHS Annexe Atlanta Point, Port Blair -744101, Andaman & Nicobar Islands, India

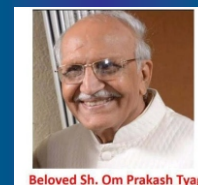
International Conference on "Integrated Healthcare Waste Management, Wash and Climate Resilient Healthcare.

Venue : India International Centre, New Delhi

Interaction with farming community for adoption of climate smart agriculture in a selected village in district Hapur.

Note: New dates to be announced shortly

OBITUARY



Beloved Sh. Om Prakash Tyagi

Shri O P Tyagi Ji passed away on 01st March, 2020 after a brief illness. On behalf of IDC Foundation, we extend our heartfelt condolences to his family. He was the Trustee of the Foundation, He had been an inspiring personality and a treasure of knowledge and wisdom. His contribution to the IDC Foundation can never be forgotten. May his soul rest in peace.

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