

Thematic Evaluation on Operation and Maintenance Management in Water Supply Sector

Study period from October 2008 to February 2009

Summary of the Evaluation

This evaluation looked at the past water supply programs financed by ODA Loans in Indonesia and Philippines. The evaluation focused two major groups in terms of management agencies to assess their operation and maintenance (O/M) status, and to analyze appropriate standards of water supply services provided to the beneficiaries; one group whose O/M has been handled by public enterprises, and the other whose O/M has been contracted to private concessionaires. In the

evaluation, performance indicators (PI) suggested by the Japan Water Works Association (JWWA) were adopted. Based on the results, JICA identified the issues of the target programs for improving water supply services, examined the possibility of Japan's future cooperation in the water supply sector, and extracted lessons learned on project design and supervision. Also, the evaluation examines the evaluation criteria for similar evaluations of water supply programs in developing countries.

Background of the Evaluation

One of the Millennium Development Goals (MDGs) calls for "halving the proportion of people without sustainable access to safe drinking water and basic sanitation, by 2015," and Japan has actively supported water and sewage programs in developing countries. However, water supply enterprises in developing countries often do not conduct adequate O/M. In some cases, collection of water fees is not assured due to water leakage and water theft, raising concerns about adverse effects on management. Recently, there are also increasing number of cases where O/M of water supply programs are being transferred from public to private concessionaires.

With a view to formulating guidelines on water and sewage service operations which enable the continuous provision of quality service to customers at optimal price, an ISO technical committee adopted and issued international standards for water and sewage services in 2007. In Japan, prior to these moves towards international standardization of water supply

service, the Guidelines for the Management and Assessment of Drinking Water Services were established in 2005 as a standard of the JWWA, to improve the level of service through quantification of water supply services. The water supply service PI (Japanese PI) presented in the guidelines have received great interest and high regard from the ISO technical committee.

It is believed that PI based on ISO standards will form the basis of future evaluations and analyses of water supply services in developing countries. Thus, Japanese PI are expected to be applied internationally, and contribute to the improvement of water supply services. Against this background, this study attempted to conduct a case study analysis and evaluation focusing on Japanese PI, and derived lessons learned and recommendations on the programs that were evaluated and on future international cooperation in the water supply sector.

The Framework and the Policy for Evaluation

Of the water supply programs previously financed by ODA Loans in Indonesia and Philippines, six programs were evaluated: two programs whose water supply is operated and maintained by public enterprises; and four programs where O/M was transferred to private concessionaires. Japanese PI values for the O/M of water supply enterprises were collected locally, and evaluated against the following five criteria:

- 1) Safety (11 items): Is safe water provided?
Water resources conservation, water quality control
- 2) Stability (18 items): Is water supply stable?
Water supply hours, facility maintenance, risk management
- 3) Sustainability (35 items): Is the management base solid?
Financial foundation, inheritance and development of technology, water supply service
- 4) Environment (3 items): Is it contributing to environmental protection?
Energy consumption, effective usage
- 5) Management (24 items): Is the management of the water system appropriate?
Operation management, facility operation and maintenance

Programs Evaluated

Country	Research Target			
	Water Supply Corporation	Water Supply Area / Population	Operation Organization	Operation Form
Indonesia	Jakarta Water Supply Enterprise (Regulatory body: Jakarta Water Supply Regulatory Body)	East region of Jakarta City / 7.2 million people	Aetra	Established by public and operated by private
		West region of Jakarta City / 6.0 million people	Palyja	
	Makassar (Ujung Pandang) Water Utility	Makassar City / 1.25 million people	Makassar Water Utility	Established and operated by public
Philippines	Metropolitan Waterworks and Sewerage System (Regulatory body: Regulatory Office)	East region of Metro Manila / 10 million people	Manila Water Company Inc. (MWCI)	Established and operated by public
		West region of Metro Manila / 6.64 million people	Maynilad Water Services, Inc. (MWSI)	
	Batangas City Water District	Batangas City / 300,000 people	Batangas City Water District	Established and operated by public

Evaluation Results

» Evaluation results

1) Evaluation by country

As to the PI value collection rate by country, Philippines (73%) largely surpassed Indonesia (16%). The same was observed for all five areas.

The table below compares the PI values for adequate water supply pressure (for maintaining national-level drinking water quality standards and water quality standards to the water tap), non-revenue water ratio (the paramount issue for improving management), etc. It is believed that comparing indicator benchmarks for facility design standards and water supply service standards is useful for the future application of Japanese PI parameters and PI value evaluations in Southeast Asian countries.

PI Parameter	Philippines	Indonesia
No. of monitoring parameters for raw water quality	36 - 52	2 - 30
Inadequate water supply pressure ratio	0.7%	5.0 - 16.7%
Non-revenue water ratio	20.0 - 32.0%	18.5 - 50.5%
Water theft ratio = Non-revenue water ratio - Water leakage ratio	0.0 - 1.9%	3.0 - 31.0%

2) Evaluation by operation organization / program scale

The results of the PI value evaluations by operation organization and program scale (water supply population) using Japan's criterion (large-scale water service ≥ 1 million > medium-scale water service $\geq 50,000$ > small-scale water service $\geq 10,000$ > basic water service) are as follows. For reference, Japan's PI values are also listed.

PI Parameter	Operated by public sector × medium scale	Operated by private sector × large scale
No. of monitoring parameters for raw water quality	30 - 45	2 - 52
Inadequate water supply pressure ratio	16.7%	0.7 - 5.0%
Non-revenue water ratio *Japan's non-revenue water ratio	18.5 - 32.0% 7.9%	20.0 ~ 50.5% 4.7%
Water theft ratio = Non-revenue water ratio - Water leakage ratio * Japan's water theft ratio	1.9 - 31.0% 1.0%	0.0- 3.0% 1.0%
Water distribution amount per employee * Japan's water distribution amount / employee	9.6 - 22.8m ³ / person-day 220,000m ³ /person-day	32.9 - 49.7m ³ / person-day 260,000m ³ /person-day
No. of meters per employee * No. of meters in Japan / employee	155 - 211 / person 582 / person	250 - 473 / person 944 / person

» Recommendations and Lessons Learned

The following lessons learned were derived from Japanese PI-based data collected from water supply enterprises and assessed against the five criteria:

- 1) Safety:** A monitoring system needs to be developed to be able to calculate water quality PI, and a manual needs to be created on the basis of the calculated PI.
- 2) Stability:** Three guidelines need to be developed for operation to proceed with: (1) a design and facility plan; (2) maintenance and management; and (3) numerical benchmarks.
- 3) Sustainability:** Operation needs to be based on a planned and strategic structure and system.
- 4) Environment:** PI parameters that take into account developing country situation need to be added.
- 5) Management:** PI parameters that take into account developing country situation need to be added.

Additionally, the following recommendations were offered on the possibility of Japan's O/M cooperation for the water supply sector in developing countries, and on the modality of such assistance.

1) Co-creation of ASEAN PI based on Japanese PI, and creation of respective country's PI option based on ASEAN PI

The water services laws, operation form, and water culture/practice are different by country, and as was made clear in this study, it is problematic to directly apply Japanese PI to other countries. To make objective quantifications and evaluations, country-based PI are essential. It is believed that the fastest way to quickly popularize the use of PI in Southeast Asian countries is to use the ASEAN PI guidelines as the basis, and add the country-based option or use a revised version. Japan has paved the way for ISO water standards, and the report notes that Japan can fulfill a role other countries cannot, e.g., in clarifying the basic concept (future vision) prior to the formulation of water service standards.

2) PI technical cooperation for agencies regulating privatized water service companies

Public-private partnership (PPP) contracts need to be based on concession contracts, and the M&E of regulatory activities need to cover a broad spectrum of activities. In the process of this study, both of the two regulatory agencies from the programs that were evaluated expressed enthusiasm towards Japanese PI and technical cooperation.

3) Enhancement measures for PI related activities

It was pointed out that at first, it is necessary to get international cooperation stakeholders, including JICA, acquainted with Japan's PI, their performance, and their differences from Southeast Asia's PI.

Furthermore, in relation to this study, the following were identified as tasks for the future:

- 1) Review or examination of PI parameters due to increase in number of case studies**
- 2) Study on relevant organizations that will have direct impact on O/M**
- 3) Creation of PI specific to each country based on Japanese PI that are more applicable to developing countries**
- 4) Implementation of evaluation and study using Japanese PI for model water supply enterprise**