VIRTUAL WATER – EVERY DROP COUNTS

By Subhash Sethi, Chairman, SPML Infra Limited

Water is a critical resource on earth essential for the existence of life along with human prosperity and healthy ecosystems. All living organisms from tiny cyanobacteria to giant blue whales need water to survive. And life exists wherever there is water and it would not exist without it.

Although over 70% of planet earth is covered by water, but effectively a very small fraction is freshwater that is suitable for human consumption. Furthermore, freshwater resources vary widely in different parts of the earth both in terms of availability and quality. The staggering 1.1 billion people lacking access to safe drinking water and 2.4 billion without proper sanitation resulting in a loss of 2 million lives per year mostly children under the age of 5 that could be reduced with access to safe water and sanitation. The vast majority about 900 million people suffering from water scarcity are extremely poor, living below the poverty line. It is estimated that every 2 minutes a child dies from water–related disease. Access to safe water and sanitation contributes to improved health and helps prevent the spread of infectious diseases as well.

> There are alternative sources available for energy. But there is no alternative for water.

The world population experiencing water scarcity is expected to increase in both absolute and relative numbers and possibly reach two–thirds of the total population in the next few decades. Although climate change is likely to play a crucial role, while growing population will aggravate water shortages.

Water – a Global Market

As the world population will keep on growing, the demand for water will continue to rise considerably. However, the availability of the very limited quantity of fresh water resources is diminishing due to large scale contamination, sinking groundwater levels, dried–up wells, extensive use in agriculture and the climate change. Nearly 70% of India's ground water reserves are already contaminated with biological, organic, and inorganic pollutants and the Central Pollution Control Board has found that 18 major rivers in India are unfit for any domestic and industrial water usage.

Global water consumption doubles every 20 years, more than twice as fast as population growth. Current trends suggest that by 2025, a third of the population will have no access to clean drinking water. Over the last 60 years water consumption in India has multiplied by several times whereas the population has exploded from 449 million in 1960 to 1,380 million currently. The water demand is continuously growing and is expected to grow further by over 20% fueled primarily by the industrial and agricultural requirements apart from the domestic usage. The standing subcommittee of Ministry of Water Resources has estimated that the water demand will escalate from 813 billion cubic meter (bcm) in 2010 to 1093 bcm in 2025

19 MLD Water Treatment Plant, Gagreen, Rajasthan

to further 1447 bcm by the year 2050. Average domestic water demand would also increase from 85 liters per capita per day (lpcd) in 2000 to 125 lpcd and 170 lpcd by 2025 and 2050 respectively.

Water – the Blue Gold

Among other challenges being faced by the people in the world, the most significant and unavoidable challenge is declining water sources. Water is a unique medium, the limited availability and increasing value is progressively becoming more important. The water is our food and a means of production of everything. It is both a source of energy and a world of power. In the next few decades there will be a significant change in the global water resources in many parts of the world. According to the 'Intergovernmental Panel on Climate Change' drought areas will expand further, heavy rainfalls will increase and glaciers and snow areas will get smaller. 'Freshwater stress' has dramatic consequences at the national and local levels.

2074 Million Litres Raw Water Reservoir, Sindhanur, Karnataka

India's NITI Aayog has cautioned regarding the distressing situation with respect to water availability in the country and identified that about 600 million people (44% of total populace) face high–to–extreme water stress in the country and 75% of households do not have proper drinking water facilities.

Prof. Malin Falkenmark from the Stockholm International Water Institute said that 'we are entering an era of aggravated water shortage where easy access to 'blue water' is coming to an end in many parts of the world. Increasing water pollution, more and more depleted rivers, over–used groundwater, the threat to water consumption from salination and from water ecosystems slipping below the critical minimum level indicate a turning point for 'blue water resources'. The inadequate, poor supply of clean drinking water to a large proportion of the world's population, and the availability of sufficient process water, represent one of the most serious challenges to mankind over the next few decades. The fear is not unfound that the way fresh water is diminishing from the earth surface, the days are not far when the value of water will surpass the value of gold.

Virtual Water

Virtual water is the amount of water required to produce a product, from start to finish and is mainly neglected and hidden component of production. Professor John Anthony Allan from King's College London and the School of Oriental and African Studies, a pioneer of key concepts to the understanding and communication of water issues and how they are linked to agriculture, climate change, economics and politics has pioneered the concept of "virtual water".

In brief, it is the quantity of clean water that evaporates, is consumed or is contaminated during the production of a product – from the watering of commodity crops to the water used in production system to even cooling the machinery used for producing a product. When the 'water footprint' of various products is calculated, it reveals a much higher consumption of water than might have been thought. People do not only consume water when they drink it or take a shower, but consume virtual water throughout their usage of products and daily living.

In 1993, Prof. Allan made a major breakthrough in how to demonstrate this by introducing "virtual water," a measurement of the water that is embedded in the production of foods and consumer products. Behind that a cup of morning tea, there are about 35 litres of water that was consumed to grow, produce, package, and transport the leaves. For a cup of coffee at breakfast, over 140 litres of water is used from producing the bean to reaching it in a cup on the table. Similarly, a hamburger consumes 2,400 litres of water, a pair of jeans uses 5,400 litres whereas a small car will consume anything above 450,000 litres of water from its assembly line to finish product at our doorway that is twice the water being consumed by an average Indian family in a year.

India is the largest user of groundwater but its water footprint is far lower than that of several developed economies as the virtual and real water use of an average Indian per day is estimated to be 3000 litres as compared to 7800 litres of an

With our consumption level and declining sources, soon, the value of water will exceed that of gold.

Gagreen Water Supply Project, Rajasthan

average American. The following table depicts the total amount of water used directly by a person in addition to the water that has gone in the production of all items used which is the virtual water not used directly.

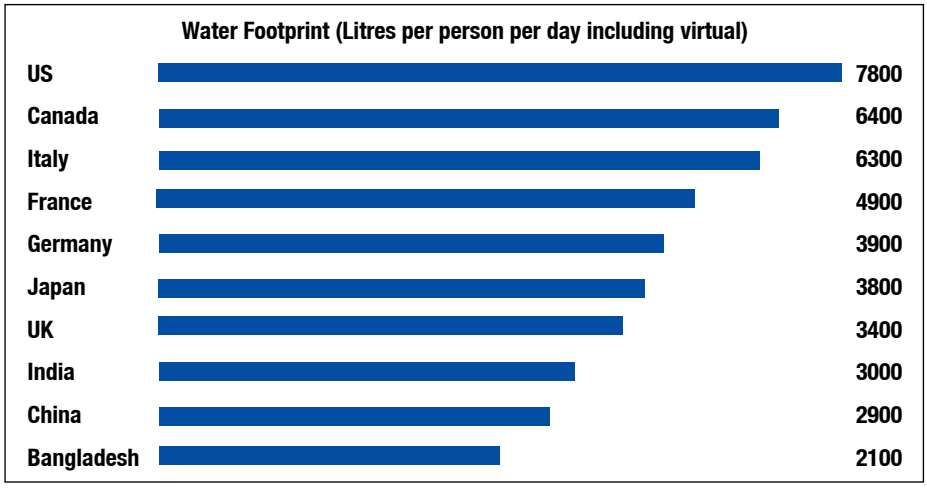
India produces wheat and rice as the main staple which are the highest water–guzzling crops. Food trading is recognized as virtual water transfer and in 2019–20, India shipped 40 lakh tonnes of basmati rice to 100 countries that used more than 10 trillion litres of water to produce it, that means India virtually exported over 10 trillion litres of water. It is estimated that 22% of global water use goes towards producing goods for exports that means developed countries are importing most of their virtual water. Estimate suggest that US imports about 20% of its virtual water which is as high as 75% in UK and 77% in Japan as compared to just 3% in case of India and 10% in China. A comparison between water wealth and water poverty will show that a disparity is evident between wealthy and developing countries in terms of access to drinking water and access to water intensive food and other articles.

The insights of virtual water through Allan's work have made major impacts on global trade policy and research and have redefined the global discourse in water policy and management practices. Water–intensive commodities can be traded from places where high returns to water can be achieved to economies that cannot produce as efficiently. This national water and trade policies has significantly been influenced with more strategic planning revolved around the major implications for balancing global water resources as virtual water concept provides the potential to use trade to alleviate regional water scarcity and make use of water resources more efficient.

In short

Fresh water is a limited resource despite being recycled by nature. High water consuming agriculture and economic activities and population growth are responsible for declining per capita water availability across the globe. The urban population is getting large in sheer numbers in all cities due to high degree of migration of the rural people in search of livelihood and the supply of water in the large cities of India is becoming a serious challenge.

This would need a systematic augmentation of water supply contending with the depleting water resources and enhanced consumer needs while also trying to reduce the virtual water consumption with city dwellers.



About the Author

Mr. Subhash Sethi is Chairman of SPML Infra Limited, a leading Engineering and Infrastructure Development company in India with over 600 completed projects in the domains of Water, Power, Sanitation, Environment, and Civil Infrastructure. Under his leadership, SPML Infra went on to establish itself as the leader in water domain and developed sustainable infrastructure to help water utilities to deliver safe and clean drinking water facilities to over 50 million people in India.

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