



The Need for Global Water (not H₂O) Resource Management and Its Impact on Climate Change

by

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Who Really discovered the composition and formula of water?

It was the chemist Henry Cavendish (1731 – 1810), who discovered the composition of water, when he experimented with hydrogen and oxygen and mixed these elements together to create an explosion (oxyhydrogen effect).

In 1811 the Italian physician Amedeo Avogadro finally found the H₂O formula for water.



What is Water?

- It is believed that the Big Bang theory led to the formation of galaxies and the birth of water's constituent elements: hydrogen and oxygen.
- Scientists believe that the primeval oceans were formed four billion years ago;
- We know ice floats when most solids sink;
- Despite being highly corrosive, water is good for us;
- Scientists have consistently misunderstood water for centuries; and as we all know even wars have been waged over it.



Are Humans Really Concerned About Water?



The planet is called earth which means Ground: The name "Earth" comes from the Old English words "eor(th)e" and "ertha", and the German word "erde". It is at least 1,000 years old.

Earth is called the blue planet because 71% of the Earth's surface is covered with water, but we still face and hear stories about water shortage and scarcity.

Worldwide name changes occur frequently, why humans have never thought of changing the name of the planet to something related to water?

Are Humans Really Concerned About Water?

Humans consider Water to be a vital commodity for survival. It's the foundation for agriculture, industry, and livestock and is required for every agricultural crop that feeds the world.

Irrigated agriculture accounts for 20% of cultivated land and produces 40% of the world's food. Miners also use water to extract metals and energy companies to generate fuel and power.

We are not really concerned about water availability as we get it in abundance where and when we want it. If we have to go to the source and fetch water, we will value it as our forefathers have done.



Should humans really be concerned about water ?

! Due to climate change, pollution, and increasing demand, water is becoming increasingly scarce. Shortages of water can lead to social, political, and economic disruption.

Do Indians today think water is valuable?

In India, water is neither considered as commodity nor possess any significant economic value.

This is mainly because of the due consideration to the essentiality of water as a fundamental human right and to ensure that access to water is not hindered on the basis economic barriers of an individual or community.



Innovative news on **water resource** management

The city of Toronto is planning to levy a storm-water tax and it would be calculated based on the extent of hard / concrete surfaces on a property which are unable to absorb water. (2nd April, 2024).

Very crucial and critical step for the World as Bangalore had 80% porous land in the 1800s, now it is only 4%

Recently, 22 March was World Water Day with the theme water for peace, which also highlights its role of water in fostering prosperity and preventing conflict.



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If You Can't Measure It, You Can't Manage It

Two hydrology projects –

Hydrology I (1995-2003) and Hydrology II (2006-2014)

supported by the World Bank, have introduced new systems and technology that give reservoir managers an accurate picture of the water situation unfolding in their region.

The World Bank projects mentioned in the previous slide have laid the foundation for a comprehensive knowledge base that can improve the overall management of water resources in the country as reliable data is a must for making better decisions.

This is especially important when you are dealing with such large volumes of water, as even small mistakes can have huge consequences.

Holistic Approach to Manage Water in India

- Two-thirds of India is prone to droughts and one-eighth is susceptible to floods.
- India's complex hydrology calls for a holistic approach.
- The two hydrology projects of the World Bank have helped several communities in vulnerable areas to plan and build resilience against the uncertainties of climate change.
- Surging flood waters afflict some 50 million people each year, robbing the economy of anything in excess of Rs. 20,000 crores.
- Drought affects a further 250 million people.



It's Not So Much A Water Scarcity Crisis As A Water Management Crisis

Fact check: Floods are not caused by heavy rains alone. The situation is often compounded by weak water management systems, faulty urban design, or rivers that have been unduly constrained by bunds and encroachments.

With half of India's annual precipitation falling in just 15 rain-soaked days, droughts and floods will likely remain a fact of life in the country.

The only way out is to change the way we manage water fundamentally

Remember the old proverb: Water, water everywhere but not a drop to drink anywhere

Water is indeed everyone's business and has to be that way!!

Water is indeed everyone's business, and stakeholders will need to come together in water-scarce countries to make some difficult trade-offs on the road to water resource security.

The stakeholders need to understand and appreciate the country's economic and social priorities, and which difficult challenges are worth tackling to deliver or free up that water

Some solutions may require potentially unpopular policy changes and the adoption of water-saving techniques and technologies by millions of farmers.

Water Scarcity Staring Us in the Face

- The world is increasingly turning its attention to the issue of water scarcity.
- Many countries face water scarcity as a fundamental challenge to their economic and social development;
- By 2030 over a third of the world population will be living in river basins that will have to cope with significant water stress, including many of the countries and regions that drive global economic growth.
- Across the globe, policy makers, civil society and the business sector are increasingly becoming aware of the challenge facing global water resources, and the need to carefully manage these resources. However, progress has been limited and overall, really too slow.
- Why is this happening: Humans have not practiced WATER CONSERVATION LIKE OUR ANCESTORS?



New Investment and Policies Needed to Increase Productivity and Augment Supply



CONSTRAINTS ON A VALUABLE RESOURCE SHOULD DRAW NEW INVESTMENT AND PROMPT POLICIES TO INCREASE PRODUCTIVITY OF DEMAND AND AUGMENT SUPPLY.



HOWEVER, FOR WATER, ARGUABLY ONE OF THE MOST CONSTRAINED AND VALUABLE RESOURCES WE HAVE, THIS DOES NOT SEEM TO BE HAPPENING.



CALLS FOR ACTION MULTIPLY AND YET AN ABUNDANCE OF EVIDENCE SHOWS THAT THE SITUATION IS GETTING WORSE.



THERE IS LITTLE INDICATION THAT, LEFT TO ITS OWN DEVICES, THE WATER SECTOR WILL COME TO A SUSTAINABLE, COST-EFFECTIVE SOLUTION TO MEET THE GROWING WATER REQUIREMENTS IMPLIED BY ECONOMIC AND POPULATION GROWTH.

Sufficient Food or Sustainably Generating Energy for The World's Population is **at Stake**

- Without a gigantic step change improvement in water resource management, it will be very difficult to meet related resource challenges, such as providing sufficient food or sustainably generating energy for the world's population.
- By 2030, if no efficiency gains are assumed, global water requirements would grow to 6,900 billion m³, this is a more than 40 percent above current accessible, reliable supply.
- One-third of the population, concentrated in developing countries, will live in basins where this deficit is larger than 50 percent.



The Water Challenge is Therefore Closely Tied to Food Provision and Trade

Centers of agricultural demand, also where some of the largest subsistence farmers live, are primarily in:

India (projected withdrawals of 1,195 billion m³ in 2030)

Sub-Saharan Africa (820 billion m³)

China (420 billion m³).



Water requirement for industries slated to increase by 40% by 2030

Industrial withdrawals account for 16 percent of today's global demand, growing to a projected 22 percent in 2030.

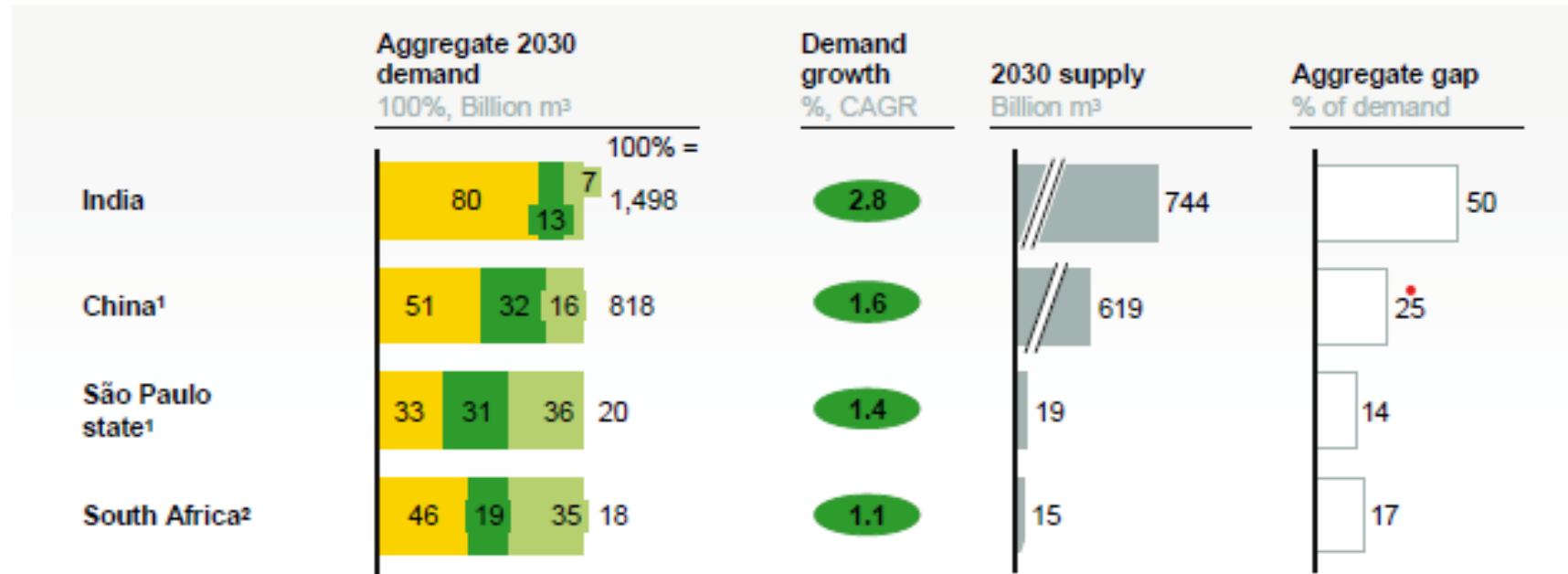
The growth will come primarily from China (where industrial water demand in 2030 is projected at 265 billion m³, driven mainly by power generation), which alone accounts for 40 percent of the additional industrial demand worldwide.

Demand for water for domestic use will decrease as a percentage of total, from 14 percent today to 12 percent in 2030, although it will grow in specific basins, especially in emerging countries in South-Asia like India.



Water is indeed everyone's business and has to be that way!!

Base-case demand, supply, corresponding and gaps for the regional case studies



¹ Gap greater than demand-supply difference due to mismatch between supply and demand at basin level
² South Africa agricultural demand includes a 3% contribution from afforestation
 SOURCE: 2030 Water Resources Group

- These four countries reflect a significant fraction of the global water challenge.
- In 2030, these countries collectively will account for 30 percent of world GDP and 42 percent of projected global water demand.

The Main Themes of The Global Water Challenge

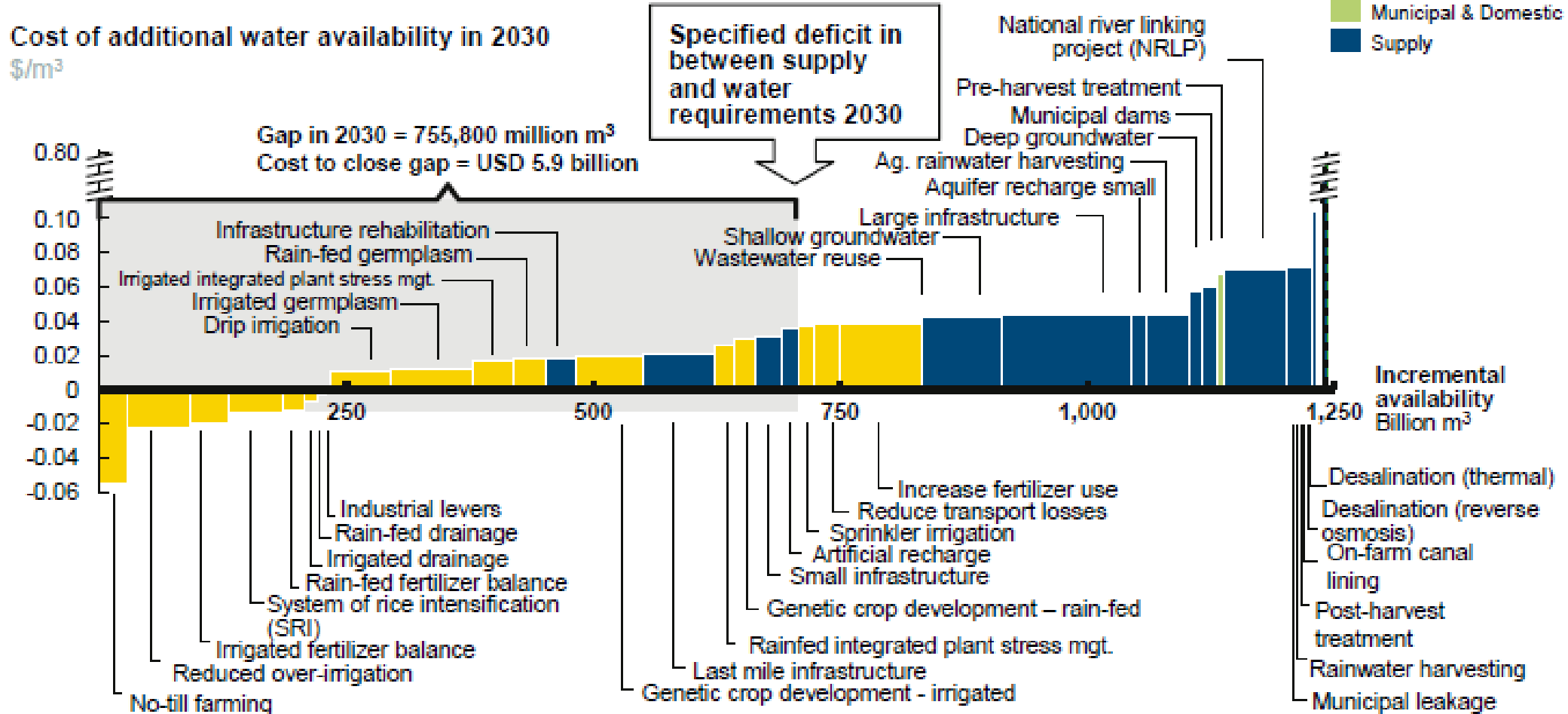
The main themes of the global water challenge, include:

- **Competition for scarce water from multiple uses within a river basin**
- **The role of agriculture for food, feed, fiber and bioenergy as a key demand driver for water**
- **The nexus between water and energy**
- **The role of urbanization in water resource management**
- **Sustainable growth in arid and semi-arid regions**

By 2030, the demand in India will grow to almost **1.5 trillion m³**

- By 2030, the demand in India will grow to almost 1.5 trillion m³, driven by domestic demand for rice, wheat, and sugar for a growing population, a large proportion of which is moving toward a middle-class diet.
- Against this demand, India's current water supply is approximately 740 billion m³.
- As a result, most of India's river basins could face severe deficits by 2030 unless concerted action is taken, with some of the most populous—including the Ganga, the Krishna, and the Indian portion of the Indus—facing the biggest absolute gap.

India – Water Availability Cost Curve



SOURCE: 2030 Water Resources Group

- The cost to close the demand/supply gap in India is over US \$ 5.9 billion per year
(about Rs. 50,000 crore/year)

Enhanced Agricultural Productivity is a Fundamental Part of the Solution to Bridge the Demand Supply Gap: Increasing Crop per drop

Agricultural productivity is a fundamental part of the solution.

- In all the countries studied, agricultural water productivity measures need to contribute towards closing the water gap.
- **Increasing “crop per drop”** through a mix of improved efficiency of water application and the net water gains through crop yield enhancement is the need of the hour.

Efficiency and quality of water are key to manage the so-called water crisis



Efficiency in industry and municipal systems is similarly critical.



Quality and quantity of water are tightly linked.



Most solutions imply cross-sectoral trade-offs.



In India agricultural income could increase by \$83 billion by 2030 from operational savings and increased revenues

In India, where agriculture plays the most important role in the least-cost solution, aggregate agricultural income could increase by \$83 billion by 2030 from operational savings and increased revenues, if the full potential of agricultural measures is mobilized.

Financial institutions are likely to be an important actor in making up this shortfall.

For example:

In India, drip irrigation offers potential for lending and equity investments alike. Further penetration of this technology will grow by over 15 percent per year through 2030, requiring increased manufacturing capacity and credit facilities for farmers.

Nexus between water and energy

- The nexus between water and energy, and between water quantity and quality, is at the heart of the water challenge
- Innovation in water technology—in everything from supply (such as desalination) to industrial efficiency (such as more efficient water reuse) to agricultural technologies (such as crop protection and irrigation controls)—could play a major role in closing the supply-demand gap.

Business as usual no longer an option

The beginnings of change are under way and there is good reason to believe that water will be an important investment theme for public, multilateral and private financial institutions in the coming decades.

Although affordable solutions are in principle available to close the projected water supply-demand gaps, institutional barriers, lack of awareness, and misaligned incentives may stand in the way of implementation, across both the private and public sectors.

Overcoming these barriers will require persistent action and, in many cases, an integrated agenda of water sector transformation.



Country-wide Changes in Water Resources Management Globally **is Critical**



The case for prioritizing country-wide changes in water resources management globally has never been as strong

The challenges that lie ahead are considerable for many countries. However, none are insurmountable

Globally humankind must come together to unlock the full potential of a sustainable water economy

Over the past 50 years the world's population has more than doubled and global GDP has grown over ten times.

Agricultural and industrial output has boomed, and cities have burgeoned. This growth, and these competing uses, have put global water resources under ever-increasing strain.

Yet despite the depletion of watercourses, glaciers, and aquifers in many regions, the Earth is not running out of water—in fact, most countries have more than enough water to supply their populations' growing needs and to sustain the flows needed to protect the natural environment.

It is this management challenge—a factor that we as human societies can control—that threatens our economies, human life and health, and natural ecosystems.

The rate of innovation and productivity improvement in water resource management lags that of many other sectors.

The problem, rather, is that our societies are doing a poor job of managing these water resources.

Please let me reiterate that we are not simply at the mercy of a scarce and variable natural resource.

Our next speaker talking on Low Carbon Emission Technologies

We at UNOICT are working on a project in this field with UNIDO.

There is a platform we manage on Low Carbon Emission Technologies.

<https://www.low-carbon-innovation.org/>

Facility For Low Carbon Technology Deployment(FLCTD): This project was launched in 2016 with an objective to identify innovative energy efficiency and low carbon technology solutions that address the existing technology gaps in Indian industrial and commercial sectors.



**Thank you so much for your
time and patient listening.**

