

CONSTRAINTS TO IMPROVING WATER AND SANITATION SERVICES

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Keywords: appropriate technology, community participation, population growth, VISION 21, WASH, WSSD

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Summary

Safe water supply and appropriate sanitation are two essential components for healthy life. At the same time, however, capturing safe water and discarding wastewater must be carefully considered. The International Drinking Water Supply and Sanitation Decade (IDWSSD) was accordingly launched to develop water supply and sanitation systems throughout the world with partnership between UN agencies, industrialized countries, developing countries and NGOs.

Water supply and sanitation systems have developed well throughout the world, but the progress has not been sufficient since, at the beginning of 2000, 1.1 billion people do not have access to improved water supplies and 2.2 billion people do not have access to

improved sanitation. There are many reasons why water supply and sanitation development have fallen behind the goal. These include population growth, lack of finance, and institutional problems.

This chapter describes the general situation regarding water supply and sanitation in the world, the major constraints for such development, and social aspects relating to sustainable development of water supply and sanitation, especially in developing countries.

1. Introduction

Water is one of the essentials, not only for domestic life but also for public activities, and at the same time, the wastewater must be discarded from the use point as soon as it completes its purpose. If one analyzes the mass balance of water around human beings, or their social activities, it becomes obvious that water usage means the use of its properties, such as solubility, thermal capacity, or hydraulic potential, and that the property change results in the production of wastewater. Water and wastewater are, therefore, closely related to human life or productive activities. Water itself supports social and economic activities, and it also maintains ecosystems. Polluting water or altering its properties lowers its value and may transmit pollutants and/or pathogens, endangering human health (see *Expected Reduction in Morbidity from Improved Water Supply and Sanitation*).

Safe water supply and appropriate sanitation are essential components for healthy and proper life, but, at the same time, capturing safe water and discarding wastewater must be carefully considered. If no water is available in the proximity of one's premises, he/she must consume his/her time and energy fetching water. This work trades off other productive activities. In developing countries, it is not surprising that people spend two to three hours per day capturing water. Research has shown that a proper water supply could enable people to spend more time in the fields or in educational activities for themselves and their children. If no actions are taken to treat human excreta in appropriate fashion, traditional water resources can become degraded. This then involves additional cost to treat the contaminated water or to capture uncontaminated water from elsewhere.

The 1980s—the International Drinking Water Supply and Sanitation Decade—saw big strides made in finding affordable technologies and participatory approaches to help serving those without access to improved water and sanitation services. But that Decade also demonstrated conclusively that “business as usual” would never bring improvements quickly enough to cope with the backlog and provide access to services for growing populations.

2. Assessment of water supply and sanitation improvement throughout the world

The Global Water Supply and Sanitation Assessment 2000 presented the findings of the fourth assessment by the WHO and UNICEF Joint Monitoring Program. Previous reports were produced in 1991, 1993 and 1996.

The *assessment* has found that:

The percentage of people served with some form of improved water supply rose from 79% (4.1 billion) in 1990 to 82% (4.9 billion) in 2000. Over the same period the proportion of the world's population with access to excreta disposal facilities increased from 55% (2.9 billion people served) to 60% (3.6 billion). At the beginning of 2000 one-sixth (1.1 billion people) of the world's population was without access to improved water supply (see Table 1) and two-fifths (2.4 billion people) lacked access to improved sanitation. The majority of these people live in Asia and Africa; less than one-half of all Asians have access to improved sanitation and two out of five Africans lack improved water supply. Moreover, rural services still lag far behind urban services. Sanitation coverage in rural areas, for example, is less than half that in urban settings, even though 80% of those lacking adequate sanitation (2 billion people) live in rural areas—some 1.3 billion in China and India alone. These figures are all the more shocking because they reflect the results of at least twenty years of concerted effort and publicity to improve the coverage.

	People without treated water supply	People without sanitation services
Asia	63%	80
Africa	28%	13
Latin America & the Caribbean	7%	5
Europe	2%	2
Total unserved	1.1 billion	2.4 billion

Table 1. Distribution of the global population without treated water supply or sanitation services

One positive finding of Assessment 2000 is that sanitation coverage appears to be higher than would be expected from the findings of earlier assessments. This is because the consumer-based survey data in the Assessment 2000 account for households that provided their own sanitation facilities, especially in Asia and Africa. These facilities were not covered by the provider-based data used in previous assessments. Although an enormous number of additional people gained access to services between 1990 and 2000, with approximately 816 million additional people gaining access to water supplies and 747 million additional people gaining access to sanitation facilities, the percentage increases in coverage appear modest because of the global population growth during that time.

Unlike urban and rural sanitation and rural water supply, for which the percentage coverage has increased, the percentage coverage for urban water supply appears to have decreased over the 1990s. Furthermore, the numbers of people who lack access to water supply and sanitation services remained practically the same throughout the decade. The water supply and sanitation sector will face enormous challenges over the coming decades. The urban populations of Africa, Asia, Latin America and the Caribbean are expected to increase dramatically. The African urban population is expected to more than double over the next 25 years, while that of Asia will almost double. The urban population of Latin America and the Caribbean is expected to increase by almost 50% over the same period. Although the greatest increase in population will be in urban areas,

the worst levels of coverage at present are in rural areas. In Africa, Asia, and Latin America and the Caribbean, rural coverage for sanitation is less than half that in urban areas. In those three regions alone, just fewer than 2 billion people in rural areas are without access to improved sanitation, and just fewer than 1 billion are without access to improved water supply.

This report uses international development targets to highlight the challenges faced by the sector in reducing the coverage gap. To achieve the 2015 target for Africa, Asia and Latin America and the Caribbean alone, an additional 2.2 billion people will need access to sanitation and 1.5 billion will need access to water supply by that date. In effect, this means providing water supply services to 280 000 people and sanitation facilities to 384 000 people every day until 2015.

Projected urban population growth, especially in Africa and Asia, suggests that urban services will face great challenges over the coming decades to meet fast-growing needs. At the same time, rural areas also face the daunting task of meeting the existing large service gap. To reach universal coverage by the year 2025, almost 3 billion people will need to be served with water supply and more than 4 billion with sanitation. Poor water supply and sanitation have a high health toll, whereas improving water and sanitation brings valuable benefits to both social and economic development. The simple act of washing hands with soap and water can reduce diarrhea disease transmission by one-third.

3. Major problems of the sustainable development

3.1. Global Water Supply and Sanitation Assessment

As described above, the International Drinking Water Supply and Sanitation Decade saw big advances in finding affordable technologies and participatory approaches to help serving those without access to improved water and sanitation services. The Global Water Supply and Sanitation Assessment 2000 presented the findings of the fourth assessment by the WHO and UNICEF Joint Monitoring Program.

The Assessment identified the following constraints to improving Water and Sanitation Systems in the world.

- Financial difficulties
- Institutional problems
- Inadequate human resources
- Lack of sector coordination
- Lack of political commitment
- Insufficient community involvement
- Inadequate operation and maintenance
- Lack of hygiene education
- Poor water quality
- Insufficient information and communication.

In addition, there are many barriers to expanding access to improved sanitation services, including 1) lack of political will, 2) low prestige and recognition, 3) poor policy at all

levels, 4) weak institutional framework, 5) inadequate and poorly used resources, 6) inappropriate approaches, 7) failure to recognize defects of current excreta management systems, 8) neglect of consumer preferences, 9) ineffective promotion and low public awareness, and 10) women and children last. The reasons for the apparent low demand need to be understood, to determine whether changes can be brought about through political, financial or technical means, or simply by improving information. People may want sanitation very sincerely, yet be powerless to express that desire in financial or political terms. Some may want safe excreta management facilities, but not at the prevailing price. Others may not want the available “improvements” at any price. Cultural beliefs have a strong impact on sanitation, and even on the possibility of talking about sanitation. In many cultures, the handling of excreta is considered a taboo and viewed as disgusting or a dangerous nuisance, not to be discussed. No one wants to be associated with excreta. Association may stigmatize those who reduce its offensive characteristics for others. Problems cannot be solved if people do not want to talk about them and be associated with their solution. In many contexts, taboos—including modern technological ones—block the safe recovery of valuable agricultural resources from human wastes. To counter the excreta taboo, education promoting sanitation and hygiene should link the value of excreta (feces and urine) with ecology and health protection.

Three principles are fundamental to the creation of socially, economically and ecologically sustainable sanitation systems:

- 1) Equity. All segments of society should have access to safe, appropriate sanitation systems adapted to their needs and means,
- 2) Health promotion and protection from disease. Sanitation systems should prevent users and other people from contracting excreta-related diseases and should interrupt the cycle of disease transmission, and
- 3) Protection of the environment. Sanitation systems should neither pollute ecosystems nor deplete scarce resources.

There are four major challenges facing the water supply and sanitation sector in the years to come:

- 1) Keeping pace with a net population growth of more than a billion people over the next 15 years,
- 2) Closing the coverage and service gap, with emphasis on sanitation, which lags considerably behind water supply,
- 3) Ensuring sustainability of existing and new services, and
- 4) Improving the quality of services.

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Biographical Sketches

Sombo T. Yamamura has been Director of the Asia-Pacific Network for Global Change Research since 2003. He was admitted to Kyoto University and received the degree of Bachelor of Engineering in Sanitary Engineering in 1974. He continued his study at the Department of Urban Engineering, The University of Tokyo and was conferred Master of Engineering in 1976. Immediately after graduation, he commenced his professional career in the Department of Water Supply, Ministry of Health and Welfare, Japan. After working for the Ministry for ten years, he was dispatched to the Department of Public Works in Indonesia as an advisor for JICA (Japan International Cooperation Agency) in 1986. In 1988, he moved back to Japan and served as an Engineer at the Office of Environmental Impact Assessment, Environment Agency. Since 1992, he has developed his career in several national and international organizations. He served as a chief at the Office of Drinking Water Quality Management, Ministry of Health and Welfare, Japan from 1992 to 1994, as a special advisor for Environmental Health Department at Environment Agency, Japan from 1994 to 1996, a JICA chief advisor for Environment Management Center in Indonesia from 1996 to 1998, then as a sanitary engineer at the Water Sanitation and Health Unit, Department of Protection of the Human Environment, Cluster of Sustainable Development and Healthy Environments at WHO (World Health Organization). He also obtained a Diploma at Imperial College, University of London, in 1983.

Mitsugu Saito is senior researcher who works for the Overseas Environmental Cooperation Center, Japan. He was admitted by the Architectural Engineering Department, Hokkaido University in 1978 and graduated from it with his graduate thesis on thermal environment. He continued his study at Graduate School of Environmental Science. For his research on thermal waste recovery systems for industrial cooling water, he was conferred a Master Degree of Environmental Science from Hokkaido University in 1984. He then worked for a construction company; Obayashi Corporation, from 1984 to 1997, as a mechanical engineer on building service works. During his work, he was dispatched to Thailand from 1990 to 1995. He was dedicated to many construction and renovation projects (mainly hi-tech factories). His responsibilities covered air-conditioning, plumbing, water and wastewater treatment, utility supply, and pollution control. From 1997, he enrolled to Japan Overseas Cooperation Volunteers (JOCV), part of the framework of Japan International Cooperation Agency (JICA). He spent two years in Morocco as an urbanist of the municipality of Fès. He was assigned to "Service Nettoyement et Parc Municipal" with responsibilities in research and planning of solid waste management systems. In 1999, he returned to Japan and resumed his study in Hokkaido University as a PhD student in the Environmental Risk Engineering Laboratory, School of Engineering. In 2003 he was conferred a Doctoral Degree, which focused on the establishment of appropriate technology for urban sanitation improvement in middle and low-income countries.

Yasumoto Magara is Professor of Engineering at Hokkaido University, where he has been on faculty since 1997. He was admitted to Hokkaido University in 1960 and received the degree of Bachelor of Engineering in Sanitary Engineering in 1964 and Master of Engineering in 1966. After working for the same university for 4 years, he moved to National Institute of Public Health in 1970. He served as a Director of the Institute from 1984 for the Department of Sanitary Engineering, then the Department of Water Supply Engineering. In the meantime, he also obtained a Ph.D. in Engineering from Hokkaido University in 1979 and was conferred an Honorary Doctoral Degree in Engineering from Chiangmai University in 1994. Since 1964, his research subjects have been in environmental engineering and have included advanced water purification for drinking water, control of hazardous chemicals in drinking water, management and treatment of domestic waste including human excreta, management of ambient water quality, and mechanisms of biological wastewater treatment system performance. He has also been a member of governmental deliberation councils of several ministries and agencies including Ministry of Health and Welfare, Ministry of Education, Environmental Agency, and National Land Agency. Meanwhile he performs international activities with JICA (Japan International Cooperation Agency) and World Health Organization. As for academic fields, he plays a pivotal role in many associations and societies, and has been Chairman of Japan Society on Water Environment. Professor Magara has written and edited books on analysis and assessment of drinking water. He has been the author or co-author of more than 100 research articles.