

FY 2013 Report of the International Cooperation Project Study in the Water Supply Sector

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(JICWELS)

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Introduction

Safe drinking water is insufficient in developing countries, and this situation, which concerns basic human needs (BHN), must be addressed. Past international cooperation in the water supply sector focused mainly on the development of infrastructure and technical transfer. However, there are many issues yet to be solved, including post-support sustainability and autonomy in development, the inequality between urban water systems and water supplies in rural areas, water supply and sanitation, the collaboration between the public and private sectors, the local applications of diverse technologies, the development of appropriate technologies, and the development of cross-sectional cooperation.

Under the commission of the Ministry of Health, Labour and Welfare, Government of Japan, the Japan International Corporation of Welfare Services (JICWELS) has been discussing “international cooperation in the water supply sector” through the establishment of expert’s committee. From 2009 to 2011, the main focus of the discussion was training, including training opportunities in Japan, training in relation to technical cooperation projects, and training provided by other donors, etc.

In 2012, our focus was on how to organize support on formulation and implementation of waterworks business management plan. In the study, it was pointed out that in order for waterworks utilities to flourish autonomously, not only technical support, but also assistance on both facilities and finances were needed, including comprehensive assistance on business operations for strengthening of the vulnerable financial foundation, and gradual development and planning in line with the circumstances of recipient countries and regions.

The demand for expansion of water infrastructures in developing countries remains high; the training of engineers and the development of sound finance and management are necessary in the future.

This year, the main emphasis was the improvement of water supply business management. Directions of future assistance in the field of waterworks and recommendations were proposed through analysis on past Japanese assistances, comparison and analysis on management indicators of several waterworks utilities in developing countries, identification of issues on water supply management in developing countries, and local survey in Indonesia. This report is a summary of the above considerations.

We appreciate that this report will be useful for international cooperation aiming to support waterworks utilities in developing countries to achieve sustainable and autonomous water supply business operations.

(Committee Members)

Hideo Ishii	Kitakyushu City Water and Sewer Bureau
Hidetoshi Kitawaki	Toyo University

Shoichi Kunikane*	Former Professor, University of Shizuoka
Ikuo Mitake	Japan Water Works Association
Tatsuo Morimoto	Pacific Consultants Co., Ltd. (Federation of Japan Water Industries, Inc.)
Koichi Ohno	National Institute of Public Health
Yuya Sato	Hamagin Research Institute, Ltd.
Toshimitsu Takahashi	Saitama City Waterworks Bureau
Akiko Takeuchi	Yokohama Waterworks Bureau
Satoshi Tamura	Bureau of Waterworks, Tokyo Metropolitan Government
Keiko Yamamoto	Former Senior Adviser, Japan International Cooperation Agency

(*: Chairperson)

(Observers)

Masami Eguchi	Kitakyushu City Water and Sewer Bureau
Kenji Okamura	Japan International Cooperation Agency
Shigeyuki Matsumoto	Japan International Cooperation Agency
Koichi Yamashita	KRI International Corp.
Ai Yamauchi	Pacific Consultants Co., Ltd.
Yasunori Yoshizawa	Ministry of Health, Labour and Welfare

(Secretariat)

Kazushi Yamauchi	Ministry of Health, Labour and Welfare
Daigo Takeda	Ministry of Health, Labour and Welfare
Yohei Matsuura	Ministry of Health, Labour and Welfare
Tetsuo Abe	Japan International Corporation of Welfare Services
Toshiyuki Shimizu	Japan International Corporation of Welfare Services

The Study Committee met on three occasions during FY 2013. The dates of the meetings are as follows:

- 1st Meeting Wednesday, October 9, 2013
- 2nd Meeting Friday, January 31, 2014
- 3rd Meeting Friday, February 28, 2014

Chapter 1 Background

1.1 Background

Developing countries face many challenges with their water supply sectors, such as improvement of coverage rate, rapid increase in population and water demand, high rates of non-revenue water (NRW), capacity building for waterworks engineers. The international assistance Japan provides in the water supply sector has focused mainly on the development of water infrastructures and measures for non-revenue water and providing technical transfers including operations and maintenances(O&M), water quality control, etc.

However, there have been cases in which the termination of support was soon followed by financial difficulties so that day-to-day management was adversely affected, indicating that support efforts did not quite take root.

It is often the case that struggling waterworks utilities in developing countries fall into the vicious circle illustrated in Figure 1-1, in which low levels of service standards and customer satisfaction results vulnerable financial states, and it leads to insufficient management of operations and maintenance, which in turn result in continued low levels of service standards and customer satisfaction. As some people who have been involved in the international cooperation in the water supply sector point out, diverting from this vicious circle is the most urgent task, but in many cases, they are unable to find a breakthrough.

There is a high recognition of the necessity for support in financial and operational aspects in parallel with technical support to change the vicious circle to a productive cycle.

The Japan International Cooperation Agency (JICA) has been conducting several technical support projects in recent years, with the objective of helping waterworks utilities improve their management. However, the diversity of national and regional circumstances has created difficulties in implementing the projects, and there is a dire need for comprehensive information and standardized support programs.

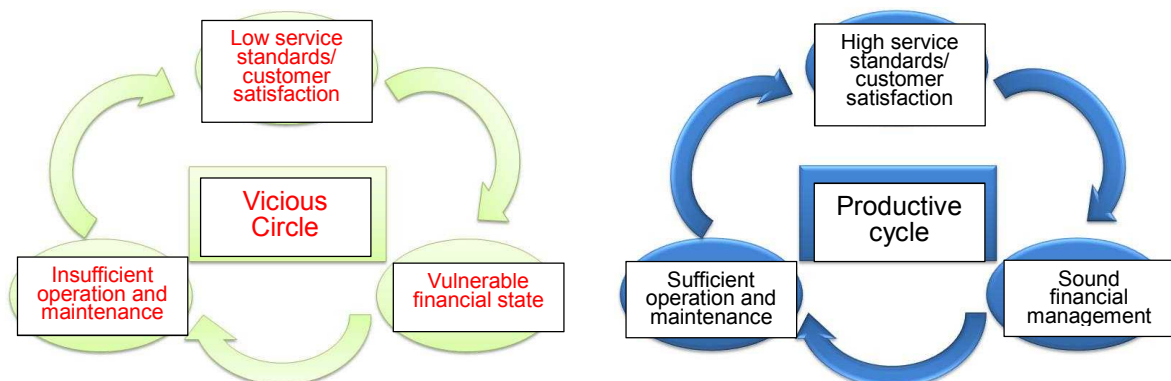


Figure 1-1 Vicious circle and productive cycle

1.2 Purpose of the Study

Given the above context, the study committee on international cooperation in the field of waterworks which consisted of industry-government-academia experts was launched and surveys, analyses, studies and proposals for future international contribution were performed in this program. In particular,

- Information of past international cooperation for improvement of water supply business management was gathered and organized to make it useful for persons related to the international cooperation.
- Information of financial condition of waterworks utilities in developing countries were collected, organized, and analyzed, after that issues and precautions were identified respectively.
- On site interviews to gain detail information of water supply business management and concrete needs for Japanese assistance, were conducted.

From the results of these activities, we derived the issues of water supply business management and discussed future assistance policies.

1.3 Contextual history of the development of waterworks in Japan

Many waterworks utilities in the emerging economies have shown a keen interest in learning how Japan has developed its waterworks and how it was able to establish this system in a short period of time.

In this section, we will briefly outline the history of the development of the waterworks in Japan.

The modern Japanese waterworks dates back to 1887, when the first waterworks commenced in Yokohama. The modernization of the water supply system arose from the need to treat drinking water in order to prevent epidemics of waterborne diseases and to secure water reserves for firefighting. Figure 1-2 illustrates the changes in the coverage rates and the number of waterworks utilities over the years. Coverage in the 1950s was 26%. Following the enactment of the Local Public Enterprise Act and Water Supply Act, it rapidly expanded from the 1950s to the 1980s. The water supply coverage in 2013 was 97.6%. It may be noted that the number of small-scale waterworks rapidly increased after the introduction of subsidies from the national treasury to small-scale water supply systems in 1952. One of the main reasons Japan was able to rapidly develop its water supply systems was the early establishment of regulations on water supply businesses. In the following subsection, we will consider the developmental process from the viewpoints of “regulations regarding the water supply sector” and “waterworks utility and water charge.”

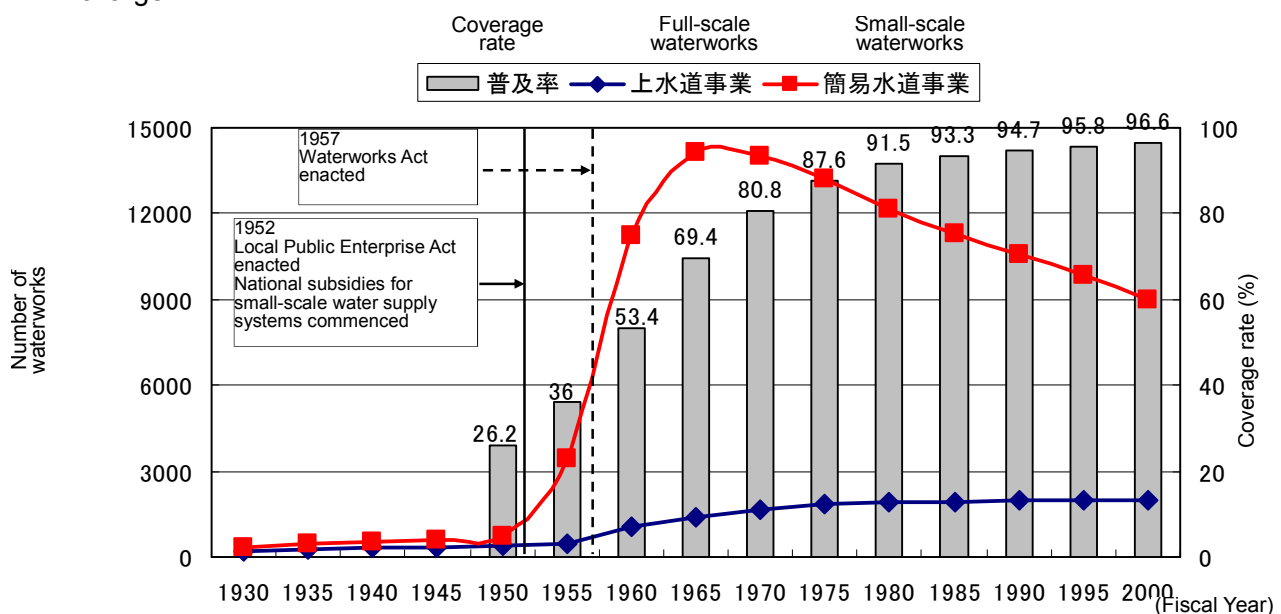


Figure 1-2 Waterworks coverage rates and number of waterworks utilities in Japan (Sources: prepared from Water Supply in Japan by the Japan Water Works Association and Water Supply (FY1950–2002) by the Statistics Bureau, Ministry of Internal Affairs and Communications of Japan)

1.3.1 Regulations and subsidies related to water supply business

In Japan, the initial major laws and regulations established to regulate the development of the water supply infrastructures and water supply business were the 1957 Waterworks Act and 1952 Local Public Enterprise Act.

From the early period of modern water works introduction to that immediately after World War II, water infrastructures were constructed, operated, and managed by local authorities. The construction of water infrastructures were largely supported by national subsidies up to the 1950s, but financial reserves were not sufficiently large to pay for all construction work.

The 1952 Local Public Enterprise Act introduced the systems of independent accounting and self-supporting accounting. The independent revenue system forced waterworks utilities to procure operational funds for construction and maintenance, but it enabled them to issue private bonds (local bonds) for securing capital at long-term, low interest rates to cover the enormous construction cost. Meanwhile, the Local Government Finance Act was implemented to allow public enterprises to procure infrastructure construction funds from the market with private bonds.

With the need for expanding waterworks and the rising morbidity rate of waterborne diseases, the Waterworks Act was passed in 1957 to address the strong social demand for the “optimization of waterworks development and management,” “planned development of water supply infrastructure,” and “the protection and expansion of water works.”

In Japan, at present, the waterworks is operated by public sectors in principle, such as municipal authorities under the Waterworks Act, and the authorization for the water supply is undertaken by the national or prefectural governments.

As stated above, waterworks in Japan are managed through self-supporting accounting. However, subsidies from the national treasury and provisions from the general accounting budgets of local authorities cover the cost of infrastructure development, such as water sourcing.

The national and prefectural governments oversee water suppliers at the same time. The Waterworks Act provides that they carry the responsibility of giving technical and operational instructions to waterworks utilities when they authorize the commencement or expansion of their water supply operations. The system developed into the structure described above, resulting in a rapid spread of relevant water supply regulations for domestic operators in Japan.

During the high economic growth of the 1950s and 1970s, the water supply coverage rapidly expanded because of a combination of several factors, such as the establishment of funding systems (such as subsidies and private bonds) and the rising social demands for more hygienic environments, and economic and population growth.

■ State subsidies and provisions from general accounting budget

Yokohama Waterworks, which was established in 1887, was constructed with a loan from the national treasury. However, the revenue from the water supply did not meet expectations and significant additional funding was required for the expansion work. The loan was eventually

redeemed in a lump sum, using the subsidies granted for the expansion work, but only 10% of the principal and interest were repaid.

The Hakodate Ward Waterworks was granted a national treasury subsidy in 1888, and the cities of Nagasaki, Tokyo, and Osaka followed suit. Between 1888 and 1945, state subsidies were granted to 66 municipalities, but some evidence suggests that these were not sufficient because of a lack of government funding.

The subsidies from the national treasury for waterworks continued during the post-World War II period for some time, but they were cut off in 1954 except the subsidies for water supply recovery after natural disasters. The intention behind the discontinuation was to encourage development of sewer systems and small-scale waterworks. However, the financing of the water supply sector soon encountered difficulties, with the rapidly increasing demand for water during the period of high economic growth and with the growing cost of developing new water sources. As a result, a new state subsidy was introduced in 1967 for infrastructure development, including water sources. The scope of subsidies was later expanded to include switch to wide-area operation by mergers of small waterworks utilities, advanced water treatment technology, and effluent treatment facilities.

The waterworks in Japan are, in principle, operated on a self-supporting accounting system, however the provisions from the general accounting budgets of local authorities were employed for installing and maintaining fire hydrants, to water source development costs, and to countermeasures for the high water prices. In its bulletin, the Ministry of Internal Affairs and Communications describes the principles for the provisions from the general accounting budgets of local authorities. The first bulletin was issued in 1974 (by the Ministry of Home Affairs at the time).

1.3.2 Water supply business and water charge

The waterworks utilities operated by local authority in principle, are responsible for preparing and implementing measures for the planned development of water infrastructures and ensuring appropriate and efficient operational management. The operations of individual waterworks utilities must be authorized by either the national government or a prefectural government, both of which prepare regulations.

Regarding water prices, the provisions of the Waterworks Act include the following description: “The rates are equitable and reasonable in light of fair costs incurred as a result of efficient management.” In addition, the Local Public Enterprise Act provides that water prices should be “equitable and reasonable and based on the rate that is appropriate under efficient management to ensure the sound operation of local public enterprises.”

At present, most waterworks utilities in Japan employ the meter rate charge system, which is based on meter diameter and meter readings. Moreover, many water suppliers employ the

increasing charge system, where the rate increases as more water is used. This system was gradually introduced in the early 1960s, under the rubric of “suppressing water demand” and “lowering costs for those who use water in their daily lives” When the rates are reviewed, a committee of experts is set up to discuss it, and the reviewed rates are then presented to the local parliament.

Regarding the history of water prices, a flat rate system based on household sizes was common in the early period of the Meiji era (the late 19th century). Meters were gradually introduced during the Taisho era and the beginning of the Showa era (the early 20th century), leading to the promulgation of a meter charge system. From the late 1940s to the early 1950s, a meter rate charge system became common throughout the country.

Water usage charge has been paid almost 100 %. In order to improve customer satisfaction, waterworks utilities today offer an all-year-round supply, regular quality checks to ensure water safety, and varied payment methods, including bank transfers, credit cards, and payments at convenience stores.

Chapter 2 was omitted.

Chapter 3 Data collection, and analysis of water supply business management in developing countries

3.1 Overview

3.1.1 Purpose

The purpose of the project was to gather data on the management status of waterworks utilities in developing countries and to analyze it in order to identify the issues and precautions applicable to specific countries.

3.1.2 Data collection

Data was gathered primarily from various sources regarding water supply business management, such as JICA reports. For nations such as Cambodia and Laos, supplemental documents were obtained from channels in relation to local project involvements. Table 3-1 shows the target nations and areas of data collection.

Table 3-1 Target nations and areas

Target nations	Cities
Cambodia	Siem Reap, Sihanoukville, Battambang, Kampong Thom Province, Kampong Cham, Kampot Province, Pursat Province, and Svay Rieng
Laos	Vientiane, Luang Prabang, and Khammouane (Profit/Loss only)
Indonesia	Surabaya, Karawang, and Bogor
Tanzania	Zanzibar
South Sudan	Juba (P/L only)

3.2 Analysis

The collected data were analyzed in order to elucidate cost structures and several management indicators.

3.2.1 Cost structures

Figure 3-1 depicts the cost structures of target waterworks utilities; the total cost is set as 100, and the breakdown is shown in percentages.

- Cambodia's electricity and fuel (power cost in Japan) costs were relatively high, accounting for 18 to 40% of its total costs. Further, depreciation costs were between 16 and 52%, with many utilities reporting higher depreciation costs than their counterparts.
- In Laos, the costs of electricity and fuel were 17% in Vientiane and 9% in Luang Prabang, slightly higher than those of Japan. Khammouane did not record its costs for electricity and fuel, but its labor cost was 35%, higher than that of other municipalities. According to a local source, the Khammouane authority was increasing the number of employees at a faster pace than planned, in preparation for personnel training for a water treatment plant, which will be constructed in the near future.
- In Indonesia, the costs for electricity and fuel in Surabaya and Bogor were around 10%. Karawang and Bogor had higher maintenance costs. As in Khammouane, Bogor spent a great portion of costs on labor.
- Zanzibar in Tanzania and Juba in South Sudan only reported four items, which is far fewer than other areas.
- Zanzibar spent 24% for electricity and fuel and 48% for depreciation, and these two items accounted for a large portion of its total costs.
- As to Juba, labor cost accounted for 55% and other maintenance cost 38% of its total costs.
- The costs for electricity and fuel were a large part of the total cost of all areas, but the overall cost structures varied to a great extent.

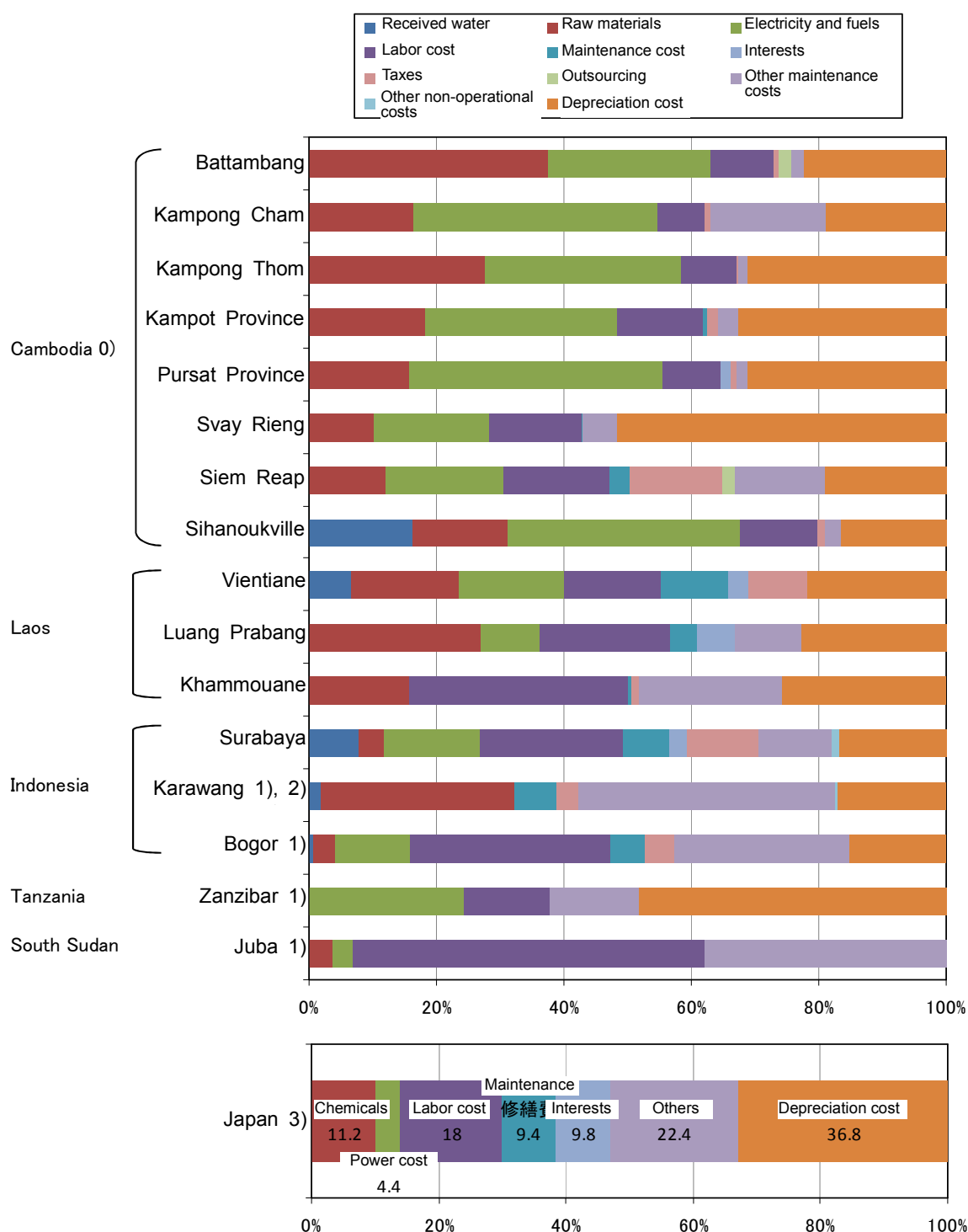


Figure 3-1 Cost structures of target waterworks utilities

0) FY 2012 data provided by Mr. Kawasaki, Chief Adviser, The Project on Capacity Building for Urban Water Supply System in Cambodia Phase 3

1) Prepared from JICA reports.

2) Karawang reported operational costs, which appeared to include costs for raw materials and electricity. In the figure above, this operational cost is shown as the cost for raw materials. However, detailed breakdowns for operational costs and other maintenance costs (such as labor costs) were not available.

3) The figures were taken from FY 2013 data (prepared from reports of the 5th Survey Planning Group, Subcommittee for Water Resource Development, National Land Development Council, and the materials were produced by Mr. Hiroyuki Fukuda, Water Supply Division, Health Service Bureau, Ministry of Health, Labour and Welfare).

3.2.2 Management indicators

In its Guideline for Management Data Disclosure, the Japan Water Works Association proposes the following indicators to measure management soundness: the gross balance ratio, current account balance ratio, operational balance ratio, cumulative operating loss ratio, ratio of amortization of private bond principal against depreciation cost, physical fixed asset depreciation ratio, current ratio, equity ratio, and fixed liability component ratio.

In this chapter, only the gross balance ratio, current ratio, and equity ratio are employed because the collected data were not sufficient to apply all the indicators. For other aspects, unique indicators are generated for comparison and analysis purposes. Table 3-4 shows the management indicators used.

The management indicators of each city and basic data on the states of water infrastructures and other factors are shown in Table 3-5.

Table 3-4 Management indicators used

Indicators	Definition used for this report
Gross balance ratio	Gross revenue divided by gross expenditure, multiplied by 100
Water supply revenue and cost recovery rate*	Water supply revenue divided by gross expenditure, multiplied by 100
Current ratio	Current assets divided by current liabilities, multiplied by 100
Ratio of depreciation cost against fixed assets*	Depreciation cost divided by fixed assets, multiplied by 100
Equity ratio	Sum of equity* and profits divided by sum of liability and equity, multiplied by 100

*Indicators uniquely created for this report

(1) Gross balance ratio

There are only two utilities in Cambodia whose gross balance ratio exceeded 100%, namely, Siem Reap and Sihanoukville. In Laos, two utilities, Luang Prabang and Khammouane, also had ratios in excess of 100%. All three utilities in Indonesia, however, had ratios over 100%.

(2) Water supply revenue and cost recovery rate

Since the gross balances include water supply revenues and other sources of income, we set up an indicator, “water supply revenue and cost recovery rate,” to evaluate to what extent the revenues from water supply alone were contributing to cost recovery.

Of the seven utilities with gross balance ratios over 100%, four had water supply revenues and cost recovery rates that also exceeded 100%. Particularly high rates were recorded by Siem Reap, Luang Prabang, and Surabaya. These three areas thrive economically from tourism and trading, which seem to give them an advantage. In contrast, Zanzibar and Juba had particularly low recovery rates.

(3) Current ratio

The current ratio indicates the sufficiency of capital against liabilities. In Japan, a preferable level is considered to be over 200%, and the average for waterworks utilities in FY 2011 was 504.2%.

Of all the utilities included in the assessment, even the city with the lowest figure equaled over 200%. Some high-performing utilities recorded high rates of 3,000% and 8,000%.

(4) Ratio of depreciation cost against fixed assets

Depreciation cost is inevitable in sustaining sound management, but some of the utilities had high percentages of depreciation costs against total costs. Figure 3-2 depicts the contrast between gross balance ratios and depreciation costs.

Even those utilities whose gross balance ratios were less than 100% would surpass 100% if depreciation costs were disregarded. Therefore, it is assumed that day-to-day maintenance costs are paid off by the revenue of water supplies and other operations.

Another indicator, the “ratio of depreciation costs to fixed assets,” was introduced in this report to oversee each depreciation period. For instance, 5% for this indicator suggests that the depreciation will be complete in 20 years. Higher figures suggest either that the depreciation period is shorter or that an excessive amount of depreciation costs is recorded. Lower figures suggest, in comparison, either long depreciation periods or insufficient recordings of the depreciation costs.

The results of the calculation indicate that few utilities showed more than 10% of the ratio; this means that the depreciation period is relatively short compared to the standard depreciation periods of Japan.

(5) Equity ratio

The equity ratio indicates the proportion of self-owned assets after discounting all liabilities. Higher figures imply a more stable management and lower ones the contrary. A negative figure indicates that the operation is in deficit. For waterworks utilities in Japan, the average in FY 2011 was 68%. Cambodia showed a contrast between highly achieving utilities (in the range of 90%) and those with negative figures. Other utilities evaluated for this indicator, namely, Vientiane, Luang Prabang, and Surabaya, were all at the higher end of 70%.

To cite an example, samples of the balance sheets (liability and equity) and equity ratios of Cambodia are shown in Table 3-6. Kampong Cham and Pursat both developed water treatment plants with aid from the Asian Development Bank (ADB). Pursat allocated its own capital and that of the ADB apart; Kampong Cham has no record of receiving ADB capital. Here, Pursat’s capital was largely came from ADB capital, and together with the fact that it had a negative profit, the equity ratio for Pursat was negative.

Table 3-5 Table of management indicator results

Cities	Gross population (10,000)*	Number of supply points	Coverage rate (%)	Non-revenue water ratio (%)	Pipeline length (km)	Pipeline length per supply point (m)	Gross balance ratio (%)	Water supply revenue and cost recovery rate (%)	Current ratio (%)	Depreciation cost/ fixed assets (%)	Equity ratio (%)
Battambang	112	10,170	38	20.5	246	24.9	90.3	86.9	234	8.2	-24.6
Kampong Cham	176	6,124	65.7	11.8	80	14.0	71.7	63.2	1,278	6.1	98.8
Kampong Thom	69	3,928	50.1	17	66	20.7	74.6	66.3	3,026	8.5	99.6
Kampot	61	4,753	44.5	18.7	70	16.5	94.8	93.8	2,685	4.6	98.6
Pursat	44	5,927	55.4	17	92	18.4	78.3	77.9	344	8.1	-33.7
Svay Rieng	58	2,062	20	15	45	25.2	78.2	69.9	2,924	6.9	-20.8
Siem Reap	92	4,918	30	9.7	127	26.4	156.7	150.6	8,080	4.0	98.9
Sihanoukville	25	6,494	57.2	15.6	84	14.6	101.6	93.3	2,777	6.3	4.6
Vientiane	78	88,024	68	31	1,154	15.2	89.9	71.5	203	6.2	74.4
Luang Prabang	41	8,650	78	21	92	10.6	129.7	111.8	8,718	5.9	79.7
Khammouane	34	5,914	58	28	72	12.2	101.0	89.4	N/A	N/A	N/A
Surabaya	277	472,000	85	31	5,400	11.4	136.9	119.1	579	15.6	78.7
Karawang	213	53,289	20	40	N/A	N/A	110.0	93.3	251	7.9	N/A
Bogor	477	154,000	10	31	N/A	N/A	113.2	102.8	680	10.6	N/A
Zanzibar	130	71,463	65	57	N/A	N/A	77.1	25.7	1,762	12.3	N/A
Juba	40	3,108	N/A	60	71	22.8	25.5	19.9	N/A	N/A	N/A

*Gross population is given as a reference to city size.

Cambodia: The data of provinces were taken from the Cambodia 2013 Intermediary Population Census, Statistics Bureau, Ministry of Internal Affairs and Communications.

Laos: The data of Vientiane capital and the provinces were taken from the 2005 census.

Indonesia: The data of Surabaya City, Karawang Regency, and Bogor Regency were taken from the 2010 census.

Tanzania: The population data of the Zanzibar Islands were taken from the 2012 census.

South Sudan: The sources were the final report on the Project for Management Capacity Enhancement of the Southern Sudan Urban Water Corporation.

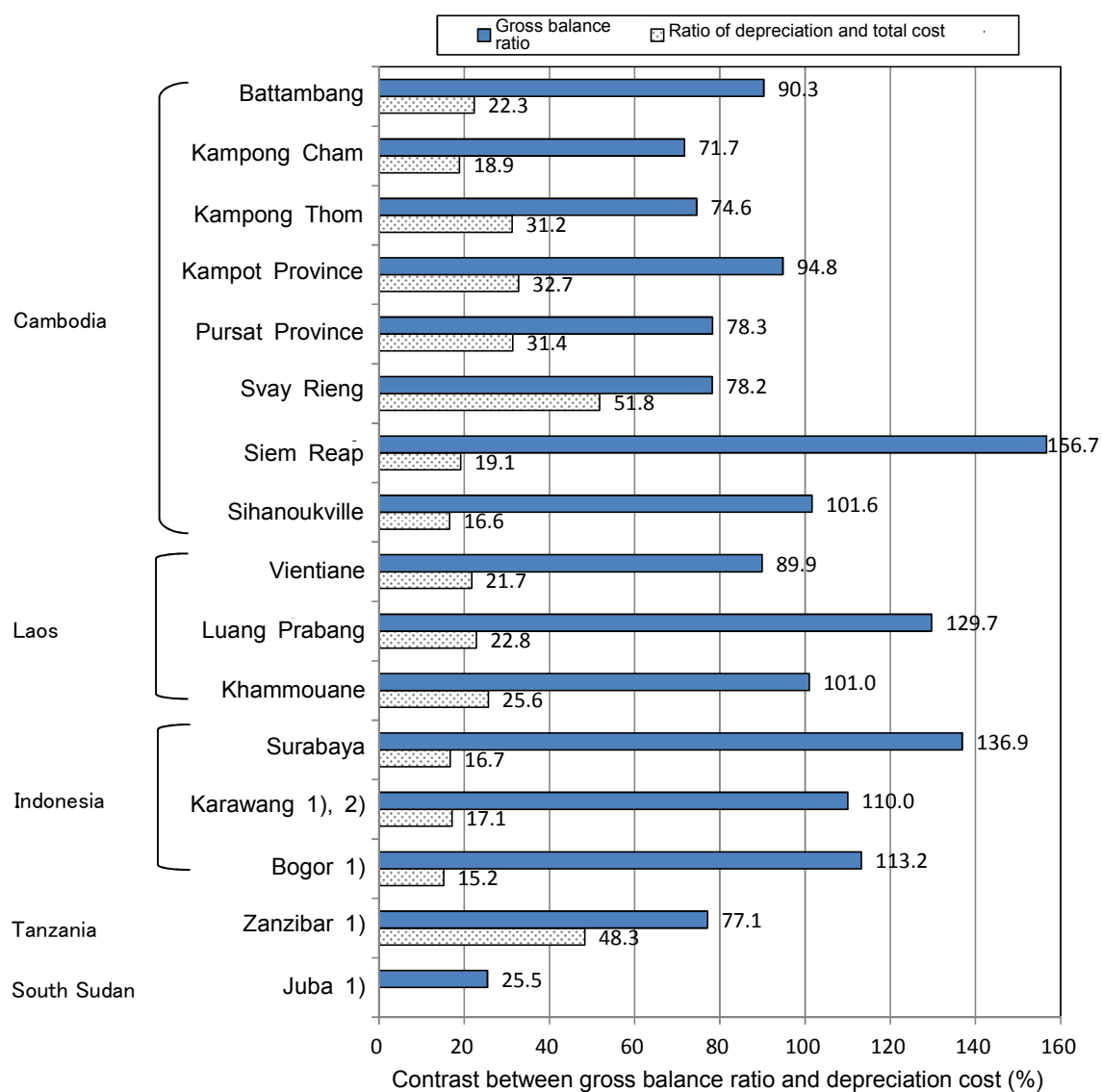


Figure 3-2 Contrast between gross balance ratio and depreciation cost

Table 3-6 Samples of balance sheets (liability and equity) and equity ratio

			Kampong Cham	Pursat
Liability	Fixed liability		8,385.8	8,761.8
	Current liability		1,490.4	679.4
Equity	Capital	Own capital	9,528.1	230.2
		ADB capital	-	11,560.8
	Profits	Profit	-1,141.8	-3,556.3
		Subsidies	1,373.3	145.1
Equity ratio (%)			98.8	-33.7

Unit: 1 million KHR

3.3 Issues and precautions that emerged from the analysis

This chapter has so far organized and analyzed the management data of waterworks utilities in several emerging economies. Taking these results, this section makes some remarks on the pertinent issues regarding data, data handling, systems, and local circumstances.

3.1.1 Data accuracy

- Financial statements are crucial for understanding financial situations, but these documents of emerging economies may sometimes present less than accurate figures. In this report, the data were not examined in detail, but in other cases, such as local inspections, it should be taken into account. It is crucial to clarify various aspects, such as the accounting systems used, to understand precisely what the figures actually represent.

3.3.2 Handling of data

- The utilities reviewed in this chapter tended to have high current ratios. In the field, it is important not only to check the ratios but also to scrutinize the details and values of current assets and liabilities, since the current ratios that are derived from financial statements include outstanding or uncollected balances at the time the statements were prepared.
- In Japan, depreciation cost is usually directed toward supplementing capital expenditures or funds for future facility rehabilitations. However, some emerging economies may have different ways of dealing with depreciation cost, such as taxes for national treasuries. It is therefore advisable to review the details of depreciation cost purposes.
- Where aid-capital is involved, if such capital is not separated from owned capital, the equity ratio will be high. It should be kept in mind.
- Where facilities are subsidized, it is advisable to check if the subsidies are included in the depreciation cost.

3.3.3 Systems

- Before handling the financial statements, it is important to ascertain accounting systems, their contents, and whether they are nationally uniform.
- It is necessary to ascertain if a service life standard in relation to depreciation is established, together with the method of initial cost calculation.

3.3.4 Local circumstances

- In Japan, waterworks are operated with self-supporting accounting, and water rates are determined on the principle of full cost recovery. To improve the operational management of water works in developing countries, it is necessary to take their local circumstances into consideration when discussing the possibility of full cost recovery and merits of switch to public enterprise or self-supporting accounting for management improvement.

- As stated earlier, a large portion of Cambodia's expenditures was for electricity and fuel (power cost). Supposing we were to work on reducing this power cost, its improvement would require diverse regional arrangements, since power cost may differ from region to region because of factors such as geographic conditions and electricity rates.

3.4 Summary

This chapter reviewed and described the relevant issues and necessary precautions of water supply business management in emerging economies that emerged from the collection, comparison, and analysis of their management data. The chapter is summarized in the following points:

- The water supply systems in many waterworks utilities dealt with in this chapter generally had low profitability and vulnerable financial foundations. They may benefit from initiatives to "increase revenue from water supplies" and "cut waste" in business operations.
- The analysis and comparison of management data makes it possible to identify the issues and difficulties confronted by specific localities.
- It is important to pay close attention to the management data when handling them, as described in Section 3.3.
- For the accurate comparison and analysis of management data, it is crucial that accounting systems and water-supply-related regulations are well established.

Chapter 4 Local survey

4.1 Purpose of the local survey

The main purposes of the local survey are as follows:

- To interview management officials who related to water supply sector and obtain detailed local information concerning the water supply business management of water supply operations in order to identify support needs
- To interview the officials mainly on topics relating to past initiatives for management improvement and current challenges so as to obtain basic information for future assistance policies

4.2 Outline of the interviews

The local survey was conducted in January 2014.

The location was Indonesia, and the interviews were conducted with Cipta Karya, the national institution responsible for the supervision and regulation of water suppliers, and 10 waterworks utilities PDAM (Prusahaan Daerah Air Munum) on the topics relating to the management of water supply operations. We approached the Indonesian Water Supply Association (PERPAMSI) for cooperation and obtained referrals to several PDAMs for the interviews.

4.3 Summary of the local survey

We conducted a local survey program in Indonesia to obtain detailed information on water supply operations and understand past initiatives and present challenges in relation to improving management.

These initiatives and challenges in water supply operations within Indonesia are outlined below.

4.3.1 Initiatives in Indonesia

- Actual cases of management improvement following the implementation of measures to address non-revenue water
- A real case of water rate revision brought about by convincing the authority responsible for authorizing water rates
- Utilization of private funding (e.g., Public Private Partnership (PPP) and business-to-business (B2B)) and cooperation with private companies overseas
- Enhancing efficiency in policy making through a PDAM league table provided by the central government

4.3.2 Challenges in Indonesia

- Despite the central government's policy of full cost recovery, only 30% of all PDAM achieved this goal.
- There was a high percentage of non-revenue water.
- The preferential scheme on loan interest, available for the PDAM that achieved a high

ranking in the central government's league table, was not fully utilized.

Chapter 5 Assistance measures for improvement of water supply business management

5.1 Outline of the assistance measures

5.1.1 Increasing of revenue from water supply

- Measures for non-revenue water
 - ✧ Measures for water leakage
 - ✧ Measures against illegal connections (water theft)
 - ✧ Improvement of water bill collection rates
- Optimization of water prices
 - ✧ Rate setting
 - ✧ Tariff development
 - ✧ Rate review
- Motivation of clients for payment
 - ✧ Enhancement of transparency
 - ✧ Enhancement of equality
 - ✧ Raising of awareness
 - ✧ Improvement of convenient payment methods
- Expansion of service connections
 - ✧ Facility expansion
 - ✧ Education in hygiene
 - ✧ Consideration for low-income population

5.1.2 Cutting of waste

- Clarification of costs
 - ✧ Implementation of appropriate accounting systems
 - ✧ Preparation and analysis of financial statements
- Optimization of expenses
- Sharing and disclosing of financial information
 - ✧ Raising of awareness of costs among employees; cultivating of impetus for change among management members
 - ✧ Establishment of audit functions

5.1.3 Utilization of external funding

- Preparation of management plans
- Implementation of management plans, followed by evaluation
- Utilization of other means, including private funding

5.2 Specific assistance measures

5.2.1 Increasing of revenue from water supply

Some possible measures to increase revenue from water supply include addressing non-revenue water, optimizing water prices, motivating clients for payment, and expanding service connections.

(1) Measures for non-revenue water (NRW)

The major target of NRW reduction activities include the water leakage, illegal connections (water theft), and the water bill collection rates.

- Measures for water leakage

As part of the measures for water leakage, much support has been dedicated to leakage survey, water distribution analysis, renewal (repair) of old pipes, and network segmentation and so on. These efforts, together with introduction of new technologies, should be continued in districts of high leakage rates.

- Measures against illegal connections (water theft)

There is a high incidence of illegal connections (water theft) in developing countries. In order to increase revenue from water supply, it is sometimes necessary to identify illegal connections and remove them. This requires a day-to-day effort to ensure that any un-metered households within the water supply network are checked for illegal connections. It is also helpful to raise the awareness of illegal connections among meter readers.

Addressing illegal connections and water leakages also has an impact on the improvement of water quality. These problems may lead to water contamination. When the negative pressure occurs in the pipe network by water suspension, contaminants can come into the pipeline from the open mouth of the leakages and illegal connections.

- Improvement of water bill collection rates

It is important to manage client (waterworks users) information and make no errors in charging them and collecting payments in order to improve bill collection rates. Some districts employ a flat-rate system, but a meter rate charge system is preferred because it promotes equality and it will be useful for activities against non-revenue water. It involves the installation of meters in each household.

In this case, it is necessary to prepare client ledgers, ensure precise meter reading, and make no errors in charging and collecting fees. Preparing client ledgers also requires the preparation of pipe network drawings to identify locally connected households. This also makes newly recruited meter readers more efficient and aids in the survey of water leakages. In ensuring precise meter readings and in charging and collecting fees, the regular training of novice workers and the use of convenient payment methods may be considered. In addition to precise meter reading and invoicing/collection, the appropriate maintenance of meters (repair/replacement) is required for raising awareness among clients of their payment duties and

for gaining their trust.

The project undertaken in South Sulawesi, Indonesia, where repeated training sessions and examinations were given to meter readers to improve their abilities to read meters precisely, leading to an improved collection rate, is an exemplary case.

Such supports from the perspective of software require less initial investment such as material cost and equipment cost in comparison with hardware supports such as renewal of old pipes, network segmentation etc. It is cost effective when the impact is expected to be same as other measures.

The introduction of smart meters, a system that allows remote monitoring, also prevents payment evasion or enhances payment collection efficiency, subject to local economic circumstances.

In Metro Cebu of the Philippines, meter readers use a portable terminal for reading, and meters are installed outdoors without covering, facilitating speedy reading by meter readers. This is an important way to enhance efficiency in meter reading. It should be noted, however, that keeping meters outdoors without protection comes with the risks of theft and vandalism.

(2) Optimization of water prices

A more direct and effective measure to increase revenue from water supplies is the revision of water prices, which requires setting the rate, providing tariffs, and reviewing the rates.

- Rate setting

In principle, all cost in providing drinking water is recovered by water charges in all waterworks in Japan, except small-scale waterworks.

In many developing countries, realizing full cost recovery is not easy because many users are still low-income and water rates are set low by policies of social welfare. For these reasons, it may be necessary to consider step by step approaches toward a full cost recovery system as a realistic option.

For example, where power cost is relatively high compared to total cost, as in Cambodia, flexible measures, such as the introduction of a local government subsidy for the power cost, followed by a gradual minimization of the size of the subsidies, may be beneficial.

The rate setting would require the clarification of operational costs (comprehensive material costs), use of various financial statements to consider the extent of the cost to be recovered by water supply revenues and setting of water prices according to them.

- Tariff development

Developing tariffs means the establishment of methods to collect the payments described above.

It is necessary to be well adjusted to local circumstances and consider “a tariff that realizes fair and equitable, corresponding to payer statuses and appropriate profitability as well as taking into consideration social welfare policies. ”.

- Rate review

Generally speaking, reviewing rates for water prices is difficult for political and social reasons.

Meanwhile, the local survey in Indonesia reveals that the authority in that country for determining water prices resides with state governors and city mayors and that it is possible to negotiate rate reviews relatively easily, if these authorities can be convinced of the need.

It is assumed that water prices are determined by government agencies, mayors, or parliaments in other countries. If this is the case, then explaining the necessity to raise water prices and obtaining consent from the authorities are the first steps to take.

To this end, the accountability to the authorities is important, such as the use of financial statements.

Regarding the timing for water rate reviews, it would be easier if price rises take place simultaneously with the opening of new facilities or the expanding of coverage areas in order to promote understanding among customers.

(3) Motivation of clients for payment

Unlike in Japan, some emerging economies regard “water as free of charge”; thus, the awareness of the obligation to pay for water is low in such countries. It is thus important to raise client awareness of the need for the payment for water supply services. This will involve not only improving service quality through “the provision of clean, plentiful water at an affordable price,” but also by “improving operational transparency” and “enhancing equality” and by “pursuing promotions” and “improving the convenience of payment methods.”

- Enhancement of transparency

It is important that information is made accessible to show the various costs necessary to provide drinking water. In addition, it is important that public relations and promotional activities encourage payment for water services.

- Enhancement of equality

It is important to charge for the amount of water used and resolve sentiment of inequality among users. To this end, thorough client management and suppression of illegal connections are crucial.

Where governmental bodies do not pay their water bills, as may be the case in certain emerging economies, persistent efforts may be necessary to resolve the issue.

- Raising of awareness

The provision of clean water contributes to better public health, but this is not well recognized in developing countries. Public relations and educational activities are necessary to raise awareness of the value of waterworks, such as, for example, arranging workshops for the general public, where officials from waterworks utilities lecture on the correlation between water supply coverage and the morbidity rates of waterborne diseases. Educational opportunities at schools are particularly effective, and organizing visits to treatment plants would benefit both

visitors and waterworks utilities.

- Improvement of convenience of payment methods

It is assumed that many areas in developing countries have payment methods, such as payment at cashier's windows or visits by bill collectors. It is conceivable that, in the future, they may introduce payment by bank transfer (including the Internet banking system) and paying at convenience stores to diversify payment methods as the economy grows. Direct debit from bank accounts is also an effective method to improve collection rates and efficiency. Methods such as bank transfers are widely deployed in many locations in Indonesia and other countries, suggesting the relative ease of introducing this method in other places.

(4) Expansion of service connections

- Facility expansion

Increasing the number of clients is effective for increasing revenue. Therefore, it is important to expand waterworks facilities, as well as to address the issue of non-revenue water to enlarge client coverage and water supply revenue. In emerging economies, however, funding is often not enough to cover the cost of facility expansion. Therefore, some consideration of ways to procure funding, including the use of external funding, is required.

It is important to note, however, that a significant expansion of the client base should be avoided because it may cause problems, such as the lowering of water main pressure.

- Education in hygiene

In order to expand client coverage, it is advisable to approach non-connected residents and explain the benefits of using the waterworks. The public relations and educational activities stated above are crucial factors in achieving this in districts where waterworks are underdeveloped.

- Consideration for low-income population

There are people who cannot afford to use the waterworks. Cambodia provides a discount/waiver system for connection fees for its low-income population. The Manila Water, Philippine also has a scheme for low-income people. In the scheme, they provide water at low price for the community where low-income people live and their water meters are set up in one place, furthermore the management and water bills collection are entrusted to the autonomous group there.

5.2.2 Cutting of waste

In emerging economies, "the clarification of costs," "the optimization of expenses," and "the sharing and disclosing of information" are important to maintain an appropriate expenditure for operational management while cutting the waste.

(1) Clarification of costs

- Implementation of appropriate accounting systems

Some shortcomings, such as non-standardized accounting systems and variations in reporting systems, exist in developing countries. It is conceivable that legal and accounting systems must be established or improved to standardize accounting methods. There is also a need for employing or training finance specialists.

- Preparation and analysis of financial statements

It is important to utilize properly prepared financial statements in analyzing costs, comparing the costs of areas, to identify items that are considered to be dealt (cost items of large proportions) and that are considered to be reduced (unnecessary expenses)

Analyses and comparisons will provide waterworks employees in emerging economies with opportunities to think for themselves and will hopefully lead to the improvement of their skills and management abilities.

(2) Optimization of expenses

Utmost efforts should be made to optimize expenses and reduce waste for the items identified in the analyses of financial statements that are described above.

For example, a large portion of Cambodia's expenditures was for power cost. In order to reduce it, that country could, for example, change its operational patterns, introduce high-efficiency equipment, and control water pressures. It may also need to take into account the ideal combination of various energy sources, including renewable energy, such as solar power generation and small-scale hydraulic power generation, and the deployment of off-grid power systems.

Regarding the procurement of raw materials, some considerations are necessary on chemical substances bearing in mind the cost performance and logistic conditions,. Moreover, it may be useful to consider whether the expansion of coverage areas by merger of other waterworks would enhance revenue structures, depending on the geographical conditions.

Considerations such as the above may well benefit from the technologies and knowledge of Japan. Given the differences in national circumstances, the evaluation of technologies and the identification of measures that are appropriate to specific localities must proceed on a case-by-case basis.

(3) Sharing and disclosing of financial information

- Raising of awareness of costs among employees; cultivating of impetus for change among management members

It is necessary to provide not only to management but also to employees in technical departments the opportunity to learn about finance and cost awareness through training sessions on management issues. This approach will help change their understanding of business management. To this end, it is important to share information about financial statuses

and systems and to develop a framework where issues and the need for change are also shared.

- Establishment of audit functions

Disclosing management information helps facilitate external examinations. There is a need for a system of auditing to examine accounting operations and financial statements, and the data should be disclosed.

The central government of Indonesia offers a system where the government publically certifies waterworks operations as “sound”; the operators are entitled to government guarantees on interest rates in arranging new loans. This is an example of reform management measures. It gives operators incentive to actively engage in management reform.

5.2.3 Utilization of external funding

Many emerging economies must urgently develop and expand their water supply systems, but their water prices are too low to recover the costs involved in such projects. This makes it very difficult for them to procure funds for facility maintenance and expansion. The only option available is to use external funding. In Japan, operators rely on externally funded capital, such as government subsidies and private bonds, for asset expenses, such as facility construction and expansion, which tend to require large sums of money; in this way, they ensure their finances and equality in the burden-sharing among generations. In the case of developing countries, there are more practical difficulties in procuring capital, such as insufficient government funding, bank refusal to arrange loans because of credit insecurity, and a lack of revenue to ensure repayments. External funding is available from the “official development assistance (ODA), banks (development banks and private banks), private funding (such as from PPPs), and government bonds. In order to secure funding from these sources, it is necessary to qualify for candidacy, which requires that the status of operational management be scrutinized and that a detailed management plan be prepared, outlining prospective operational income and costs.

*In the Philippines, the JICA operates the project Water Revolving Fund, which provides long-term, low interest rate funding by yen loans to aid water suppliers with their infrastructure development. This project can provide water suppliers with loans with interest rates lower than those offered by private banks; these are made possible by combining funding from private banks with yen loans. The U.S. Agency for International Development (US AID) also provides a similar guarantee project. There are some requirements that must be met before applying for loans in this project, such as preparing a management plan and facility maintenance policies; technical support is given for their preparation.

(1) Preparation of management plans

A management plan should include items such as “specific measures and period of implementation,” “a monitoring plan,” “asset data,” “financial statements (balance sheet, P/L, and cash flow statement),” and a “repayment plan.” In preparing a management plan, support will be

required so that it will be based on the preparatory efforts that are described above, including the preparation of basic data, such as financial statements and client management, the improvement of revenue collection, and the optimization of water prices, and that it will be implementable. Realistic first steps in preparing the management plan would be, for example, addressing the issue of non-revenue water and improving the profit level from the revenues from water services; these steps would be followed by preparing a prospective revenue and expenditure plan that reflects the actual circumstances of the locality.

(2) Implementation of management plans followed by evaluation

Developing a system that facilitates the proper implementation of the management plan is as important as preparing the plan. Proper implementation of the plan requires a constant assessment (monitoring) based on the plan-do-check-act (PDCA) cycle, and support for carrying out this aspect of the plan.

Discussions with fund providers, based on a realistic plan, would benefit the smooth execution of facility maintenance and expansion.

(3) Utilization of other means, including private funding

The local survey in Indonesia reveals the use of PPP or B2B funding and joint projects with private company from abroad to implement measures against water leakage.

Private funding, such as from a PPP, would be an inevitable source because support from ODA alone would soon be insufficient to meet the fast-growing demand for water supplies in emerging economies. In the case of delegation to the private sector, however, it will be necessary to establish or strengthen regulatory bodies, since service standards and public utilities may be affected as a result of the drive for profitability.

Chapter 6 Recommendations, challenges and precautions

This study conducted a review of past assistances in the water supply sector, data collection and analysis of water supply management in developing countries, local interviews in Indonesia in order to consider a way for future assistance on improving water supply business management. In the following, we describe our recommendations in providing support for management improvement and identify the challenges and precautions involved in implementing them.

6.1 Recommendation

6.1.1 Support for diverting from the vicious circle

Japan's international cooperative initiatives in the waterworks sector increasingly recognize the importance of improving the management of water supply business. There is a dire need to break away from the vicious circle of low service standards and customer dissatisfaction, which leads to vulnerable finances that affect operations and maintenance levels, which in turn further lowers the service standards and customer satisfaction; however, this objective is difficult to address.

From a different perspective, much experience and knowledge have already been done in improving operation and maintenance, such as addressing non-revenue water, water quality control and enhancing facility maintenance and management.

This report focused on the concept of enhancing revenues and considered measures to “increase revenues from water supplies,” “cut waste,” and “utilization of external funding.” While continuing the technical support hitherto given, such as measures to address non-revenue water and improve facility maintenance abilities, we consider it possible to break the vicious circle by improving income and revenue balance in order to enhance the management skill of waterworks utilities.

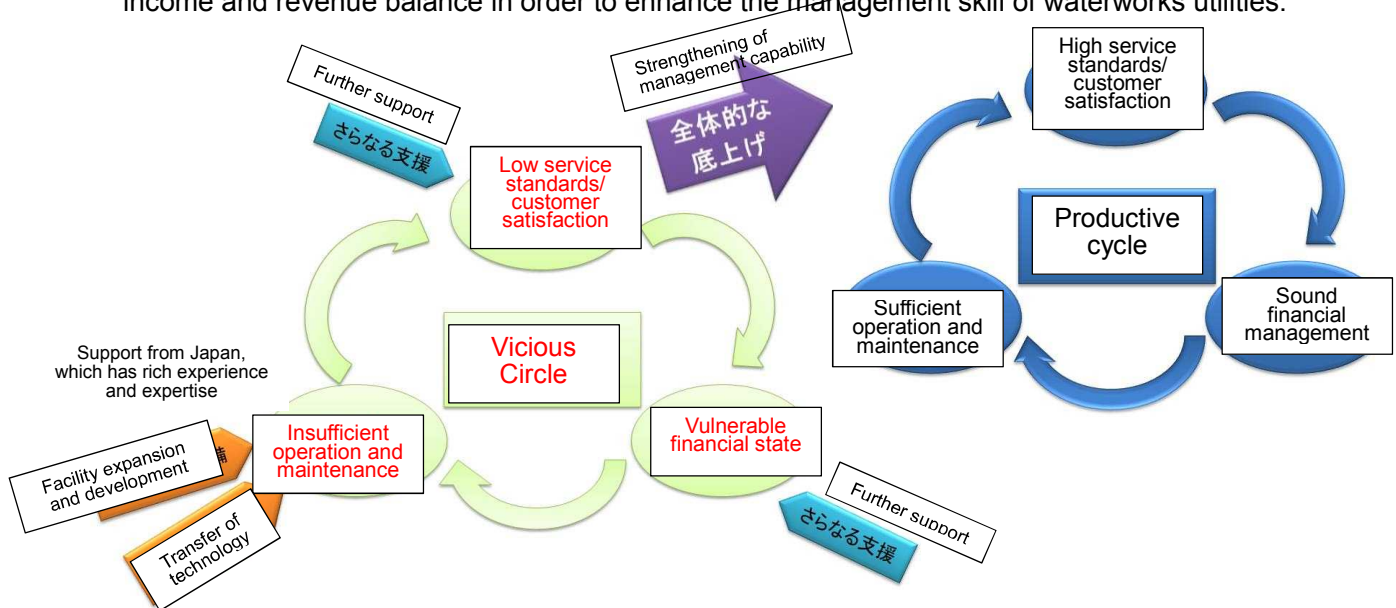


Figure 6-1 Conceptual image of diverting from the vicious circle

6.1.2 Shift from individual approaches to cooperative approaches of across different fields

Support for management improvement requires the discussion of several themes, including the establishment, improvement, standardization, and diffusion of a common accounting system, when necessary. Moreover, the national significance of waterworks is an important factor to consider; it includes a legislation on the fundamental rules for water supply business (general accounts or special accounts, the level of self-supporting accounting required, or the operation of waterworks by the public or private sector).

Some countries have no legal structure equivalent to Japan's Waterworks Act, and the lack of legal frameworks hinders foreign fund and particularly, Japanese companies, from expanding their activities in emerging economies. It is also necessary to consider providing a wider legal structure for water supply business, such as that in the Waterworks Act, Accounting Act, and Public Company Act, in order to aid the reform of water supply business management. To support a realization of the sector-wide reform, we must adopt a cooperative approach that extends across different fields, rather than addressing issues individually. The cross-field cooperative approach entails such initiatives as the inclusion of experts from other areas, such as accounting and law, and the coordination of several projects, such as, for example, in technical transfer, management reform, laws and regulations, and health and hygiene.

6.1.3 Promoting liaison and cooperation

In Japan, various information and training opportunities are provided by the Japan Water Works Association for both technology and management. These activities have contributed to the sound development of waterworks throughout the country.

Meanwhile, in developing countries, there is often no uniform standards, systems, or regulations. In this regard, aid organizations in developing nations should support initiatives related to operator liaisons, information sharing, the unification of standards, and reform proposals. In the future, assistance will be required in establishing and leveraging initiatives or mutual support organizations, similar to the Japan Water Works Association, in addition to various, individual support in technology and management reform.

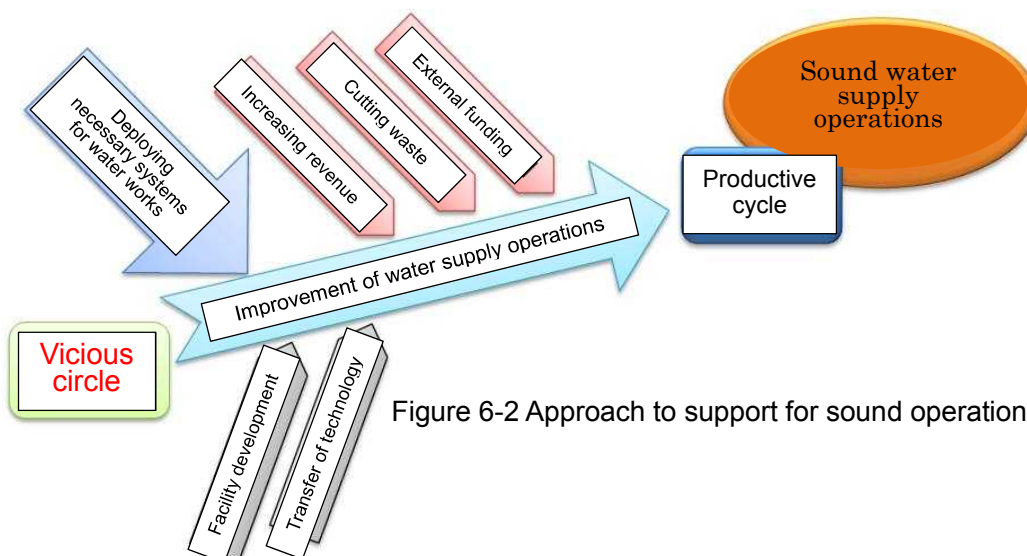


Figure 6-2 Approach to support for sound operational management

6.2 Challenges and precautions

6.2.1 Differences from Japan

Water works in Japan strive to provide clean, plentiful water at an affordable price to ensure public health and improve the living environment. In developing countries, however, circumstances vary and are not necessarily identical with those of Japan. Some countries do not aspire to high standards in water supply services or do not employ self-supporting accounting systems. For this reason, it is necessary to develop systems and ideals that correspond to the local state of affairs. In Japan, waterworks are, in principle, operated by municipal authorities, thereby fostering a sense of pride in operators that underpins their incentive to comply with regulations and to ensure quality. In developing countries, this sense of compliance with laws and regulations may be weak in some cases. Where this is the case, support is required to promote and cultivate the awareness of legal compliance among those who work in the water supply sector. It is also necessary to consider how local authorities may be involved in operating waterworks in emerging economies, as it is often the case that waterworks are managed by national governments or public companies or are privatized.

6.2.2 Well-considered assistance from the viewpoint of the recipients

Some aspects of the social contexts of developing countries differ from those of Japan, such as small populations in certain districts, low industrial growth, low incomes, large gaps between income levels, and the lack of public awareness of the need to pay for water. Given this reality, assistance that imposes a Japanese sense of value may be rejected by local populations or may not produce expected outcomes. Thus, support must consider the viewpoints of the people that it seeks to help, taking into account their local conditions.

6.2.3 Securing transparency

Management reform often involves handling valuable data, such as financial statistics. In dealing with such cases, transparency must be maintained, but it may give rise to conflict in certain political or social contexts. The extent of Japan's intervention in international cooperation must be determined case by case.

6.2.4 Structuralizing asset management

Often, in emerging economies, asset management is inappropriate (e.g., the lack of pipeline network information or asset ledgers), suggesting a low awareness of asset management, which is a core component of business management. Therefore, a system or framework must be developed to ensure precise and efficient execution from acquisition to amortization of assets.

6.2.5 Securing resources

The JICA experts who are adept at water supply business management and/or management

reform are not always enough. Therefore, it must be considered the possibilities of securing and training human resources domestically, in addition to assistance for developing countries. Because of the absence of data with respect to the actual assistance given to improvement of systems or law, it will be necessary to consider and define the required human resources in terms of expected qualifications and skills.