

# Water Management in Megacities

At a full-day seminar during the World Water Week in Stockholm, 16–20 August 2004, key features of megacities from the developing world were penetrated. According to a United Nations definition, a megacity is a city having a population of 5 million or more. Special attention was devoted to the challenges related to water provision and waste disposal and what policies have been pursued to deal with these basic and vital functions of city life. In excellent overviews, the rapid growth of megacities in the southern hemisphere during the last half century, their roles in development, implications in terms of resource pressure, environmental consequences, and management options were synthesized. Practical examples from Jakarta, Sao Paulo, Istanbul, Mexico City, Johannesburg, Dhaka, and Bangkok illustrated the breadth and depth of interactions in the water development environment.

## RAPID URBANIZATION AND EMERGENCE OF MEGACITIES

In terms of pace, magnitude, and consequences, the contemporary growth of the urban population, and what might be called the “urban conglomerate system,” is unprecedented. A few figures illustrate this extraordinarily swift transformation. During the coming decades, almost the entire population growth in the world is likely to be in the urban population, primarily in sub-Saharan Africa and Asia. Between 2000 and 2025, the increase in the global urban population is estimated to be about 2 billion, or roughly 95% of total population increase in the world. In one generation, the additional urban population is roughly equal to the combined populations of the two most populous countries of the world at the turn of the century, China and India. The characterization of countries in Africa and Asia as “rural” is therefore less and less valid. As underlined at the Seminar, the contemporary urbanization in the South is quite different from urbanization that took place in Europe, the United States, and Japan. The level of urbanization in Latin America is close to that in the latter category. But in terms of water provision and environmental issues, the situation in Latin America is close to that in most of Asia and the affluent parts of Africa.

The rapid emergence of megacities is a striking facet of urbanization. In 1975,

22 cities fell into this category; 40 cities qualified by 2000, and it is expected that by 2015, there will be about 60 megacities in the world. A troubling trend is that the most rapid growth of urban centers takes place in the economically weakest countries and in regions in which water resource endowments are limited and management capacity is comparatively poor.

The massive increase in the population of megacities has been continuing for some decades. For example, the population of the Mexico City metropolitan area, which is a loosely connected conglomerate of Mexico City proper and 34 municipalities, increased by 17 to 18 million people between 1950 and 2000: from 3 to about 21 million. Similarly, Sao Paulo, consisting of the city of Sao Paulo and 39 municipalities, had a population of 300 000 at the beginning of the 20th century; today, the conglomerate is inhabited by about 18 million. These two megacities are among the largest urban conglomerate systems in the world, which have expanded at a very fast rate. Examples presented at the Seminar illustrated a similar trajectory in many countries.

## WATER PROVISION AND ENVIRONMENTAL SUSTAINABILITY ARE KEY CHALLENGES

Irrespective of the size and sophistication of a settlement, provision of clean water and safe disposal of wastewater remain basic necessities for daily survival and for virtually all economic activities. With the growth rates of the urban system indicated above, the provision of adequate amounts of safe water becomes increasingly complex and expensive. It was shown that water sources in the vicinity of the cities are inadequate. Supply to Johannesburg is somewhat special. Unlike many other big cities, it is located by neither a river nor the sea. Water provision to Johannesburg, Mexico City, Istanbul, and other megacities is increasingly arranged through long-distance water transfers. Beijing represents an extreme case. Within a few years, it is supposed to get water from Chang Jiang (Yangtze river), about 1200 km away. Tapping of groundwater is often done before sophisticated surface systems can be built. Excessive pumping of groundwater in Jakarta, Dhaka, Bangkok, and Mexico City have resulted in the lowering of the water table, sometimes up

to 1 m y<sup>-1</sup>, with severe problems of land subsidence, apart from increasing cost. For coastal cities, the lowering of groundwater results in saltwater intrusion and practically irreversible damage to the aquifer.

## MEGACITIES TRANSCEND BORDERS

With an increasing distance to the source(s) of water, the formal jurisdiction of megacities is transcended. It is impossible to arrange supply within a river basin context in many cases. Similarly, the significance of megacities in overall national development implies that bulk supply of water will be secured through national policies rather than through corresponding institutions at the local or regional administrative levels. It was emphasized that the growth of megacities has challenged the notion of river basin management, at least on the supply side. For the management of wastewater and, generally, the downstream aspects, the physical river basin where megacities are located should remain the logical and important management context.

It was also shown that megacities are, more and more, the interface of a country and the globalized economy and culture rather than being closely connected to the surrounding rural hinterland. Hence, megacities are hubs in supranational complexes in terms of water, energy, and material fluxes and in terms of socioeconomic and political development and security complexes.

## ECONOMIC GIANTS . . .

It has been estimated that urban areas of the developing world, which contains 30% of the total population, contributed nearly 60% of the total gross domestic product (GDP) at the turn of the century. Johannesburg, for instance, is the economic engine not only for South Africa, it generates 10% of the GDP of the entire African continent. In many countries, the urban economy is, by far, the most important in terms of government revenue.

## . . . HAUNTED BY SOCIAL,

A particular feature of megacities is related to the combination of a highly sophisticated part—with modern industries and technologies, posh hotels, administrative offices, financial and commercial institu-

tions, and universities, for example—and a part characterized by a lack of planning and hazardous living conditions, socially and physically. These informal areas, which are literally mushrooming, make up 30%–50% of the population. In spite of deplorable living conditions and in the absence of a systematic policy for resource utilization and environmental care in this part of the urban conglomerate system, it nevertheless plays an important role in economic terms. It was noted that in Latin America, 8 of 10 jobs are in the informal sector. Obviously, the formal sector does not have the capacity to absorb more than a fraction of the increase in the labor force in years to come.

It is difficult to imagine a transparent policy and an active involvement of representatives of water users and other interest groups in water management in megacities, especially in informal areas. But there are interesting cases in which public participation is seen as a constitutional right and in which the say and decision of local constituencies are part of the management. In Sao Paulo, for example, citizens are exercising their rights by organizing themselves into associations, which pressure the political class to provide more funds to restore the urban environment. Public participation in policy making and project implementation and management is very high on development agendas all over the world. It was emphasized that the reliance on the public sector (i.e. the government or municipality) as a monolithic institution has proved fallacious.

### ... ENVIRONMENTAL, AND

An increasing supply of water to households, industry, and other activities means a proportionally increasing volume of wastewater. Apart from liquid waste, activities in the city generate substantial amounts of solid waste. Garbage, both toxic and nontoxic, is a nuisance and a health hazard in living quarters, in the streets, and on pavements, and it clogs drainage channels. Dissolved substances seep into the ground or are transported through the flow of water and with the wind, rather than through proper disposal arrangements. Figures presented at the seminar showed that only a fraction of the waste is taken care of in an organized manner. In Mexico City, for example, it is estimated that less than 10% of the wastewater generated is properly treated and disposed of at present.

### ... FINANCIAL CRISES

The increasing challenges of water provision, lingering poverty, and enormous environmental threats imply that huge

investments are required. With a host of investment requirements in various sectors, there is a considerable backlog of urgent investments in the water, sanitation, and waste disposal sectors. The possibility of securing funding for the required investments is hampered by the widespread notion that water services should be free or heavily subsidized. For some of the investments, particularly in waste management, it is also difficult to identify who should pay, when, and how much.

### TRANSFER OF MANAGEMENT RESPONSIBILITY

The combination of challenges indicated above has resulted in a management crisis and a critical assessment of the dominant model for water management. In virtually all countries, the public sector has been the sole agent for policy formulation, execution, and evaluation. Both in terms of the difficulty in mobilizing enough investment resources and of organizing the services in an effective manner, the current situation is far from satisfactory. Even in countries and cities that have had strong economic growth, the situation is deplorable. For instance, in Jakarta, the capital of Indonesia, which has had very strong economic growth for about 30 y (i.e. before it was hit by the Asian financial crisis in 1997/1998), only about 41% of the population was served by an organized water supply. Another noticeable shortcoming was that about 57% of the water in the distribution system was unaccounted for.

With a shortage of investment funds and poor institutional capacity, the government operator in Jakarta was not able to increase coverage or service level. The responsible city government of Jakarta negotiated with private operators in an effort to improve water supply and wastewater disposal. A number of objectives were specified and contracts were signed in 1997 with two well-known international operators; Thames Water International, UK, and Lyonnaise des Eaux of France.

So what is the experience? Most of the objectives and agreements have only partly been reached. One major reason is the Asian financial crisis, which hit the entire region after the signing of the contracts. For Indonesia, the gross national product per capita was cut by about 40% in only 4 y, which forced the authorities to impose a ban on any increase in fees for water services, even though escalating costs motivated such increases. In Jakarta, as well as elsewhere, it is painfully clear that a take-over of management responsibilities by the private sector involves very complex issues and changes that could be impossible to foresee.

A general experience and recommendation, both in Jakarta and in similar cities, is that it is crucial to have an independent and strong regulatory agency. Such an agency should have the authority to ensure that the obligations of the big contracting partners are being adhered to. The significance of a regulating agency is illustrated by the rapid increase in the number of such agencies. In 1996, there were only a few of these institutions; by 2000, the number had increased to 900 agencies in 185 countries.

### CONCLUDING REMARK

Water decisions are among the most critical in shaping the future of megacities. In terms of economic significance, social and cultural transformations, political factors, and environmental issues, megacities have a special role to play. The Seminar highlighted the challenges and pinpointed some of the most earnest attempts at water management to deal with these challenges.

The seminar was organized and convened by Stockholm International Water Institute Stockholm, Sweden; Third World Centre of Water Management, Mexico City; and Helsinki University of Technology, Water Resources Laboratory, Helsinki, Finland.

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