

RURAL AND URBAN WATER SUPPLY AND SANITATION

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Summary

The appropriate technology of water supply and sanitation is affected by the geological, economical and cultural characteristics of the projected area. The first target of water supply and sanitation technology is to reduce the potential of infectious diseases.

The integrated development of waterworks and sanitation is important not only in urban areas, but also in rural areas. After the development of the water supply and sanitation facilities, the most important issue is the sustainability of water supply and sanitation services in order to encourage the willingness to pay of communities.

There is a wide range of waterworks from small-scale waterworks for providing drinking water to multi-purpose large-scale works. The following items need to develop an appropriate institutional management (1) development of legal system, (2) payment by the users as beneficiary, (3) interest in meter management system by the waterworks companies, and (4) human resource management. The differences of development costs between areas are caused by the difference of natural conditions such as access to water

sources or geographical features of the project areas, the difference of the application technology of the system such as the type of water treatment process, and the difference of social and economic conditions.

The safe water supply and sanitation is the basic social infrastructures that provide a various kinds of benefits to the people. Therefore, residents are invited to join in many stages of planning, designing, and constructing. This is advantageous for the resident cooperation is easier to get even for the post-construction stage of operation, which is maintenance and management. Water supply projects in rural areas are also considered as projects of Women in Development (WID).

It is women who use water, and waterworks should benefit them the most. In the communities where the sense of unity is not strong, the benefits are not equally distributed, and many weak groups are often put behind of the benefit. To treat each group of the community equally, it is necessary to select representatives from each group in a democratic way.

Most of the waterborne infectious diseases are caused by bacteria, viruses, or helminthes, which are originated to human or animal excreta. These pathogenic microorganisms are ingested with foods or water, or through hands or fingers, and then they are again excreted into the environment after the multiplication in human intestines. Waterborne infectious diseases are classified into following categories, 1) water diseases, 2) water-washed diseases, 3) water-based diseases, 4) water-related diseases 5) water-dispersed diseases.

In case a patient or carrier of an infectious disease lives in a water district, pathogenic microorganism may exist in supply water due to defaults of water supply or sewerage network. Using the contaminated water may result outbreak of the infection. Waterborne infectious diseases occur mainly in poor countries where environmental sanitation facilities, i.e. waterworks and sewerage, are yet furnished, or where hygienic behavior is not popular practice. Therefore, the provision of safe drinking water and sanitation are the paramount tasks for the health for all.

1. Introduction

The appropriate technology of water supply and sanitation is affected by the geological, economical and cultural characteristics of the projected area. The first target of water supply and sanitation technology is to reduce the potential of infectious diseases. Most of pathogens in water are associated with suspended particles; therefore, the train of treatment units should be the solid-liquid separation process, followed by the process for removal of impurities and the disinfections process.

The sanitation system should be developed with the water supply system because most of the pathogens in living environment are related with the excreta. The selection of sanitation system for on-site treatment or off-site treatment is heavily dependent on the economical potential of the projected area.

The integrated development of waterworks and sanitation is important not only in urban areas, but also in rural areas. After the development of the water supply and sanitation facilities, the most important issue is the sustainability of water supply and sanitation services in order to encourage the willingness to pay of communities.

There is a wide range of waterworks from small-scale waterworks for providing drinking water to multi-purpose large-scale works. The following items need to develop an appropriate institutional management (1) development of legal system, (2) payment by the users as beneficiary, (3) interest in meter management system by the waterworks companies, and (4) human resource management.

The differences of development costs between areas are caused by the difference of natural conditions such as access to water sources or geographical features of the project areas, the difference of the application technology of the system such as the type of water treatment process, and the difference of social and economic conditions. When a financial aid is made to build waterworks facilities in “poorest countries”, the subsequent project management will not be able to provide enough maintenance to the facilities.

Though the limits to the ability to pay and the percentage to be paid differ depending on time, place, and people, waterworks popularization must be developed promptly with such service fit for the regional circumstances so that water is available in good quality and quantity, for a relatively small financial burden.

The safe water supply and sanitation is the basic social infrastructures that provide a various kinds of benefits to the people. Therefore, the enlightenment plan with the cooperation of hospitals, public health centers, and schools will be necessary in order to let residents understand the importance.

In such water supply and sanitation system, residents are invited to join in many stages of planning, designing, and constructing. This is advantageous for the resident cooperation is easier to get even for the post-construction stage of operation, which is maintenance and management.

Water supply projects in rural areas are also considered as projects of Women in Development (WID). It is women who use water, and waterworks should benefit them the most. In the communities where the sense of unity is not strong, the benefits are not equally distributed, and many weak groups are often put behind of the benefit. To treat each group of the community equally, it is necessary to select representatives from each group in a democratic way.

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Waterborne infectious diseases are classified into following categories, 1) water

diseases, 2) water-washed diseases, 3) water-based diseases, 4) water-related diseases 5) water-dispersed diseases.

In case a patient or carrier of an infectious disease lives in a water district, pathogenic microorganism may exist in supply water due to defaults of water supply or sewerage network. Using the contaminated water may result outbreak of the infection.

Waterborne infectious diseases occur mainly in poor countries where environmental sanitation facilities, i.e. waterworks and sewerage, are yet furnished, or where hygienic behavior is not popular practice. The poorer the countries, cities, or villages are, the more often the diseases occur. Therefore, the provision of safe drinking water and sanitation are the paramount tasks for the health for all.

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Biographical Sketch

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 the Director of the Institute since 1984 for Department of Sanitary Engineering, then Department of Water Supply Engineering. In the meantime, he was also obtained the Ph.D. in Engineering from Hokkaido University in 1979 and was conferred 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, planning 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 the 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. He meanwhile performs the international activities with JICA (Japan International Cooperation Agency) and World Health Organization. As for academic fields, he plays 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.