Groundwater development and water supply project in Ethiopia

Ethiopia is one of the countries with the lowest percentage of safe water supply. More than 40-million people who do not have access to safe water are using surface water which is not safe in terms of health and hygiene. In Ethiopia, only 24% of the population has access to safe water, whereas the average of sub-Saharan countries is 57%.

Groundwater is the most important source of water for people in both the rural and urban areas of the country. Developing the capacity of engineers who deal with groundwater development and water supply is one of the most important challenges to be addressed by the government.
Along with other services, the Ethiopian government is decentralizing its groundwater development and water supply services to local governments. However, the local governments do not have sufficient capacity to conduct the projects properly due to the lack of skilled engineers.

Against this backdrop, Japan cooperated with the Ethiopian government in establishing the Ethiopia Water Technology Center (EWTEC) in Addis Ababa to enhance the capacity of groundwater development and water supply system maintenance. Since 1998, JICA has been involved in human resource development in the fields of groundwater development and water supply system maintenance at EWTEC. The following are some of the features of EWTEC's activities:

●Implementation of various training courses

EWTEC conducts basic and advanced courses to train municipal engineers. The courses also cover a wide range of issues to suit the needs of local governments, including water supply planning, groundwater modeling, maintenance of wells and equipment, and guidance on the operation of water supply systems at the community level.

●Emphasis on Ethiopian ownership and the dissemination of technologies to surrounding countries

Basic training courses (e.g. drilling technologies) are conducted by local Ethiopian trainers on the basis of Ethiopian ownership. Moreover, with the goal of disseminating technologies and sharing experience with neighboring countries around Ethiopia, engineers from 15 other African countries have completed training courses at EWTEC.

●Utilization of adequate local technologies

Appropriate technologies are utilized to develop rope pumps that are cost efficient and easy to maintain. Also, studies are conducted to develop plans for groundwater resources management.

Safe and Stable Water Supply

Sharing experiences from the field for reliable services (Urban water supply)

Strong organizations with proper facilities are essential to ensure a safe and stable water supply to an urban population.

JICA has been providing support in planning improvements to water supply facilities and in developing the human resources of organizations in order to increase the coverage of water supply systems and improve services. JICA has dispatched experts from public water operators in Japan to developing countries, who have supported local engineers to develop their potential to solve problems under their own initiatives. Capacity development, through on-the-job training, has led to service improvements such as a stable water supply, improved water quality and the reduction of non-revenue water.

JICA also provided opportunities for officials and engineers from developing countries to learn about relevant technologies and expertise in Japan to solve water supply problems.

Some water operators, which have developed their capacity through cooperation with JICA, are now active in supporting other water operators in their own country and neighboring countries.

National Waterworks Technology Training Institute Project in Thailand

In the 1980s, the government of Thailand (GOT) rapidly expanded water supply facilities nationwide. There was an urgent need to develop human resources to operate and maintain these systems. GOT established the National Waterworks Technology Training Institutes (NWTTI) in Bangkok, Chiangmai and Khonkaen with the support of Japan's grant aid.

Through capacity building of NWTTI from 1985 to 1999, JICA supported the development of human resources at the Metropolitan Water Authority (MWA) and the Provincial Water Authority (PWA). JICA dispatched experts from water operators of the municipalities of Sapporo, Yokohama, Tokyo, Osaka and Nagoya to NWTTI. In addition, NWTTI officials visited several water operators in Japan to participate in training programs to become core engineers, who will train other operators, disseminating their knowledge and experience throughout Thailand.

Japanese and Thai engineers have worked together on the ground to find appropriate remedies to improve the maintenance of facilities, to reduce non-revenue water and to enhance customer service. Through such exercises, knowledge and experience were shared amongst MWA, PWA and Japanese water operators. This on-the-job approach was applied nationwide as a model to solve the problems of water supply systems in Thailand.

NWTTI, in cooperation with JICA, is regarded as the key organization to support capacity building of water operators in Cambodia, Laos and other neighboring countries.

Capacity Development for water supply systems in Cambodia

In 1993, JICA drew up a master plan for the water supply system of Phnom Penh in order to restore the water supply facilities devastated during its civil war. The Phnom Penh Water Supply Authority (PPWSA) had been renovating facilities based on the master plan accessing necessary financial resources from donors including Japan's grant aid. In addition to the physical recovery, capacity development of operation and maintenance also became the key issue for securing sustainability. In response, JICA implemented the technical cooperation project for capacity building of PPWSA from 2003 to 2006.

In the project, JICA dispatched experts from the water bureaus of several cities including Kitakyushu and Yokohama to transfer technologies to operate and maintain water treatment plants, to manage water distribution and to control water quality.

The problem-solving approach of Japanese water operators was introduced through on-the-job training that involved the concerted efforts of all members of related divisions. Operational manuals were prepared by the PPWSA itself with the facilitation of JICA experts. Since the project, the manuals have taken root with PPWSA staff, who continue to make modifications applicable to their daily operations. The training program in Japan provided opportunities for participants to learn not only technological skills, but also the processes water operators in Japan use to improve their daily operations.

The phase-2 project, launched in 2007, aims to enhance the capacity of public water operators in eight provincial cities in Cambodia, where the water supply systems have been improved with the assistance of Japan's grant aid and assistance from other donors. In cooperation with the Ministry of Industry, Mines and Energy, PPWSA serves as the core resource center of the country to disseminate knowledge and know-how to other public water operators. The objective is to raise the level of water supply throughout the country.

Capacity Development of urban water supply authorities in Lao People's Democratic Republic

The government of Laos has been improving water supply systems in major cities such as Vientiane and Savannakhet with the assistance of Japan's grant aid. To meet the urgent need to strengthen services in provincial cities nationwide, JICA implemented a three-year project for developing the capacity of urban water supply authorities from 2003.

In the project, JICA dispatched experts from water bureaus of several cities including Saitama, Kanagawa, Sapporo and Tokyo. The experts supported the preparation of textbooks and operational manuals for three levels, the director level, the engineer level and the technician level and also conducted training programs to disseminate knowledge to all water operators.

JICA volunteers, working at water treatment plants in Vientiane, gave valuable feedback during the preparation of textbooks and manuals in the project. Because they worked with Laotian technicians on the ground and understood the problems of daily operations, the volunteers assumed an important role in the project. The volunteers also provided on-the-job training to the staff of the water operator of Vientiane (NPV), using the training materials and supporting them in acquiring knowledge and strengthening their capacity.

NPV continues to train the staff of provincial water operators using the techniques and knowledge obtained in the project.

NWTTI of neighboring Thailand also cooperated in the project. The training provided by NWTTI proved effective because of good communication due to the similarity of their languages.

Improvement of flood control to protect lives and properties

Disasters such as floods and landslides are increasing throughout the world because of rapid changes in land use associated with urbanization and deforestation. In coastal areas, many problems such as tsunamis, high tides, and coastal erosion are emerging.

Traditionally, structural measures such as the construction of dikes and check dams have been taken to protect lives and properties from these disasters.

However, structural measures alone will not be sufficient, because structural measures are effective only to their design capacity, while expanding their capacity may be expensive in terms of environmental and social costs.

An integrated approach, which includes non-structural measures such as warning systems and hazard maps in addition to conventional structural measures, is therefore required.

JICA aims to develop an effective approach that combines structural and non-structural disaster prevention/mitigation measures. The approach will include the development of structures, reinforcement of organizations and systems to cope with disaster, and community-based disaster prevention measures.

Support of integrated flood control in the Nyando River Basin

The Nyando River Basin (catchment area of 3,625km^2) is situated in Nyanza Province, Western Kenya. The lower plain area is constantly hit by floods in the rainy season, and its economy and people are seriously affected. The persistent floods are among the reasons for economic stagnation in the area. Nevertheless, there is no single national organization in Kenya that has been specifically designated to cope with floods. Consequently, it has been difficult to pursue flood control measures in the Nyando River Basin, because urgent issues other than floods have been given higher priority.

To improve this situation, JICA has been conducting the "Study on Integrated Flood Control Plans in the Nyando River Basin" since July 2006. The study addresses the following issues:

●Establishment of a scheme to support implementation of flood control measures in the basin

JICA supports the formation of the Nyando River Forum, an organization composed of administrative agencies, academic institutions, NGOs, private companies, and community associations. It also supports implementation of flood control measures through information sharing and consensus building among the stakeholders in the forum.

●Incorporation of flood control measures into community development programs

Five villages in the Nyando River Basin have been selected as model communities, and the following flood control activities have been implemented in the villages with public involvement:

- ○using churches and nurseries, which are activity bases in the communities, as shelters
- ○securing escape channels by raising access roads that lead to arterial roads
- ○implementing evacuation drills, disaster prevention awareness programs at school, and training on sandbag piling.

●Preparation of a master plan for integrated flood control in the basin

JICA is preparing a master plan to promote flood control in the Nyando River Basin on the basis of lessons learned in the above activities.

The Nyando River Forum was highly appreciated by the Water Resources Management Authority of Kenya for the effective and important role of the forum in supporting flood control measures in communities. Continued operation of the forum on a regular basis as an association of water resources users is being considered.