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**Water: How to Manage a Vital Resource**

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**Water Management in the 21<sup>st</sup> Century: Some Myths and Realities**

An objective and comprehensive analysis of water management and development in recent years will indicate that the water profession has been quite good at looking at the past and present situations, but very poor at assessing the possible future developments, say even a decade from now, let alone in 2025 and beyond. This is not a new development. For example, if we review the forecasts of water requirements of the world that have been made since 1950, these have consistently proved to be serious overestimates. The present forecasts of future water requirements are equally likely to prove overestimates.

The main reason for this likely overestimate is that the world is changing very fast, and, with it, the water use and requirements patterns are changing rapidly as well. In fact, a historian in the 21<sup>st</sup> century, looking back on early part of the 20<sup>th</sup> century, will probably characterize the present period as a time when profound changes took place. Based on the work we have carried at our Third World Centre for Water Management, it can be safely said that the world of water management will change rapidly during the coming decades. We shall probably witness more changes during the next 20 years, compared to the past 2000 years. However, unlike in the past, the main drivers of these future changes are likely to come from outside the water sector on which the water professionals will have limited, or even, no control.

Within this overall context, let me share with you my views on some of the priority water issues of the future.

**Water crisis** – The prevalent majority view is that the world is facing a crisis because of physical scarcities of water. Many international organizations have now produced maps showing how the various regions of the world will increasingly face scarcities because of increasing water shortages in the coming decades.

Research carried out at our Centre indicates that this view is erroneous. The world is not facing a water crisis because of actual physical scarcities of water. However, the world may face a water crisis in the future because of widespread and continuous mismanagement of water. This is NOT the same as a water crisis resulting from physical scarcities of water. The two issues are very different, and their solutions are equally different. The world has enough water for our current and foreseeable needs, if we can concurrently manage our demand and supply properly. Even for the very arid

regions of the world, there should be no water crisis, if we can manage our available water resources prudently and efficiently.

In this connection, my view is very similar to that of the Asian Development Bank, the only major international institution that has pointed out that the world has enough water but it is not being managed properly. It is the mismanagement that is causing all the existing water-related problems. The water profession should commend the Asian Development Bank for its technically and intellectually correct view, even though the most other international institutions and the international media has thus far preferred the “gloom and doom” scenario of the world’s water future.

Sadly, even though we now have the knowledge, experience and technology to manage water efficiently, these are now, for the most part, being widely ignored. If we can translate our existing knowledge into practice, the world’s water problems will disappear. Water management is exemplary in a few selected parts of the world. For example, countries like Singapore have made remarkable progress in terms of total catchment management, provision of high quality water supply, wastewater management, water conservation and public participation. If other countries and cities can follow the Singapore experience, the urban water supply and wastewater problems of the world will basically disappear. Similarly, a city like Phnom Penh has made absolutely remarkable progress in terms of urban water management since 1993, when its unaccounted for water losses were at 75 percent. By 2006, these losses have been reduced to only about 9 percent, which is better than most of the European cities. Consequently, the residents of Phnom Penh at present have a 24-hour drinkable water supply. Unfortunately, the world at present does not even know much about the best practices in places like Singapore or Phnom Penh, let alone learn from their positive experiences.

By focusing on the real success stories from different parts of the world and also for different water sectors, which are often mostly unknown at present to the water professionals, we can learn what are the best models that are now available, as well as what have been the enabling environments that have allowed such models to function effectively. Countries that are looking for solutions to their specific water problems can review the successful models that are being used in different parts of the world, select one that may suit their needs and the prevailing conditions the best, and then modify the model(s) as appropriated to suit their own specific boundary conditions.

For this positive but essential development to occur, a great deal of knowledge synthesis has to be carried out, especially in developing countries, to objectively identify the best practices, and also carefully assess of the enabling conditions which have made such best practices possible. These studies, for the most part, have yet to be done. I again would like to commend the Asian Development Bank for being one of the pioneers to initiate a programme of knowledge synthesis to determine in which Asian cities urban water management now works best and why. Similar approaches are needed to find the current best practices for other water sectors and also for all different geographical regions. Once these best practices are identified, assessed and used for managing water, the so-called crisis becomes manageable.

A corollary of the water crisis issue is the idea of water wars. Many people have suggested that some countries are likely to go to war because of conflicts over water scarcities and water allocations. For the record, in some 5,000 years of human history, no two countries have gone to war over water. It can be said with near total confidence that no two countries are likely to go to war in the foreseeable future because of conflicts over water. It is possible that two countries may go to war for which the 15<sup>th</sup> reason may be water, but the first 14<sup>th</sup> and the main reasons for the war will be non-water related.

While the media loves the stories about water crises and water wars, none of these are real issues. Paraphrasing Alfred Hitchcock, ideas of water crises and water wars are clever McGuffins at best. Based on my own personal analyses and work in 60+ countries, I am now cautiously optimistic of the global water future. I do not share the gloom and doom scenarios because the existing and foreseeable water problems are now solvable. We already have the knowledge, technology and management expertise to solve them.

**Urbanisation and megacities** – In the water profession, much has been written on urbanisation and megacities. During the past Stockholm Water Symposia, World Water Forums and other major international water gatherings, the water problems due to increasing urbanisation and growth of the megacities have been discussed ad infinitum. While both are complex issues, my view is that these are unlikely to be the most complex urban water problems of the future.

Let us consider megacities, which are at present defined to have populations of 10 millions or more. It will not be an exactly easy task to manage their water and wastewater problems in the future, but they are likely to manage them somehow. This is because megacities like Cairo, Delhi, Dhaka, Jakarta, Mexico or Sao Paulo are politically and economically powerful. The elites and the power brokers live in these cities; they have technical and managerial expertise; financial wherewithal; and good media coverage. These and other associated advantages will ensure that the residents of these megacities continue to have reasonable access to water.

The problems are likely to be much more complex and difficult for small-to-medium size urban centres, with populations between 20,000 and 250,000. They have access to limited funds, as well as to management and technical expertise. They have no economic or political power. These are likely to be the urban areas where the people are likely to face serious water problems in the future, for which implementable and long-term solutions will be very difficult to find.

Similarly, while urbanization has been an important concern for the water profession, we have completely ignored “ruralisation”, a term that we have coined at our Centre. By ruralisation, we mean the growth of new hamlets of 2,500 inhabitants or less. From Mexico to Morocco, the growth of these small hamlets has been exponential. They are dispersed, and inhabited with poor people, without any economic and political power. How we can provide all types of services, including water and sanitation, to this increasing number of hamlets is completely ignored at present. Not a single country and

not a single international institution has even considered the issue of ruralisation, let alone formulate a policy to resolve this accelerating problem. Not even a single person anywhere in the world is now working on this exceedingly complex problem. And yet, this is likely to be a major water-related issue of the future.

An associated, but equally complex problem of the future will unquestionably be water-related needs of the elderly. The number of elderly in the developing world will start to go up exponentially from about 2010. By 2025, China alone will have more elderly people than the entire current population of the United States. And yet, even though one can easily identify hundreds of workshops on water-related issues for women and children, not even a single event anywhere in the world has thus far focused on the water needs of the elderly. At present, we simply do not have much information on water and the elderly. It is another forgotten issue that requires our urgent attention.

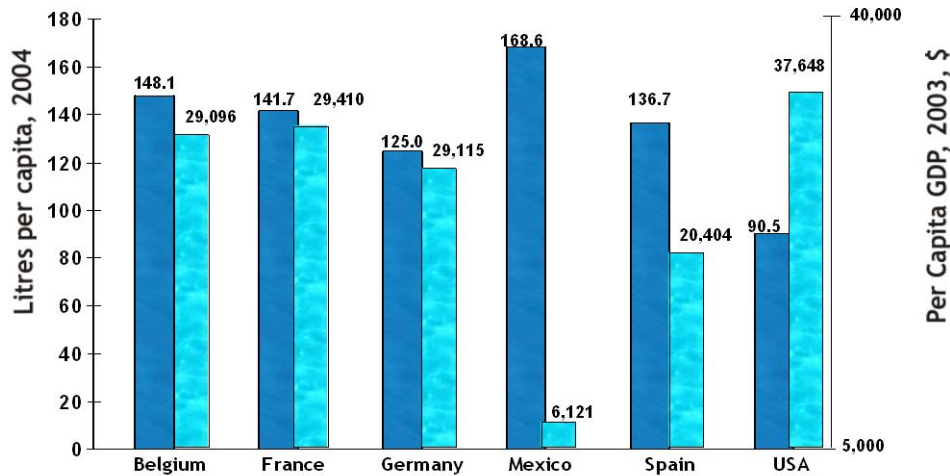
**Millennium Development Goals** – An important millennium development goal (MDG) has been to reduce the number of people that do not have access to clean drinking water by half, between 2000 and 2015. The MDGs did not refer to access to sanitation. However, the Johannesburg Declaration stipulated that the number of people not having access to sanitation should be reduced by half, by 2015.

During the preparatory process of the United Nations Water Conference that was held in Mar del Plata, Argentina, in 1977, we proposed that the decade of the 1980s should be proclaimed as the International Water Supply and Sanitation Decade so as to accelerate access to water supply and sanitation. The implicit understanding, when the Decade was first considered, was that access to water meant a source that was drinkable, and access to sanitation, at least in the urban context, meant that wastewater will be collected, treated and disposed of in an environmentally-safe way. However, the situation is now very different in terms of statistics that are currently being used in terms of access to water supply and sanitation, at least achieving the MDG targets.

From Mumbai to Mexico City, and Delhi to Dhaka, water that the urban residents currently get is not drinkable, and the service delivery is restricted for only a few hours (generally 2–4 hours each day). Consequently, residents now have to boil water, or use a filtration system. In cities like Delhi, the quality of water supplied has deteriorated so much in recent years that the traditional methods like boiling or filtration are no longer adequate to safeguard health concerns. Accordingly, households are now being forced to use membrane technology, at significant costs, in order to ensure that the water supplied is drinkable.

Because of poor quality of water supplied, use of bottled water is increasing exponentially in the developing world. At present, annual per capita use of bottled water in Mexico is nearly twice that of the United States, even though the per capita GDP in Mexico is approximately 1/6<sup>th</sup> that of the USA (Figure 1). This is because the quality of tap water is generally considered to be unacceptable in Mexico, as a result of which the residents are either forced to buy bottled water for drinking, or use a good household filtration system. This situation has ensured that the consumption of bottled water in Mexico is exceptionally high.

Figure 1. Comparison of per capita bottled water consumption (2004) and per capita GDP (2003) in U.S. dollars



The issue that thus needs to be discussed urgently is whether under these conditions we can consider that the residents of these urban centres can be considered to have access to safe drinking water in terms of achievement of the MDGs, as it is assumed at present.

The situation is equally unsatisfactory in many urban centres of the developing world in terms of access to sanitation. At present, in many urban centres of the developing world, practices and processes in terms of collection, treatment and disposal of wastewater continues to be poor and thus unacceptable. In cities all over the developing world, wastewater management needs to be very substantially improved. In many cities, wastewater is collected, but not treated, or only partially treated, before being discharged to rivers, oceans or land, creating serious contamination problems. The approach is almost equivalent to “out of sight, out of mind”. Cities as diverse as Delhi, Dhaka, Manila, Mexico and Sao Paulo are discharging untreated, or partially treated, wastewater to land and water surfaces. For example, at present Mexico City discharges over 45m<sup>3</sup>/sec of untreated wastewater to the Mezquital Valley, which is then used for irrigation. Because of such discharges of untreated, or partially treated, wastewater, water bodies in and around major urban centres of the developing world are often seriously contaminated. These will have long-term adverse impacts on the human health and the environment.

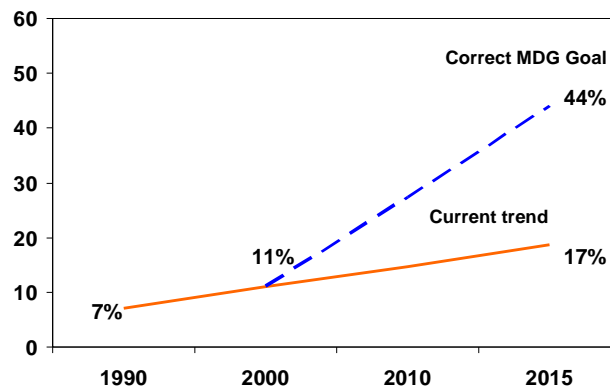
Surprisingly, in the context of achieving the sanitation target by 2015, it is assumed that the residents of these cities have access to sanitation, even though wastewater is not properly treated. It is true that wastewater is taken away from the places where they are

generated, but this was not what was meant by access to sanitation when we first proposed the Decade of the 1980s. The global discussions and debates regarding the MDG-associated goals need to be rephrased: playing statistical games to achieve the targets is not the solution, nor should this be the goal.

Let us approach the problem in a slightly different way: that is, the percentage of people that had access to reasonable wastewater treatment in 2000, and then take the MDG philosophy of halving the number of people who may not have access to wastewater management by 2015.

Viewed in this way, in Latin America, only about 11 percent of the people had access to wastewater treatment in 2000. This means that if we apply the general philosophy of the water-related MDGs, by 2015, this percentage should increase to 55.5 percent (Figure 2). By considering the progress that have been made up to 2006, it can be said with almost with near-total certainty that the realistic probability of achieving this target for Latin America as a whole, by 2015, is almost close to zero!

Figure 2. CORRECT MDG GOAL : percentage of population in Latin America with wastewater treatment



Our Centre has not done similar studies for the Asian developing countries or Africa. Nor are we aware of any such studies by any other organisation for these two continents. However, my view, based on anecdotal evidence, is that the situation is likely to be somewhat similar in Asia and Africa, as noted in Latin America. In other words, Asia and Africa are facing similar mammoth problems in terms of wastewater management.

The global situation in terms of the percentages of the people that have access to drinkable water supply and proper sanitation practices are significantly lower than what the world has been led to believe thus far. By playing statistical games, we may be able to achieve the MDG targets, but we shall not be able to solve the real problems. In the

water profession, we have failed to ensure that the global water debate on these complex but important issues remains correct and relevant.

**Same old stuff (SOS)** – A major global syndrome at present in the global arena is what I call SOS (same old stuff). One can go from one meeting to another, and listen to the same old stuff time and again. They are based on past experiences, past mind-sets and past knowledge. The world has moved on, but we in the water profession generally have not. We have been saying for at least the past 35 years that business as usual is not the solution and thus cannot continue. However, we behave as if there is no other solution! Activities have often become synonymous with progress: and simply treading water will not allow us to make good progress.

Let us consider the last two World Water Forums in Kyoto and Mexico City. Not even a single presentation focused on what the world of water will look like in 2010, let alone in 2020 or beyond. Some of the papers presented could have come even from the 1960s, let alone from the 1980s or 1990s. Not surprisingly, the impacts of these megaconferences at national, regional or global levels have simply been indiscernible. Such events have not contributed to even one person getting better water supply or sanitation, no national, international and institutional policy has changed because of these events, and our knowledge-base has not improved even one iota because of these events.

At our Centre, we have carried out a comprehensive study on these impacts of megaconferences. Only 2.27 percent of the 2,326 respondents from 121 countries that were contacted felt that such meetings have been useful and cost-effective. This is not surprising since these large meetings have never formulated any specific criteria for measuring their success. Nor have the organisations concerned have encouraged or assisted with independent evaluations to identify their strengths and weaknesses. The criteria of success have invariably been how many people participated, and from how many countries. As long as a large number of participants from 100+ countries did participate, these meetings are considered to be very successful, irrespective of any perceptible impacts. In retrospect, there is no question that even if these meetings had not taken place, the world of water would not have been any different at present.

The best that can be said for these large gatherings is that they provide an opportunity to meet old friends, and make some new ones. They provide opportunities to the participants to do some side business on water-related issues. They can also be a useful mirror to gauge the views of the water establishment, which change very slowly. It would be fair to say that we should stop pretending that these are useful and desirable water events for the world, except perhaps for some few participants for their own personal reasons.

The costs of these events have now become astronomical. It is estimated that the total cost of the Mexico Forum was around 200 million dollars. Only the Secretariat cost of the Kyoto Forum has been estimated at 28 million dollars. By any standard, these are huge amounts for events which have had no discernable impacts on the water sector. It

is time that we reassessed the needs of these mega and expensive events, which mostly produce SOS: the same old stuff.

**Concluding Remarks** – In this brief exposition, I have discussed some of the current perceptions and likely future developments in the water sector. By being politically correct, and saying everything we are doing is fine, will not even allow us to identify the real water problems facing the world, both current and future, let alone solve them.

The world is heterogeneous, with different cultures, social norms, physical attributes, skewed availability of renewable and non-renewable resources, investment funds, management capacities, and institutional arrangements. The systems of governance, legal frameworks, decision-making processes, and types and effectiveness of institutions differ from one country to another in very significant ways. Furthermore, countries are at different stages of development, and thus their water and development needs and requirements, which vary with time, are also different. Accordingly, and under such diverse conditions, one fundamental question that needs to be asked is if it is possible that a single paradigm, like IWRM or IRBM can encompass all countries, or even regions, with diverse physical, economic, social, and cultural conditions? Is it feasible that a single paradigm can be equally valid for technological giants like the United States and Japan, the world's most populous countries like China and India, and for countries as diverse as Brazil and Burkina Faso? Is it possible for a single concept to be equally applicable for Asian values, African traditions, Japanese culture, and Western civilization? My personal view is that they do not. In this heterogeneous world, one size simply does not fit all.

Equally, one size that may fit a country at a specific time may not be appropriate at a later time. There is thus a time dimension to the solution of any specific problem, since the overall environment within which water is to be managed is not static: the conditions are invariably dynamic and changing continuously. Equally, the social, economic and institutional frameworks for water planning and management are evolving. Accordingly, there is a time dimension to the solutions to the water problems as well. In other words, a solution that may be appropriate at any one time in a specific place may not be a good solution a decade or more later.

The world's water problems are solvable. We already have the knowledge, experience and technology to solve them. If we do not manage to solve them, we should remember the salutary remarks of William Shakespeare in *Julius Caesar* (I, ii, 140–141):

“The fault, dear Brutus, is not in our stars,  
But in ourselves, that we are underlings.”