5 New Mindsets: Solving the World's Water and Wastewater Problems

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My interest in water developed in a circuitous way. When I decided to pursue an academic career, I joined the University of Strathclyde in Glasgow. I wanted to be a specialist in soil mechanics and foundation engineering. The tradition in Strathclyde at the time was that the newest hire had to teach the subject for which there was no lecturer available. Soil mechanics had more than its fair share of lecturers in those days, but hydraulics and fluid mechanics did not have many. I was thus forced to teach this subject. It was initially not a very exciting option for me!

At the end of the first year I realized that not only is water a truly fascinating subject but also that a water expert could make a far greater contribution to improve lifestyles and standards of living than a soil mechanic expert ever could dream. A few years later, I was totally convinced that this was the right decision for me. Life dealt me an ace, and I have never looked back!

More than two centuries ago, Samuel Taylor Coleridge wrote in his immortal poem, *The Rime of the Ancient Mariner*: "Water, water, everywhere, Nor any drop to drink." Coleridge's ancient mariner was stranded in the middle of an ocean on a motionless ship because there was no wind. The freshwater supply had run out. Thus, his statement was fully understandable. However, some 225 years after Coleridge wrote the poem, the situation in many parts of the world has become very similar to what was faced

by the ancient mariner. The situation is now so grim that water from river and lakes and even underground water near the urban centres of the developing world cannot be drunk without significant treatment. According to the Third World Centre for Water Management, at least 3 billion people, and possibly as many as 3.6 billion people, still do not have access to clean drinking water. This is significantly higher than the entire population of the world when Coleridge wrote his remarkable poem.

Why has this happened in spite of the fact that scientific and technological developments have made tremendous progress over the past five decades, the world has been awash with money, the number of middle class households all over the world has increased to a level that is unprecedented in human history, and a true communication and information revolution has occurred all over the world? The answer, not surprisingly, is complex.

First, throughout history, water has been taken for granted. It has been used extensively and abused intensively without considering its future availability. One would be hard pressed to find a single country anywhere in the world where water has been managed efficiently and rationally for the past 30 years, let alone over a longer period. Not surprisingly, nearly all water sources in and around the urban centres of the developing world are under considerable stress, because of overuse as well as poor water quality management practices.

Second, sadly, throughout the world, one would be hard pressed to find a single country where political leaders have dealt with water issues seriously on a consistent basis over the past three to four decades. Leaders become interested in water only when there is a severe flood, a serious drought, or a calamitous natural hazard. Once the danger has passed, water no longer merits a place in their agendas. Yet, solutions to all water problems require long-term sustained attention: these cannot be resolved in three to four months, or even years.

Third, unlike other resources, water has a deep emotional linkage to human beings. It also has profound meaning and significance in all religions and cultures. It is the only natural resource people expect to be provided free or at highly subsidized prices. Water professionals claim that this is because human beings cannot survive without water. While this may be true, human beings also cannot survive and function without food, energy, and many other resources. Yet, no country provides food

to everyone free or at very subsidized prices. Without energy, people will freeze to death in most temperate climates and mountainous areas. A city like Singapore cannot function without air conditioning which requires considerable energy. Yet, no one argues that energy or food should be provided free or with high subsidies.

The water mystique and emotionalism is evident too in the fact that no country wants to provide water to another country at any price, even when they may have water in excess of foreseeable needs. Take Canada. If any Canadian politician dares hint that there is excess water in the country and that this excess water could be exported to the United States at mutually agreed prices, that person would be committing political suicide! Countries will take other countries to WTO arbitration if they feel that their energy, agriculture, food, timber, or minerals cannot be freely exported. However, trade in water between countries, or even states within the same country (as in India and Pakistan), is unacceptable to the people and thus to politicians.

Fourth, water, in most countries of the world, is provided free. Agriculture, which accounts for nearly 65 percent of global water use, is provided free to all farmers everywhere in the world. Not surprisingly, farmers use much more water than they need, as a result of which in all countries where agriculture is an important activity, groundwater levels have been declining steadily as also river flows because of extensive water abstractions for irrigation. This situation can be noted in developed countries like the United States, France, Spain, and Australia as well as in most developing countries.

For domestic water use, prices are either free or subsidized in most places. Even in Singapore, where urban water management is one of the best in the world, the price of water has remained the same since 2000, while average household income has gone up by nearly 80 percent in the same period. Not surprisingly, an average Singaporean uses nearly 50 percent more water than a Hamburg resident, primarily because Hamburg has used water pricing very successfully as an instrument of water conservation and also has more innovative pricing policies. The absence of proper water pricing has been a major problem in water management all over the world.

Thus, the global water situation has been progressively worsened for the last several decades — not because there is not enough water in the world but rather because prevailing water management practices and processes have been consistently poor everywhere. Over the years they have improved only incrementally.

At present, not only are our management practices 30 to 40 years behind the times, but also many widely accepted facts and figures are significantly wrong and do not make much sense. When the accepted problem definitions are flawed, their solutions cannot be correct. In addition, the general public and policymakers do not appreciate the seriousness of the current and future water problems, especially when their magnitudes and extents have been consistently underestimated.

Take the oft-quoted 'fact' that the world has met its Millennium Development Goal (MDG) in water some three years before the target date. (The MDG stipulates that the number of people in the world who do not have access to safe water should be reduced by half between 1990 and 2015.) This achievement has been trumpeted by the United Nations as remarkable, especially when the majority of its targets in different areas are seldom met.

Let us consider the facts objectively and carefully. The United Nations Water Conference that was held in Mar del Plata, Argentina, in 1977, proposed that the decade of the 1980s should be considered as the International Water Supply and Sanitation Decade. By 1990, the target was that every person in the world should have water that is safe to drink. While this target proved to be over-ambitious like most other UN targets, the fact still remains that this decade was instrumental in providing clean water to millions of people all over the world who otherwise would not have had access to clean water.

However, the concept of "clean" or "safe" water was basically lost during the process. A cynic may claim that the process was deliberately fudged so that no matter what happens in reality, the target could be seen to be achieved. The two leading UN institutions, the WHO and UNICEF, came out with new terminology: the target was now referred to in terms of "improved" sources of water rather than "clean" or "safe". For all practical purposes, the WHO and UNICEF, who are responsible for monitoring progress in water supply and sanitation, allowed countries to define arbitrarily what constitutes "improved" sources of water. As a result, most developing countries decided to define "improved" as access to water, irrespective of its quality and quantity.

All UN institutions, the World Bank, and the regional development banks further obfuscated the problem by referring to "improved" sources of water at the beginning of their reports and then later consistently referring to "clean" or "safe" water. By

using the terms "clean" or "safe" significantly more often than "improved" sources of water, international organizations have created an illusion that "only" 783 million people in the world "do not have access to clean water". For example, the UN trumpeted this "achievement" in its World Water Day message in 2013 and also in nearly all of its relevant publications.

The developing countries provided erroneous national data to the UN and the UN accepted these data without any qualms or questions and published such dubious information in their regular assessments because in the end both sides had an interest in claiming success. For example, *Progress in Drinking Water and Sanitation: 2013 Update* notes that Egypt had 100 percent piped water in all its urban premises in 2011. The figures for China were 95 percent, Mexico 94 percent, Congo 64 percent, and India 51 percent. An intelligent and perceptive tourist, who has spent even a week in any of these countries, would dispute these highly inflated, self-serving figures which are nowhere near the truth.

Let us consider South Asia as a whole, a region over 1.7 billion people. Neither the UN nor the countries of the region can showcase one reasonable-sized urban centre where the inhabitants dare drink directly from the taps. What is even worse is that in cities like Delhi or Dhaka, a decade ago people were using simple carbon filters to treat their water. In the intervening years, water pollution has become so severe that the citizens of these megacities are forced to use membranes before the water is safe to drink.

The world is subjected to similar misinformation in terms of sanitation targets. I was the principal advisor to the Secretary-General of the UN Water Conference and was one of the prime movers to have water supply and sanitation targets approved by this world body. When I proposed the targets for the Water Supply and Sanitation Decade (my suggestion was more modest), the idea was simple and unambiguous. Safe water was water which could be drunk without health concerns. Sanitation meant collecting wastewater from houses, treating it properly at a sewage treatment plant, and then discharging this treated wastewater safely to a water body without causing health hazards and environmental harms.

This simple definition was subsequently corrupted very significantly. Sanitation now means that households should have toilets and the wastewater needs to be taken

out of the houses. What happens to the wastewater afterwards is not relevant! For instance, Delhi discharges nearly all its untreated wastewater into the Yamuna River and Mexico City exports its untreated wastewater to Mezquital Valley. Both megacities have been claiming for years that they have excellent sanitation!

Regrettably not only UN officials but also politicians all over the world are parroting grossly erroneous figures. Consequently, the consensus thinking at present is that the water supply and sanitation situation in the developing world is significantly better than it truly is on the ground. Even academics are not reading the fine print and are repeating erroneous facts. All these developments remind me of the infamous statement attributed to Joseph Goebbels: "If you tell a lie big enough and keep repeating it, people will eventually come to believe it." Sadly, the situation is somewhat similar in the water supply and sanitation areas.

The unfortunate fact is that given sustained political will, an informed public, and an alert media, there is absolutely no reason why any urban centre of more than 200,000 people cannot have a financially viable model to provide 24-hours of water that can be drunk straight from the tap. The domestic users of such a utility can pay for the water directly based on the exact amount of water they consume. Only the poor could receive a targeted subsidy to ensure that they have access to an adequate quantity and quality of water. By following this simple model, the city of Phnom Penh has already developed a world class water utility, many of whose performance indicators are better than those of London or Los Angeles. If a city like Phnom Penh, with all its current constraints and shortcomings, can achieve it, there is absolutely no reason why other Asian urban centres cannot duplicate this model with appropriate adaptations to account for local conditions.

As Marcel Proust said "The voyage of discovery is not in seeking in new landscapes but in having new eyes." In the area of water supply and wastewater disposal, the time has come — in fact I would argue long past — to look at these global problems with a new pair of eyes in order solve them. Recognizing the real dimensions of global water problems is my passion. Finding cost-effective, timely, and implementable solutions for them is my dream.