

## Missing and neglected links in water management

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**Abstract** In the current revolution in water management; issues that must be addressed include both urbanisation and ruralisation, water quality, and globalisation and energy policy. Water management must struggle against inappropriate research, myths and inadequate data

**Keywords** Flawed data; rural growth; urbanisation; water management; water myths; water quality

The world of water management is changing radically, so much so that it is likely to change more during the next 20 years compared to the past 2000 years. The signs of rapid changes can be noted only if the developments that are occurring on the ground in different parts of the world at present are carefully reviewed. Many past trends have already changed, and are continuing to change. The water profession has noted some of these changes, but equally many are being ignored, or are not receiving adequate attention. In addition, there is no doubt that water management practices and processes in the coming years will become increasingly complex, and forces stemming from developments from outside the water sector are likely to influence this area more and more in the coming years.

There are many missing and neglected links to which the water profession is not giving adequate attention. In contrast, there are also several issues to which the water profession is currently giving too much attention, which they do not deserve, perhaps because of political correctness, or expecting the future to be a gradual extension of the past, or other reasons.

There are many missing and neglected links in water management, but because of time and space constraints, only some of them will be discussed herein.

### Urbanisation

The problems associated with water management (water supply, wastewater treatment and disposal, flood control) in the megacities of the world have received considerable attention in recent years. There is no question that as these megacities continue to grow, their management will become more and more complex, certainly more difficult than what they are at present, or were in the past (Uitto & Biswas, 2000). While water management in megacities has received the lion's share of attention during the last decade, it is highly likely that it is the mid-size cities that will find managing their water resources significantly more difficult in the coming years, compared to the megacities. Megacities are politically, economically and institutionally very powerful within the countries concerned. Accordingly, they generally "suck in" significantly more resources and attention compared to the shares of the mid-size cities. The case of the Metropolitan Area of Mexico City is a good example. The total construction cost of the Cutzamala system until 1996, which is expected to bring some 27 percent additional water to the area, was more than the combined national annual budget for that year in the areas of education, health and social security, agriculture, livestock and rural development, tourism, and the marine sector (Tortajada, 1999). It should be noted that the construction of the Cutzamala system is still incomplete, and the costs do not include operation and maintenance costs, or the costs of collecting and treating the additional wastewater that would be generated.

In addition, the population growth rates in many of the mid-size cities are now higher than the megacities of the countries concerned. As the Mexico City case indicates, the mid-size cities do not have the political, economic, and institutional power to attract their fair share of investments for the water sector, compared to the megacities. Thus, the urban water management problems of the mid-size cities need urgent accelerated attention.

### **Ruralisation**

While urbanisation of the developing world is receiving most attention, an associated phenomenon has been neglected thus far since the water profession has been basically interested in the implications of urbanisation and not ruralisation. Studies in Mexico (Castelan, 2000) indicate that the number of rural centres of population of 2500 or less has increased dramatically in recent years, from 96,611 in 1970 to 198,311 in 1995. To what extent this phenomenon is occurring in other parts of Latin America, Asia, and Africa is unknown at present. However, it is unlikely that ruralisation is an exclusively Mexican development. These new rural habitations are often in geographically undesirable locations, people concerned have limited education and skills, and they have equally limited economic or political power. Government institutions have shown little or no interest in this ruralisation process. Provision of basic infrastructures like water supply, wastewater disposal, transportation and communication facilities, etc., to these emerging, but often isolated, rural areas, is going to be an extremely difficult task because of economic and political reasons. More work will be necessary before the magnitude and extent of this ruralisation is known, and reasons for their growth are understood. Only then can policy measures be identified for the resolution of this complex problem.

### **Water quality management**

The main water issue the world is preoccupied with now is the possible scarcities many countries may face in the future. While water scarcity is an important issue, an even more serious crisis during the next two decades is likely to stem from the general neglect of water quality issues. In spite of the national statistics and reports of international organisations which often generally portray a rosier situation than the one prevailing at present, less than 10 percent of industrial and municipal wastewaters is properly treated and disposed of at present in Africa, Asia and Latin America. Water bodies near urban centres, ranging from Delhi to Mexico City, and Rio de Janeiro to Manila, have mostly been transformed into open sewers. For example, the River Jamuna is classified as dead for a stretch of around 32 kms around Delhi because of dangerous levels of toxic chemicals and hazardous wastes. Groundwater contamination, for the most part, is increasing.

Water quality is a critical consideration for human and ecosystem health. Based on currently available national and international statistics, 81 percent of the population of a country like India has safe drinking water. Not only are such figures way off the mark, but much of the drinking water supplied at present in the developing world is not "safe." Unsafe drinking water has already become a significant burden to the national economies of the developing world because of very high health and environmental costs. The health costs of unsafe drinking water for India alone has been conservatively estimated as \$4,650 million for 1993. The costs would be similarly high for other countries like Brazil, Indonesia, Mexico or Kenya. Sadly, there is a lot of rhetoric and "politically correct" statements on water quality management from national and international institutions, but regrettably all the indications are that this issue is still not receiving adequate attention. Furthermore, even though many new water supply schemes are now under construction, commensurate emphasis is not being given on the construction of appropriate drainage systems and wastewater treatment plants. Since virtually all water supplied ends up as wastewater, under the existing and foreseeable conditions, water quality conditions in the developing world will

continue to deteriorate in the coming years. The cost of remedying these decades of neglect are going to be astronomical. Even more difficult would be to find the investments necessary to rectify the situation.

In addition, water quality monitoring is poorly organised and managed in nearly all developing countries. Quality control and quality assurance in water quality laboratories are poor. Expertise available for proper water quality management is poor, and the universities continue to give significantly more emphasis on water quantity, compared to water quality. Thus, capacity building in water quality management is going to be a difficult task. Without trained and experienced people, effective water quality management will simply not be possible.

### **Globalisation**

This is an issue that has basically been ignored by the water profession as a whole, even though globalisation has already influenced the water use and availability patterns in many parts of the world. The impacts of globalisation on the water sector are likely to increase manifold during the next two decades.

Very rapid changes in the historical trading trends of manufactured and agricultural goods in recent years have meant that water use and wastewater production patterns are changing rapidly. For example, water requirements of the border areas of Mexico with the United States have increased radically because of increased exports of manufactured goods to the USA and Canada. These industrial developments have meant generation of new employment opportunities, which is acting as a magnet for immigration. Thus, the water requirements for the border cities like Ciudad Juarez have increased at an average annual rate of 15 percent, or even higher, during the past five years. What impacts such astronomical water use growth rates may have had on water quality are basically unknown at present because of the absence of any proper water quality monitoring and evaluation system. Even without such information, it can be safely said the situation has already become critical in many border areas during the dry season.

As the tariffs for agricultural products are reduced, or even eliminated during the next few years under the North American Free Trade Agreement (NAFTA), there could be tectonic shifts in agricultural production in North America, which would have equally significant implications for water use and quality patterns of the three countries concerned.

Globalisation of trade, capital, expertise and information will have major impacts (both positive and negative) on the water sector in countries as diverse as Bangladesh or Japan. Studies are urgently needed on the nature, extent and magnitude of these current and potential impacts both on developed and developing countries. Studies on the impacts of globalisation are urgently needed.

### **Energy**

Energy and water issues are closely related. Water is essential for large-scale electricity production, either through hydropower, or through cooling water requirements for thermal and nuclear power generation. In fact, for countries like France or U.K., cooling requirements are the largest user of water.

What is basically ignored is the fact that the water sector is not only essential for electricity production, but is also a major user of energy. For example, in India, hydropower generates slightly over 20 percent of electricity, but it also uses a similar amount of energy for pumping of water. Encouraged, and even some times coerced, by international funding institutions to provide very cheap electricity to farmers to pump groundwater for irrigation to increase food production, this policy has produced mostly a “lose-lose” situation. All the State Electricity Boards in India are now basically bankrupt since because of such heavy

subsidies, farmers continue to pump water irrespective of their actual irrigation needs, and groundwater levels are continuing to decline in many such areas because neither energy nor water is properly priced. It has already created a vicious circle, which would be difficult to break because of socio-political considerations.

Electricity requirements in all developing countries are increasing steadily. In South and Southeast Asia, and countries like China, Mexico and Brazil, annual electricity requirements are increasing at the rate of 6 to 8 percent. The impacts of such high growth rates on the water sector are basically unknown at present. There is no question that energy and water policies need to be coordinated much more effectively in the future to enhance national welfare.

### **Inappropriate research**

The crux of the major water problems of the future will be on developing countries. And yet, the universities and research institutions of developing countries are generally not conducting research on water problems that are relevant and appropriate for their countries. The basic thrusts of their research programmes are often similar to what could be seen at Oxford or Harvard Universities, even though the water problems faced by developing countries are very different from these of the UK or USA.

Let us take the example of monsoon Asia. Generally, much of the annual rainfall occurs in no more than 25 days (not consecutive). The main issue then is how can this enormous amount of rainfall over a very short period be stored and conserved so that water is available for the other 340 days of the year? Very few, if any, institutions in the monsoon countries of Asia (including Japan), are working on this fundamental problem to find cost-effective solutions. It is clear that the universities and research institutions of the developing world must start working on the real water problems facing their respective countries. Equally, they have to develop solutions that are appropriate for their physical, climatic, economic, environmental, social, legal and institutional conditions. Water problems in countries like Sweden or Senegal may be similar. However, a solution that works efficiently in Sweden may be an inefficient approach for Senegal, and vice versa. Thus, research is urgently needed to determine country-specific solutions.

### **Myths in water management**

There are many myths that are now in the literature on water resources management. These have developed for a variety of reasons. Regrettably, once they enter the literature, they develop a momentum of their own. These myths often get quoted and re-quoted, and consequently many people consider them to be facts.

The situation is especially bad for international rivers, which is a very sensitive subject for the co-basin countries concerned during the negotiating process. The official discussions take place behind closed doors, and are considered confidential by all the parties. The studies prepared to support the positions of individual countries are equally confidential. At the end of all such negotiating meetings, press releases are issued which provide very little factual information as to what really transpired during these discussions, except in very general terms. However, politicians often make statements, which are primarily for consumption in their own countries. Thus, considerable posturing takes place when these negotiations take place, which often do not reflect either the real situation or the actual discussion.

Newspapers and magazines often become the conduit for these stories. They invariably make a story out of these so-called special or confidential discussions. Some times they accurately report what the politicians say, but equally at other times they suitably edit the statements to make a good story. A few times the statements are made up completely.

Since the actual discussions and all associated papers are confidential, the scholars often

depend on the newspaper reports for analyses. Having no direct access to senior decision-makers, they rely on the printed media reports, whose accuracy leaves much to be desired. These media reports are often used for scholarship analyses. Naturally, because of the paucity of accurate information and use of unreliable information from the media, the quality of many scholarly reports leaves much to be desired. In addition, in a few instances there is simply poor scholarship.

Consider these statements. A recent publication (2000) by the International Committee of the Red Cross on War and Water, claimed that the manager of the Ataturk Dam had said that water is a weapon, and Turkey can cut off the flow of water to Syria for months. The claim had no reference attached to it, nor was the name of the manager given. This report had first surfaced in a U.S. newspaper about a year earlier. Unfortunately, no one had even bothered to discuss the issue with the manager of the Dam, even though the quote was falsely attributed to him. This claim is patently ridiculous, since southeastern Turkey will be badly flooded if the Euphrates is not allowed to flow through its neighbours, Syria and Iraq.

Similarly, during the Stockholm Water Symposium 2000, Minister Kader Asmal of South Africa claimed that I had said in 1991 that the conflicts over international waters would lead to war in the 20th century. When challenged later, his speech-writer responded lamely that they had picked up the “story” from a tertiary source, which, in turn, referred to a magazine article. On further investigation it turned out that the magazine reported on my Presidential Address to the International Water Resources Association (IWRA), in Rabat, Morocco, in 1991, where I had said that management of international waters will be a major issue in the 21st century. The subject of war was never even mentioned. In this case, it was simply poor scholarship, since the Presidential Address was published in full by *Water International*, the Journal of IWRA, and later as a book that was published by Oxford University Press (Biswas *et al.*, 1993).

Regrettably, literature on water management contains many similar spurious analyses and erroneous statements. One thus has to be extremely careful in using the printed materials on water management. Authors often cite printed materials, even though they are patently wrong, or even sometimes “manufactured” to give some colour to a newspaper or magazine article. Clearly such bad scholarship can no longer be acceptable.

### **Data availability**

It is difficult to do a proper analysis of the global water situation without reasonably reliable data. The accuracy of data that are widely used at present at global and regional levels is basically unknown. In fact, one of the issues that bothered me the most as a member of the World Commission on Water was the quality of data on global water issues. For many issues, we really do not know whether the data being extensively used at present are wrong by 25 percent or 250 percent. Sadly, for political correctness, we are not even questioning the use of such unreliable data.

For example, we really do not know the total area irrigated at present in the world, nor the number of people that have access to safe drinking water, or the number of people affected by schistosomiasis. There are numbers available for all these and other issues, and they are widely used. All that can be said at present is that it would be a miracle if any of these numbers prove to be even reasonably accurate. No one ever defines what is an irrigated area: irrigated once every year, or once every 20 years? What is meant by “access” to “safe” water? Does access mean that there is a standpipe within 2 kms of home, or water supplied to home? Can people really drink this “safe” water without any health concerns? Do the tubewells which have not functioned for years still provide “access”? Why is that the global annual estimate of people suffering from schistosomiasis has remained the same, at 200 million, since at least 1969, if not longer? If water quality issues are considered, the situation is even worse. We do not have even aggregated figures of dubious quality!

If the global water perspective is to be diagnosed with reasonable accuracy so that appropriate policy frameworks can be proposed, we need a proper database. Accordingly, the Third World Centre for Water Management, with the support of the Nippon Foundation of Japan, has embarked upon a definitive study on the state of the world's waters. A register of international rivers and lake basins has already been prepared (Wolf *et al.*, 2000), and it shows that the number of such basins at present is 261, and not 214 as widely used earlier. Equally, it identifies new co-basin countries for major water bodies like Lake Chad or the Euphrates-Tigris system. Similarly detailed analyses of national water situations for 30 major countries are now at various stages of preparation. Some national reports, like the one on Mexico, have already been published (Castelan, 2000). These analyses will be finally aggregated to provide a much better global information database on water than available at present.

### Concluding remarks

Only some of the issues that the water profession is not giving adequate attention to are discussed herein. There are of course several other major issues which are neglected at present. Among these are long-term implications of the information and communication revolution on the water sector, technological developments outside the "water box" which may have profound impacts on our use and management practices, political correctness, or the need for effective South-South experience transfer.

There is now a revolution taking place in the area of water management, during the wake of which long-held concepts and approaches will either disappear completely, or undergo rapid evolution. In the context of this revolutionary change, we must identify some of the missing and neglected links, so that these could be considered holistically and integratively to determine the best approaches to efficient water management in the 21st century.

It was John F. Kennedy, when visiting Ottawa in 1961, who said:

Geography has made us neighbours,  
History has made us friends,  
Economics has made us partners, and  
Necessity has made us allies.

Kennedy's views could be equally appropriate for the countries of the developing world to collaborate closely to exchange ideas and experiences and to find efficient solutions for water management. We are certainly neighbours, and mostly we are also friends and partners. The urgency of solving the water problems of the future clearly should make us allies as well. All of us in the developed world face a common future. Whether we triumph or fail will depend upon our determination to chart a course for a common future for a water-secure world.

### References

- Biswas, A.K., (1993), "Water for Sustainable Development in the Twenty-First Century: A Global Perspective." In "*Water for Sustainable Development in the 21st Century*", Edited by Asit K. Biswas, Mohammed Jellali and Glenn Stout, Oxford University Press, New Delhi, pp. 7-17.
- International Committee of the Red Cross, (2000). "*War and Water*," ICRC, Geneva.
- Castelan, E., (2000). "*Analisis y Prespectivas del Recurso Hidrico en Mexico*," Third World Centre for Water Management, Mexico City, 98 p.
- Tortajada, C., (1999). "*Environmental Sustainability of Water Management in Mexico*," Third World Centre for Water Management, Mexico City, 155 p.
- Uitto, J.I. and Biswas, A.K., (2000). "*Water for Urban Areas: Challenges and Perspectives*," United Nations University Press, Tokyo, 245 p.
- Wolf, A.T., *et al.*, (1999). "International Rivers of the World," *International Journal of Water Resources Development*, Vol. 15, No. 4, pp. 387-428.