FY 2014
Report of the International Cooperation Project Study in the Water Supply Sector

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Government of Japan

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JICWELS

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Chapter 1. Introduction

1.1 Purpose of the study

Safe drinking water is insufficient in developing countries, and this situation, which concerns basic human needs (BHNs), must be addressed. Past international cooperation in the water supply sector revolved mainly around the development of infrastructure and technical transfer. However, there are many issues yet to be solved, including post-support sustainability and autonomy in development, 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 Japanese Ministry of Health, Labour and Welfare, the Japan International Corporation of Welfare Services (JICWELS) has established an experts' committee with specialists from across the industrial, governmental, and academic domains, and it has been discussing the theme of "international cooperation in the water supply sector." By sharing the outcomes with those who engage in international cooperation, JICWELS has been pursuing activities to promote international cooperation projects effectively and efficiently, leading to the autonomous development of waterworks in the emerging economies.

From 2009 to 2011, the main focus of discussion was training, including training opportunities in Japan, training in relation to technical cooperation projects, and those provided by other funding sources, as well as follow-up training for participants and more effective arrangements for training through public and private partnerships (PPPs).

In 2012, our focus was on how to organize assistance with the formulation and implementation of a waterworks business management plan. As a result, it was pointed out that technical support and other types of assistance, such as financial and operational/management support should be provided in keeping with the real circumstances of recipient countries and regions. In this regard, some perspectives were presented in 2013 to suggest specific measures in order to turn the vicious circle into a productive cycle.

Our discussions this year concerned the perspectives of waterworks support in the emerging economies, for understanding the local situations of the target countries and regions, and how to proceed with the support on the basis of this understanding. We hope that this report will be useful for providing support to waterworks utilities in developing countries to achieve autonomous water supply business operations.

1.2 Summary of the study

This project has established an experts' committee on international cooperation in the field of waterworks, formed by industry-government-academia experts. We undertook surveys, followed by analyses and considerations to provide recommendations on international contributions to improve waterworks business management in the emerging economies. In particular,

- (Groundwork on affairs in each country) We gathered and organized information regarding legal and political systems in relation to waterworks from public documents, previous reports on studies and/or collaboration projects.
- (Field survey) For the matters that are difficult to understand from document-based research, we conducted interviews to Japanese experts based in Cambodia, Myanmar, Laos, or Indonesia.
- (Field survey) Interviews were conducted in Indonesia to survey governmental initiatives and waterworks utilities' operations, and levels of their relationship and collaborations were compared from many perspectives.
- (Recommendations based on the study results) We discussed an analytical method for waterworks business operations, and prepared recommendations on ways to leverage the method in order that the support given to the emerging economies could be effectively implemented.

The members of the experts' committee for FY 2014 were as follows:

(Committee members)

	Hideyuki Aoki	Bureau of Waterworks, Tokyo Metropolitan Government
	Koichi Ohno	National Institute of Public Health
	Hidetoshi Kitawaki	Toyo University
○	Shoichi Kunikane*	Former professor, University of Shizuoka
	Kazuya Kubota	Kitakyushu City Water and Sewer Bureau
	Satoshi Takizawa	University of Tokyo
	Masayuki Nagashima	Saitama City Waterworks Bureau
	Ikuo Mitake	Japan Water Works Association
	Takashi Miyagawa	Yokohama Waterworks Bureau
	Tatsuo Morimoto	Pacific Consultants Co., Ltd.
		(Federation of Japan Water Industries, Inc.)
	Keiko Yamamoto	Former Senior Adviser, Japan International Cooperation Agency

(○: Chairperson)

(Observers)

Shigeyuki Matsumoto	Japan International Cooperation Agency
Yasuyo Yoshikawa	Pacific Consultants Co., Ltd.

(Secretariat)

Eiji Hinoshita	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
Takeo Yamaguchi	Japan International Corporation of Welfare Services
Miyu Hayashi	Japan International Corporation of Welfare Services

(Committee meetings)

The Study Committee met on three occasions during Japanese FY 2014. The dates of the meetings are as follows:

- 1st Meeting Monday, October 20, 2014
- 2nd Meeting Thursday, February 5, 2015
- 3rd Meeting Wednesday, March 25, 2015

Chapter 2. Study policies

2.1 Background of the study

The water supply sector in the developing countries faces many issues and challenges, such as improvement of coverage rate, rapid increase of demand for water services due to a fast-growing population and economy, high rates of Non-Revenue Water (NRW), and 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 NRW, as well as providing technical transfers, including operations and maintenances (O&M), and water quality control. However, we are aware that there are some issues to be addressed from the fact that in some cases, the termination of successful support (project termination) was soon followed by financial difficulties, adversely affecting day-to-day management. This indicates that the support efforts did not quite take root.

Continued investigations into this problem led us to point out that the waterworks utilities in developing countries in need of improvement were struggling in a vicious circle, as illustrated in Figure 2.1, in which low levels of service standards and customer satisfaction led to vulnerable financial states, and hence to insufficient management of O&M, which in turn resulted in continued low levels of service standards and customer satisfaction. International cooperation in the water supply sector recognizes the need for proactive financial and operational assistance to be given in parallel with technical support, to change this vicious circle to a productive cycle we work on the O&M and financial management aspect more often in recent years.

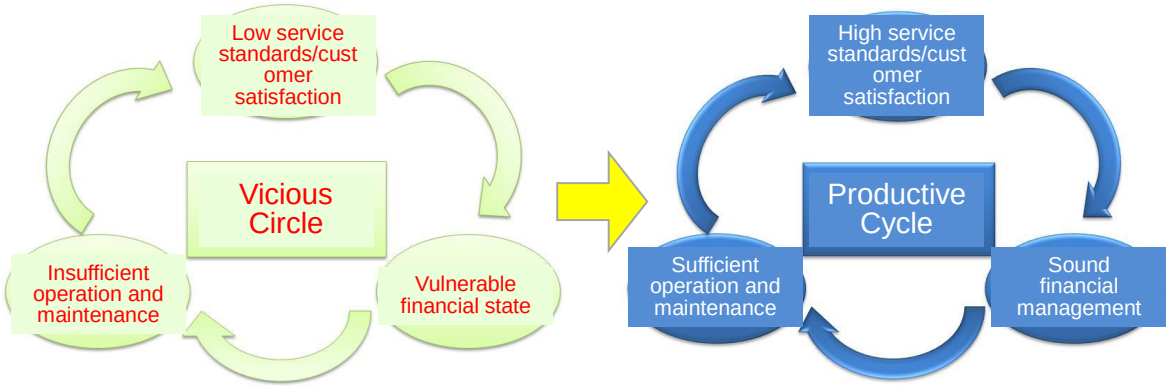


Figure 2.1 Vicious circle and productive cycle

In order to contribute with these activities, we analyzed the finances and operations, identified specific points considered for assistance, structuralized many support programs, and prepared a report in the 2013 project study. Meanwhile, it was pointed out that the future challenge for us was to better understand the differences between Japan and the recipient countries, and identify the

type assistance required from the recipient country's perspective, in order to pursue these diverse support programs.

2.2 Viewpoints of the study

At present, the basic concepts on the "differences between Japan and the recipient countries" and "the assistance required from the recipient country's perspective" can be found in published materials such as JICA's *Handbook for capacity assessment of urban water supply sectors and water supply utilities in developing countries* (2010). Keeping these concepts in mind, we considered the possibility of grasping the "differences" and "the assistance required from the recipient country's perspective" in a more practical way by studying the operational environment of the waterworks utilities that transpired from actual assistance activities in the field. Therefore, we decided to consider specific study methodologies, and prepare a proposal on a method to analyze and evaluate operational environment of waterworks, focusing on the dimensions of governance, human resources systems, and financial foundations. The overview of these three dimensions is as follows:

Table 2.1 Overview of three focal dimensions

Dimension	Descriptions	Purposes
Governance	● Political stability and collaborations between governmental offices ● Ministerial offices and laws relevant to waterworks ● Implementation of waterworks business operations based on plans ● Monitoring and benchmarking ● Waterworks utilities and supporting organizations	To understand the overall framework of water supply in the given countries, in terms of the concepts, legal systems that document the concepts, agencies that carry out the tasks, and control systems
Human Resources systems	● Ways in which waterworks top management is selected ● Personnel systems for employees ● Personnel training plans and evaluation/remuneration systems	To research the ways in which waterworks staffs are recruited and trained. The management top's leadership is very important in an operational reform. If systems to recruit, post, and train personnel at waterworks utilities are in place, this helps to pursue operational reforms.
Financial foundations	● Independent waterworks account and self-financing for each municipality ● Accounting standards with double-entry bookkeeping ● Appropriate budgeting and funding management ● Pricing scheme ● Treasury system and customer management ● Fair pricing ● Customer response	Developing a water supply system requires sustainable source of funding. A waterwork may be regarded as having a good foundation to stably supply water if its operation is based on a clear accounting system that specifies all necessary cost for waterworks maintenance while the business is sustained through an appropriate and fair pricing scheme and water fees collection.

- Governance is defined as "the development and operation of all the institutions, including government organizations and systems, the synergetic relationship among government, civil society, and the private sector, and the processes of decision-making, in order to mobilize, allocate, and manage the resources of the country efficiently and in a manner that reflects the

will of the people, with the aim of realizing the stability and development of the country." Realizing widespread, sustainable waterworks at the country level needs governance to be established in a variety of areas, such as legal systems, governmental organizations, and the development of operational environment. It is also necessary for the country to take the initiative to continue developing autonomously during and after the Japanese assistance is implemented, which must be pursued effectively and efficiently.

- An appropriate operation of waterworks utilities cannot be realized without the involvement of competent top management and employees who have expertise and high motivation. It would be difficult to achieve sustainable operation of waterworks without a personnel system designed to select and train such talents. From past experience, it is clear that the success of Japanese assistance largely depends on the top leadership of the recipient countries. In this sense, human resources analyses should be considered as one important support measures to offer.
- In order to maintain waterworks utilities over an extended period, constant funding must be secured to cover the cost of ongoing operation and maintenance. To ensure this, there must be a transparent, impartial, and independent accounting system to clarify revenue and spending at all times. Then, a system should be introduced to secure the identified cost perpetually, and invest the valuable funds and revenues efficiently. The most common way to effectively execute this is business management based on self-financing principle, in which water users' payments for the service sustain the autonomous operation. Paying for water helps to foster the awareness of using water wisely among users, constituting a significant secondary effect of enhancing efficient water supply in water-scarce areas. These are the waterworks that have a sound financial foundation.

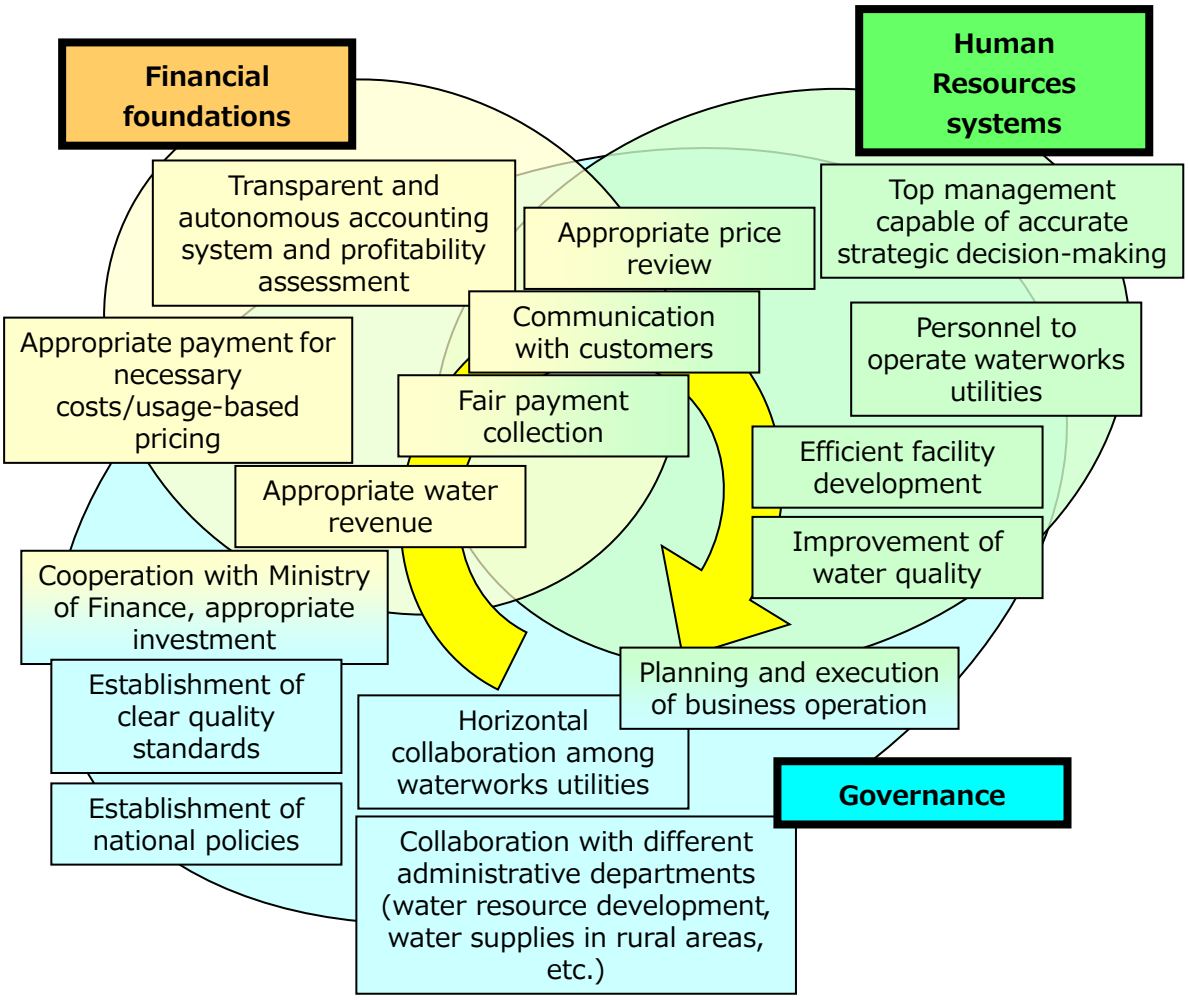


Figure 2.2 The three dimensions and components

As illustrated in Figure 2.2, the three dimensions are useful for the understanding of the waterworks in terms of the operational environment, offering insights into the possibilities of effective and efficient assistance, based on thorough considerations. We therefore set out tasks to discuss a specific analytical method capable of facilitating such considerations.

Chapter 3. Study methodologies

3.1 Methods of data collection

Information on the operational environments is not always documented and readily accessible; it is difficult to gain comprehensive understanding only from official documentsand existing research reports. Therefore, we regarded interviews with Japanese specialists as well as local personnel as an important method of information gathering. The following explains the methods in detail.

1) Document-based study on official documents and existing research reports

Laws, regulations, and basic plans are made open to the public. Geopolitical data, such as historical facts on government changes and ethnic compositions, are also available to the public. For such information, we conducted local surveys as well as document-based research on past documentations, to enrich our information collection.

2) Interviews (for information that is unlikely to be available in writing)

Upon gaining overall understanding from the open sources, we conducted interviews during the local survey for such information that was unavailable from the documents, such as current conditions concerning system operations. The local survey consisted largely of interviews with Japanese specialists and interviews with people who were engaged in the local waterworks.

- Interviews with Japanese specialists

  We prepared interview questionnaire about various situations in each country or region, and conducted the individual. Considering the nature of this method of data collection, that is, the information gained in this way may well be based on the interviewees' personal experiences and opinions we tried as much as possible to pursue the interviews in a comparative context between the local situations and those in Japan.

  The target countries for this local survey were Cambodia, Myanmar, Laos, and Indonesia. The selection was based on the facts that Japan had been providing assistance to these countries for a number of years, and that a seminar was to be held in Laos, where specialists from these countries were in attendance.
- Interviews with local waterworks personnel

  We aimed to select a country that had close involvements with Japanese ODAs, and to conduct diverse interviews at the levels of the state, regions, and various organizations that played certain roles in the waterworks sector. Through this, we looked into the relevance between their organizations and our country. For this part, we chose Indonesia to be the target country for the following reasons:
  - There is a cross-sectional waterworks organization, Persatuan Perusahaan Air Minum

Seluruh Indonesia (PERPAMSI), which has a remarkable prominence in the country, unparalleled by the other countries. The Japan Water Works Association (JWWA) had connections with this organization through its network, enabling us to directly establish appointments for interviews.

- Policy advisors from Japan were on a long-term posting position at the Cipta Karya (General Housing Environment Bureau, Ministry of Public Engineering), which provided convenient opportunity for follow-ups on the local affairs and backgrounds.
- Indonesia used to be a centrally governed polity, which later changed tack toward decentralization; thus, we expected to gain insights into the relationships between the central and regional authorities, and the effects of decentralization, regarding which Indonesia could offer a perspective different from Japan.
- Indonesia is a country of diversity. This also applies to the waterworks utilities in this country, ranging from sound business operators to ones laden with problems. We expected that this background could offer an opportunity for us to study factors that facilitated good practices. There are waterworks utilities known for their good practices, such as Palembang, Surabaya, and Tangerang. Makassar is building a good reputation recently.
- Japan is the top contributor for Indonesia in the water supply sector, which offers us the opportunity to conduct a survey on the outcomes of Japanese aids. In particular, Japan has provided a long-term contribution at Bekasi training center on personnel training, and, therefore, we could conduct follow-up surveys with people who were trained at this institution to see how these talents were employed in the improvement of waterworks. We considered this to be an example of good practices for Japan in terms of capacity development.

3.2 Survey items and information-gathering methods

Subsequently, we identified and organized specific items for the survey in the areas of governance, human resources systems, and financial foundations.

There are written materials regarding governance, and, therefore, document-based research was considered an effective method of information gathering. In reality, however, the systems may not be properly realized, implemented, or underpinning the actual operations, as it often seems to be the case. Thus, interviews were employed to supplement the information gained from the document research.

For the information regarding human resources systems and financial foundations, interviews were the main means of information gathering, because written materials did not provide all relevant information.

1) Governance

The survey items for analyzing governance-related aspects are shown below. Good governance is considered to be one that has clear and effective policies and plans, under which legislature and governments assume respective roles, and maintain a coherent relationship. The following checkpoints are based on this notion of good governance.

Table 3.1 Survey items on governance-related aspects

Area of concern	Category	Item	Checkpoint	Points to verify through document-based research	Points to verify mainly through interviews (for information unlikely to be available in writing)	Notes
State system	Framework of state government	Political stability/relationship between the central and regional authorities	● Is the political regime stable?	● The country's history and composition of ethnic cultures ● Organizational structures of central and regional governments ● Relevant laws and regulations	● Political stability ● Relationship between the central and regional governments ● The government ministries' administrative competence ● Lack of balanced interministerial collaborations and power distribution ● Incoherence or contradictions in legislations	Instability in political climate or ill-coordinated relationships between the central and regional governments poses risks in providing assistance.
			● Are the relationships between the central and regional governments good?			
		Ministerial collaborations and legal systems relevant to waterworks	● Is there a sufficient cooperation between ministries on waterworks-related issues?			Poor collaborative relationships or lack of appropriate legal systems may hinder upon the progress of aid activities.
			● Are there coherent legislations in place regarding waterworks?			
	Regulatory framework	Water supply authority and established legislations on	● Is there an authority established under the state government for governing water supply?	● Relevant laws and regulations	● Relevant laws and regulations, and efforts to prepare further necessary legislations	The authority will be the contact point in terms of requesting information, developing strategies, and

Area of concern	Category	Item	Checkpoint	Points to verify through document-based research	Points to verify mainly through interviews (for information unlikely to be available in writing)	Notes
		water supply	● Are established water supply laws enforced and operational?		● Prioritization of various laws and regulations, and regulatory system of particular importance ● Coherence between relevant laws and regulations, redundancy, or inconsistency ● A system to prepare, consider, and approve laws and basic plans	coordinating with ministries or governmental offices.
		The authority to control water supplies in rural areas	● Is the authority for water supplies in rural areas clearly established?			It helps to delineate responsibilities between urban and rural water supplies.
		Water resource management systems and relevant rules	● Are there clear management systems and rules regarding water resources in place and functional?			Water resource management and arrangements are prone to pose risks on providing waterworks aid.
		The authority to control finances and funds for waterworks	● Is there an established authority for controlling the finances and funds for waterworks?			It helps to facilitate smooth negotiations for budgeting.
		Provision and operation of water quality standards	● Are there water quality standards prepared and implemented?			They help to clarify the objectives of water safety.
State system	Information disclosure	Dissemination of legal information	● Is there a system to disseminate information on laws and regulations?	● Information disclosure system	● Circumstances for information disclosure	Preferably, the enforcement of laws and ordinances is clearly defined and made accessible to the public.
Planning management	Well-considered operational manageme	Preparation and implementation of national	● Are there national strategies prepared regarding the development of waterworks? ● Do they engage in reviews toward	● Basic national plans for the development of waterworks	● Decision-makers in preparing the basic national plans ● Feedback from subordinate	Understand the efforts to materialize the national plan.

Area of concern	Category	Item	Checkpoint	Points to verify through document-based research	Points to verify mainly through interviews (for information unlikely to be available in writing)	Notes
	nt and auditing systems	strategies on waterworks development	the realization of the national strategy?	● Progress monitoring systems for the basic plans ● Basic plans by waterworks operators for the development of a waterworks network ● Monitoring systems for the waterworks operations ● Implementation of benchmarking	organizations ● Differences or disparity between cities in the progress of planning ● Operational organizations of the monitoring ● Appropriate evaluations and feedback to policies/measures	
		Urban waterworks development basic plans for each city	● Do municipalities pursue waterworks development according to their plans?			Review the progress in the development of urban waterworks with appropriate planning.
		Monitoring of waterworks	● To what extent is monitoring implemented on waterworks performance?			It helps to comprehend the circumstances for waterworks operations if they monitor the operations.
Waterworks agencies	Framework for waterworks operations	Constellation of waterworks utilities and efforts to realize it	● Are there clear ideas about who should operate waterworks (public company, public management, etc.)?	● Circumstances for waterworks utilities ● Associations and organizations	● Autonomy of waterworks organizations ● Discrepancies between the system principles and reality ● Activities of the associations/organizations	Knowing what the benefiting country aims to achieve in terms of waterworks makes it easier for us to provide assistance.
			● Are there efforts to realize the designated system?			
		Waterworks association and similar organizations	● Is there a waterworks association established, or a similar organization to the same effect?			Established waterworks association or similar organization could be a contact point when pursuing an operational reform, personnel training, and other initiatives.

2) Human resources systems

The survey items concerning the dimensions of human resources systems are described below. There are four aspects of human resources systems assistance, intended for hiring and placement, performance assessment, remuneration systems, and training and education. A good human resources system facilitates appropriate positioning of employees according to the skills they have to pursue the tasks, and who are highly motivated for work. Appropriate programs for personnel selections, placements, and opportunities for promotion are necessary for a good human resources system. The survey items are arranged with reference to these notions.

Table 3.2 Survey items on aspects regarding human resources systems

Area of concern	Category	Item	Checkpoint	Points to verify through document-based research	Points to verify mainly through interviews (for information unlikely to be available in writing)	Notes
Recruiting and training personnel	Appointing competent top person	Methods to select the waterworks top management	● Is the selection of the top management influenced by candidates' connections with politicians? ● Are the selection procedures clear and transparent? ● Do the selection procedures involve certain competitive elements such as open recruitment and qualifying assignments? ● Did the selection procedures work out effectively? Does the selected top have adequate abilities and specialist skills?	● Organizational charts ● Written regulations regarding recruitment, placement, promotion, and other organizational programs	● Decision-makers in selecting the top management ● Points for considerations in selecting the top management ● Employees' support	Verify if there is an established system to ensure that competent individuals assume the positions of top management in succession at the waterworks utilities. If the human resources system is based on the wages that are determined by the job evaluation, a popular case outside Japan, then it is important that the selection criteria are clearly defined.
	Employee recruitment, placement, and education	Personnel system for employees	● Are there transparent employee recruitment systems, involving some selection assignments? ● Does the system have a transparent promotion program for employees involving exams? ● Is the personnel management		● Selection of managers ● Evaluation of employees' specialist skills (engineers, administrators, etc.) ● Scope of human resource management authorized to the waterworks	See if the system is adequate for recruiting employees who have the required skills for operating waterworks. In case of the system based on the wages calculated by the job

Area of concern	Category	Item	Checkpoint	Points to verify through document-based research	Points to verify mainly through interviews (for information unlikely to be available in writing)	Notes
			division given a degree of freedom and independence that allows for securing necessary personnel for operating waterworks?		● Promotion programs such as promotion exams ● Plans and programs for personnel education ● Levels of stable employment	evaluation, it is important that the evaluation criteria are clearly defined.
	Employee selection, placement, and education	Plans and evaluations of personnel training	● Do they have plans and programs for recruiting and training personnel? ● Do employees engage in waterworks operations with confidence and willingness? Are there programs of recognition, rewards, and awards to motivate employees? ● Do employees seem happy to stay in their positions? If not, what are the reasons for dissatisfaction?	Same as above	Same as above	Employee education and training can be successfully promoted provided that there are training programs, an environment that helps to boost employees' morale, and conditions for stable employment.

3) Financial foundations

The survey items concerning the dimension of financial foundations are described below. The primary factor of financial foundations is the appropriate management of operational costs, which requires that a proper accounting system is established and practiced. It is also important that there are funding and pricing systems capable of securing funds to cover the necessary costs, as well as policies to ensure profitability while ensuring fairness. The items were arranged with reference to these notions.

Table 3.3 Survey items on aspects regarding financial foundations

Area of concern	Category	Item	Checkpoint	Points to verify through document-based research	Points to verify mainly through interviews (for information unlikely to be available in writing)	Notes
Appropriate financial management and pricing scheme	Profit management	Independent municipal waterworks accounts, concept of self-financing, and accounting standards based on double-entry bookkeeping	● Do they understand that waterworks should be operated on the basis of self-financing using double-entry bookkeeping?	● Accounting standards ● Balance sheets, budgeting, and financial statements ● Standards for rate calculations ● Procedures for reviewing prices ● Documents outlining private utilities	● Independence of waterworks accounts ● Preparation of financial statements ● Raising awareness of self-financing and cost calculation ● Funding compensation in case of operating deficits ● Who prepares the budget proposals? ● Budget approval system ● Budget execution system	Self-financing is the most common style of operation to continually procure costs necessary to operate waterworks, and to this end, waterworks accounts must be kept separate from the municipal general accounts.
			● Are waterworks accounts independent from the municipal general accounts? Do they have accounting standards?			
Appropriate financial management and pricing scheme		Appropriate budget management	● Is the budget management appropriate?			Verify if the waterworks budgets are arranged and assessed by a clearly designated authority.
	Funding management	Investment for construction, authority over funding procurement, and	● Do waterworks utilities have the authority to pursue relevant infrastructure investments?		● Investment procurement system	Waterworks utilities are able to invest in constructions while adjusting the investments according to the impact on the operation management,
			● Is the funding for infrastructure investments procured at the discretion of waterworks utilities?			

Area of concern	Category	Item	Checkpoint	Points to verify through document-based research	Points to verify mainly through interviews (for information unlikely to be available in writing)	Notes
		transparency				provided that they themselves are allowed to make their own decisions on infrastructure investments and procure funding for them.
	Pricing scheme	Practice of pricing reviews, clear rationale for rate calculations, and introduction of a use-based charging system	● Are they capable of reviewing their rates in order to adjust pricing appropriately? ● Is there a clear rationale for rate calculations? Do they pursue the concept of use-based charging?		● Whether the prices are based on calculation with appropriate rationale ● Whether the level of pricing for water services is appropriate	In order to realize the waterworks operation sustained by water revenues, it is necessary to calculate the water prices based on appropriate guidelines, and review them if needs arise.
	Customer management	Cash flow management and customer management	● Do the waterworks utilities appropriately manage cash flows regarding their revenues? Do they pursue customer management?		● Payment/customer management systems	If the payments for water are treated as part of tax revenues, it is difficult to review the waterworks operation income on its own.
	Private funding	Procurement of private funding	● Is it possible to have private funding? Do they utilize private sources of funding?		● Circumstances for the procurement of private funding	Private funding and loans, if they are available, add to options for funding procurement.
Efforts in payment collection	Fair pricing scheme	Fair charges for political parties, military, police forces, and other public institutions	● Are prices charged equally to those with political powers, such as political parties, military, police forces, and other public institutions?	● Documents on pricing schemes	● Willingness to pursue fair pricing ● Other irregular pricing schemes ● Operation of discount/waiver programs for low-income populations	Confirm if they pursue, or aim to pursue, fair pricing for water by collecting payments from parties of political powers.

Area of concern	Category	Item	Checkpoint	Points to verify through document-based research	Points to verify mainly through interviews (for information unlikely to be available in writing)	Notes
		Assessment methods for discount/waiver eligibility for the poor	● Do they employ appropriate criteria for the assessment of discount/waiver eligibility?			The discount/waiver program may lead to decrease profits if inappropriately executed.
	Customer response	Responses to customer requests and complaints	● How do they respond to customer complaints? Are there past cases of customer dissatisfaction developed into collective disputes?		● Ways of receiving customer complaints ● Whether there were precedents of collective disputes due to customer dissatisfaction	Hearing opinions and complaints of local residents gives important insights into improving the operation.
		Measures against nonpayment and water theft	● Do they implement appropriate measures for nonpayment?			Verify to see if they make appropriate efforts to prevent nonpayment and water theft in order to maintain fair pricing and payment collection.
			● Do they implement appropriate measures for water theft?			

Chapter 4. Local survey and document-based research

In this section, we describe the local survey (interviews to Japanese specialists and local personnel) and document research in detail.

4.1 Interviews with Japanese specialists

1) Purpose of the interviews

For the purpose of gathering information on current affairs regarding waterworks in various countries, we seized the opportunity of the joint seminar in Laos (JICA's Capacity Development Project for Improvement of Management Ability of Water Supply Authorities 2nd International Seminar and 4th p2p Meeting; Laos-Japan Waterworks Seminar, provided by the Japanese Ministry of Health, Labour and Welfare), where specialists gathered from Laos, Cambodia, Myanmar, and Indonesia. We sent out a brief outline of our survey to these specialists beforehand, and had interviews with them individually during the event.

Table 4.1 Local survey schedules

Target countries, cities, etc.	Dates	Venues of the interview	Participants (represented bodies)
Laos Vientiane	November 19	Project office	Specialist Mr. Shimomura (Saitama City Waterworks Bureau) Special officer Mr. Kinoshita
Cambodia Phnom Penh	November 20	Private room on the seminar venue	Specialist Mr. Kawasaki (Kitakyushu City Water and Sewer Bureau)
Myanmar Yangon	November 20	Private room on the seminar venue	Specialist Mr. Matsuoka (Fukuoka City Waterworks Bureau)
Indonesia General Housing Agency, Indonesian Ministry of Public Works and Public Housing	November 20 November 23	Seminar venue Jakarta office	Specialist Mr. Sugawara (JICWELS)

Interviews were also conducted in Indonesia, which we will describe later in detail. Information gathered in this way mainly concerned the national-level affairs. For the analysis at the municipal level, however, we gathered information about the cities where the interviewed specialists were based, unless the localities were specified otherwise.

2) Survey party

The members of the survey party are as follows:

Table 4.2 Composition of the local survey party

(titles omitted)

Party member	Committee member/secretariat	Position	Notes
Ikuo Mitake	Committee member	International Director, International Division, JWWA	
Tatsuo Morimoto	Committee member	Manager, International Operation Division, Pacific Consultants Co., Ltd. (Senior Advisor, Federation of Japan Water Industries, Inc.)	
Takeo Yamaguchi	Secretariat	Technical Advisor, Operation Division, Japan International Corporation of Welfare Services	

3) Survey schedule

The survey schedule was as follows. The entire schedule took place in Vientiane, Laos.

Table 4.3 Schedule of local survey

Date	AM	PM
Tue, November 18	Narita⇒Vientiane	
Wed, November 19	Laos-Japan Waterworks Seminar (Water Supply Sector International Development Project, MHLW Water Supply Division, JICA) Interviews with Laos specialists	
Thu, November 20	MAWASU 2nd International Seminar (hosted by JICA local TCP) Interviews with Myanmar specialists/interviews with Cambodia specialists	
Fri, November 21	Visit to the Vientiane water treatment facilities	Vientiane⇒Narita

4) Survey outcomes

The outcomes of the survey will be drawn up in this report.

4.2 Interviews with local personnel

1) Purpose of the interviews

The interviews were conducted to gather information on the environment and circumstances regarding waterworks operations in the countries that had made certain progress, where social

and economic contexts are different from those in Japan.

We targeted the central and regional waterworks authorities in such countries. We also aimed to enhance our understanding of the current affairs by following up previous support programs (research of previous project reports and survey of support providers), mixed with interviews of local specialists.

2) Survey target overview

The institutions visited for the survey are as follows.

Table 4.4 List of institutions visited for the interviews

Target institution	Date and place of the interview	Description of the institution
Cipta Karya	Wed, November 26	A national institution to monitor and regulate waterworks utilities in the country
Water Supply and Environmental Sanitation Center (Bekasi)	Mon, November 24	A personnel training institution operating under Cipta Karya. The center was established with Japanese aid.
Indonesian Waterworks Association (PERPAMSI)	Tue, November 25	An association whose members are Indonesian water enterprises. PERPAMSI has been working closely with JWWA.
Bandung Water Agency	Mon, November 24	This is a typical water agency in Indonesia. Its current president also holds the presidential position of PERPAMSI. Water supplied to approx. 110,000 clients Capacity: 5,500 l/s (475,000 m^3 daily) Coverage rate: 20% Water price: approx. 3,000 rupiah/m^3 Issues: tackling water source problems
Makassar Water Agency	Tue, November 25	It is in a good operating condition and esteemed as a model waterworks operation in the country. Water supplied to: approx. 160,000 clients Capacity: 2,600 l/s (225,000 m^3 daily) Coverage rate: 62% Leakage rate: 47% Issues: Securing future water sources. Waiting list for service enrollment counts more than 60,000 prospective connections. Repayment of the loans is yet to be discussed.

Note: The descriptions of water agencies are taken from the previous local survey. *1 rupiah = 0.0093 yen (FX rate of February 2015)

3) Survey party

Members of the survey party are as follows. For Bandung and Bekasi Water Supply and Environmental Sanitation Center, the party split to visit them on the same day.

Table 4.5 Composition of the local survey party

(titles omitted)

Party member	Committee member/secretariat	Position	Notes
Shoichi Kunikane	Chairperson	Former professor, Institute for Environmental Sciences, University of Shizuoka	
Ikuo Mitake	Committee member	International Director, International Division, JWWA	
Tatsuo Morimoto	Committee member	Manager, International Operation Division, Pacific Consultants Co., Ltd. (Senior Advisor, Federation of Japan Water Industries, Inc.)	
Takeo Yamaguchi	Secretariat	Technical Advisor, Operation Division, Japan International Corporation of Welfare Services	

4) Survey schedule

The survey schedule was as follows:

Table 4.6 Schedule of local survey

Date	AM	PM
Sat, November 22	Narita⇒Jakarta	
Sun, November 23	Internal meeting	Team 1: internal meeting, interviews with specialists Team 2: Jakarta⇒Bandung
Mon, November 24	Team 1: Interviews at the Water Supply and Environmental Sanitation Center (Bekasi) Team 2: Interviews at Bandung Water Agency	Team 1: internal meeting Team 2: Bandung⇒Jakarta
Tue, November 25	Jakarta⇒Makassar	Interviews at Makassar Water Agency Interviews at PERPAMSI
Wed, November 26	Makassar⇒Jakarta	Interviews at Cipta Karya Jakarta⇒Narita
Thu, November 27	Jakarta⇒Narita	

4.3 Survey outcomes

The outcomes of this survey are included in the Supplement under Interview Outcomes. A summary of the data on each country is presented in this report.

4.4 Document-based research

We gathered and organized existing research reports and various documents for information regarding operational environments for waterworks utilities in the developing countries—mainly official information and other data—to serve as preliminary data for the analyses in the second phase. The target scope included Cambodia, Myanmar, Laos, and Indonesia.

1) Historical context

The 150-year history of these countries was researched and organized in a chronological fashion since the introduction of waterworks technology. We focused particularly on the political regimes, domestic conflicts, and disputes through history, as these served us insights into the domestic political regimes in these countries and their soundness.

Of particular importance were the political regimes (e.g., republican, constitutional, and communist) and the situations over the period of social stability after the establishment of present governments.

Table 4.7 Study on historical backgrounds

Period	Governing regime	Wars, domestic conflicts, and peace	Description
Indicate the years of event occurrence	Organize in terms of colonization, governing regimes, etc.	Organize in terms of domestic unrests, coups, wars with other countries, etc.	Describe the events that had significant impact on society, such as political regime changes and breaking out of wars.

2) Culture and society

We present information on ethnic groups, religions, and languages. This served us as basic information to observe the relationships between central and regional authorities.

Table 4.8 Study on local culture and society

Category	Description
Ethnic groups	We organized the information on a structure of ethnic groups.
Religions	We organized the information on religious groups and practices.
Languages	We surveyed the official languages and other languages in use.

3) Development of legal systems concerning water resources and water supply

We present information on the legal systems and basic plans concerning waterworks. This relates to laws on waterworks, water resources, water supplies in rural areas, and water quality, among

others. We investigated the extent of the development of these regulatory systems, and, wherever possible, how well they were functioning. The outcomes are included in the Supplement.

Table 4.9 Study on the development of legal systems concerning water resources and water supply

Category	Institution in charge	System/law	Notes
Urban water supply	Authority	Involvement in waterworks operations	
Preparation of national policies	Authority	Basic national plans	
Water quality standards	Authority	Outline of the water quality standards	
Water supplies in rural areas	Authority	Remarks	
Water resource management and coordination	Authority	Remarks	
Contact for subsidiary funding	Authority	Remarks	

Chapter 5. Summary of study outcomes for each country

The outcomes are tabulated and presented in the following comparison tables.

1) Governance

Table 5.1 Survey outcomes on governance

Category	Subcategory	Country A	Country B	Country C	Country D
State system	Political stability/relationship between the central and regional authorities	● The country is under the reign of constitutional monarchy, and the prime minister has a strong power. The prime minister is second in power in the order of the majority party. ● Where there are powerful figures in regions, their influence may override national governance for certain operations. This also applies to the case of waterworks operation. ● The political climate is relatively stable in recent years.	● The political regime is basically military led, but in transition to democratic regime. The military still holds a strong position owing to a prolonged period of the military rule. ● If the political members considerably change through elections, the national governance may be transformed significantly. ● It is a multiethnic state. The central authority and regions are gradually integrating.	● The country is under a single-party regime. The party holds an unparalleled authority. ● The diversity due to multiple ethnic groups forming the country defies general descriptions. There is room for improvement in terms of regional authorities (prefectures) reporting to the party.	● They are under a republican regime. The president is elected through direct voting. ● It is a multiethnic state.
	Ministerial collaborations and implementation of legal systems relevant to waterworks	● Ministerial collaborations are not efficient. The dynamism in negotiations depends on the minister's power. It seems unlikely that they engage in preparatory negotiations or horizontal collaborations. ● Many schemes and programs show a lack of necessary arrangements and preparations. The introduction of a system to prepare cash flow statements is one example, as they do not possess the skills to control cash flows.	● There is no established system of ministerial governance. Most projects are led by the military, and the vertical relationship between the military and ministries is important.	● The party dominance makes the vertical line more significant than horizontal coordination between the ministries.	● There are many legislations and guidelines. The possible explanation is that, when a new legislation is introduced in tandem with the change of ministers, consistency with past legislations tends not to carry as much weight as it does in Japan. ● Majority of waterworks-related offices are placed under Minisutry, which makes collaborations among them easy. ● The ministry of state development planning has been made in charge of preparing and distributing budgets for development, thus strengthening its authority. There has been this tendency since before, but it has increased in prominence over the recent developments. ● Water agencies and other operators consult law specialist employees and external lawyers to identify from many present laws and schemes the most relevant ones to prepare their strategies.
	Water supply authority and established legislations on water	● Urban waterworks operate under the authority of the Ministry of Industry and Handicrafts. They oversee the water supply in provincial capitals and mid- to small regional cities. They also manage and	● There is noMinistry responsible for managing urban waterworks utilities. The relevant ministries change depending on the water sources; if water is taken from rivers, it is the Ministry of Transport, and taking water from	● Urban waterworks are under the jurisdiction of the Ministry of Public Works and Transport. This is provided by the Prime Minister's Ordinance. ● The Waterworks Law is in place, and the	● Waterworks operate under the jurisdiction of the General Housing Agency, Ministry of Public Works and Public Housing. This agency undertakes the drafting of relevant laws and plans at the state level, and it also

Category	Subcategory	Country A	Country B	Country C	Country D
	supply	supervise water supply businesses participated in by the private sector. These authorities are provided by ordinance (Prime Minister's Ordinance). ● The waterworks law is under preparation. The draft was developed by the Ministry of Industry and Handicrafts, and JICA with advice from the Japanese MHLW. The draft will be ultimately sent to parliamentary approval, only after modifications are made by the cabinet council and ministries. The final decision is made by the Ministry of Interior. ● Public waterworks agency is basically operated pursuant to the 1996 Public Enterprise Law. ● Since there is no effective control over unlicensed private water business operators, preparation is under way to develop the waterworks law from the viewpoints of keeping water quality, facilities, and pricing under the government's control.	irrigation systems is under the purview of the Ministry of Agriculture and Irrigation. ● They do not have established legislations such as a waterworks law and a waterworks enterprise act. ● No details are available regarding the activities to prepare a waterworks law, but they will first need to establish a Ministry to regulate waterworks, which will then take the initiative to draft the law.	latest amendments are dated 2008–2009. ● Public waterworks agencies manage the operations. The Law on Commercial Enterprise provides the necessary procedures for incorporation and management of such agencies.	organizes investment cases requiring grant-aids to be proposed to the ministry. It also gathers and analyzes each waterworks agency's developmental plans, and operates training centers for waterworks and environmental health. ● The waterworks legislation is provided as a ministerial ordinance. The latest version is of 2005, with subsequent minor amendments in the form of additional provisions such as those on the collaboration between the public and private sectors.
	The authority to control water supplies in rural areas	● Water supplies in rural areas are under the jurisdiction of the Ministry of Rural Development. The ministry oversees the non-private water supply and public health in rural areas. ● Villagers utilize reservoirs, wells, and rainwater. There is some pipe scheme water supply.	● Water supplies in rural areas are under the jurisdiction of the Ministry of Livestock, Fisheries and Rural Development. ● Villagers utilize reservoirs, wells, and rainwater. There is some pipe scheme water supply.	● Water supplies in rural areas are under the jurisdiction of the Ministry of Health. ● Wells and rivers are the main sources of water in villages.	● In villages not covered by public waterworks agencies, local communities operate and manage the springs and wells. ● The central government subsidizes waterworks and treatment plants for provincial centers. The pipe schemes are supported by the regional authorities.
	Water resource management systems and relevant rules	● The Ministry of Water Resources and Meteorology is responsible for coordinating water sources' utilization and irrigation at the national level. However, not many activities are undertaken except occasional coordination of new grant-aid cases. ● An ordinance regarding the licensing of waterworks business was issued in May 2014, which made it mandatory for waterworks utilities to coordinate water resources as one of the conditions for obtaining the license. Existing utilities will need to meet this condition at the time of renewing their licenses. However, there are no provisions in the ordinance specifying the obligations for improvement or voiding of license.	● No laws on water resources are in place. ● The National Water Resources Committee is established to organize water resources' coordination.	● The rights to water and water resource management are provided by the Law on Water and Water Resources. There seem to be no conflicts regarding irrigation rights and the like, perhaps because of the abundance of water resources in the country.	● The Water Resources Law of 2004 is enforced. Government Act on the Development of the Water Supply System (2005) was subsequently enacted under this 2004 law.

Category	Subcategory	Country A	Country B	Country C	Country D
	Authority to control finances and funds for waterworks	● The Ministry of Economy and Finance is responsible for managing the overall national budget, and the finances for public waterworks come under the ministry's purview.	● The Ministry of National Planning serves as a contact point with donors.	● The Ministry of Finances serves as a contact point for developing relationships with donors. Thus, it is crucial to coordinate with the Planning Bureau of the Ministry of Finances. ● It is necessary to obtain investment permission pursuant to the Law on Investment Promotion. Part of the requirements is described in the Waterworks Law.	● Accounting and funding policies are handled by the Planning Bureau of the General Housing Agency, Ministry of Public Works and Public Housing. Ministry mainly deals with technical aspects of waterworks, and collaborates between themselves with clear divisions of responsibilities.
	Provision and operation of water quality standards	● Water quality standards are under the purview of the Ministry of Industry and Handicrafts. ● The Drinking Water Quality Standards were introduced in 2004 by the Ministry of Mines and Energy (present Ministry of Industry and Handicrafts). The standards are in compliance with the WHO guidelines.	● Water quality standards are under the purview of the Ministry of Health. ● However, they are still in draft format, and yet to be enacted. ● Water quality control has only begun in major urban areas.	● Water quality standards are under the purview of the Ministry of Health. ● The ministry issued the Drinking Water Quality Standards in 2003, followed by amendments in 2014.	● The water quality standards are provided by the Waterworks Law as well as by the Ordinance of the Ministry of Public Works. ● The national standard provides the law on water quality examinations.
	Dissemination of legal information	● Legislations are published.	● Laws are announced in governmental newspapers.	● Some supplemental materials are also distributed.	● New laws and systems are familiarized thoroughly by means of public discussions, workshops, and other media.
Planning management	Preparation and implementation of national strategies on waterworks development, accountability	● The National Water Supply and Sanitation Sector Policy was established in 2003, with assistance rendered by Japan. ● However, the policy is not leveraged in preparing specific national plans or progress management.	● Preparatory meetings to establish a water law have been called recently. ● Water is considered to be an important matter in terms of winning the public trust, and is thus given a high priority.	● There are national strategies in place, with an objective to realize safe and stable water supply in urban areas, available round the clock serving 80% of the urban populations. ● Although the political party dominates, it is involved so far as preparing a slogan. Only certain coverage rates are indicated as specific goals to be achieved by the waterworks sector.	● There is a national five-year plan prepared by the national government, and the development investments are based on this plan. The draft concerning waterworks is drawn up by Ministry ● They aim to achieve 100% coverage of water supply with safe water throughout the country by 2019. They are willing to introduce no-pipe scheme systems to propel the diffusion of waterworks. In other words, they do not insist on having piped water. ● Debates on what 'waterworks' entails are an ongoing affair: whether it is more important to secure potable water quality, or propagate the water supply network even if the water quality is slightly compromised.
	Urban waterworks development basic plans for each city	● Regarding the development plans for waterworks in rural areas, JICA has just provided Phase 2 of its waterworks specialist training project. Currently, Phase 3 is under way, continuing its training efforts.	● Some cities have begun preparing their urban waterworks development master plans. Construction works have already commenced in parallel with the planning, but the master plans are well considered and closely followed in the execution of these works. ● They are not capable of preparing master plans by themselves at present.	● Master plans for cities are prepared only where donors are secured for the development, and they are prepared by the donors.	● Waterworks agencies prepare the master plans. ● Some of the agencies consider investment plans over a period of 15 years or so, and revise them every two years. ● There is no explicit system of preparing a national midterm development plans upon consulting waterworks agencies. ● There have been cases in which Japanese specialists worked together with specific

Category	Subcategory	Country A	Country B	Country C	Country D
					bodies to prepare operational plans.
	Monitoring and benchmarking	● Various organizations conduct their own audits without coordination with other authorities, thus there are areas of waterworks operations that are subjected to audits by several different agents. The Finance Department and Audit Bureau of the Ministry of Industry and Handicrafts, as well as the Ministry of Finances conduct their own audits independently. Together with other agencies, there are four to five audits, and these seem to lack coherence in their audit exceptions.	● There are only few waterworks utilities, and a third-party monitoring system is yet to be developed. It is still in a very early stage at present.	● The waterworks agencies are monitored by the Waterworks Regulation Bureau within the Waterworks Regulation Committee under the Ministry of Public Works and Transport. ● Each province is responsible for monitoring its accounting.	● BPPSPAM, an assessment body, undertakes the monitoring. BPPSPAM belongs to the Ministry of Public Works and Public Housing. While it is independent from Ministry, it shares policies with Ministry. ● They annually assess the waterworks agencies in terms of their operational challenges, financial status, open information, projects, and planning, and classify them by their soundness into three levels. The information is leveraged in preparing policies to provide support. ● The classification is executed on the basis of the information obtained annually by auditors. However, they do not conduct interviews of the agencies. ● They employ databases for information gathering and publishing. Waterworks agencies enter the data themselves. The system has only been launched this year, and still awaits the evaluation for effectiveness of its operation.
Waterworks agencies	Constellation of waterworks utilities and efforts to realize waterworks	● There are public agencies, central government-run utilities, and private operators. ● Two public agencies belong to the central government, while ten are directly managed by the Ministry of Industry and Handicrafts. There are 150 privately funded waterworks utilities licensed by the Ministry. Furthermore, numerous non-licensed operators engage in waterworks, numbering in the region of 400 to 500. ● Public waterworks agencies are autonomous in terms of accounting and human resources. The governments are involved in regulatory aspects, as the board members (six to seven in total) are from the Ministry of Industry and Handicrafts. ● The waterworks utilities other than waterworks public agencies are part of the government offices and therefore not independent.	● Although there are not many fully established waterworks services, water supply is mainly provided directly by the municipal authorities. They are part of the national political system, and not independent. ● They do have urban water supply systems, which are operated by each city's development committee. ● It appears that the seven provincial capitals have their waterworks installed. However, this is a multiethnic country with an extensive area, and there is more to investigate in order to gain an understanding of the overall situation. ● The responsibilities and authorities are divided between rural and urban areas. ● There are also areas where piped water is provided free of charge. Relatively primitive methods are, however, still used in some areas, such as taking water simply from the river.	● The waterworks utilities are operated by public agencies. ● They used to be the government's direct subsidiaries, but subsequently delegated to regional authorities during 1998 and 1999 in tandem with the decentralization of the governments, followed by the establishment of public agencies by each province. ● The capital region has its own metropolitan waterworks agency. Other than this, all waterworks agencies are managed by provincial authorities. ● The municipalities and provinces manage their respective waterworks financially. ● In recent years, the private sector began taking part in supplying water for the public agencies. ● There are a few private water supply networks.	● Waterworks are run by waterworks agencies. The waterworks agencies are government-led enterprises where mayors assume the presidential seat; thus, they do not directly comprise the governments. ● Waterworks agencies were part of the government privatization scheme, which materialized through the 1999 decentralization laws. ● However, there are some cases of small-scale municipal waterworks. The government is in a process of regulating these by amending the Waterworks Law.
	Waterworks association and similar	● There is no waterworks association, but efforts are being made at present to establish an equivalent organization.	● There is no waterworks association, but there is Engineering Society , an equivalent to Japanese institutions of professional	● There is no waterworks association, but the establishment of a national waterworks association is under way at present.	● The national Water Works Association was established in 1972, and it has over 400 member agencies today. It provides

Category	Subcategory	Country A	Country B	Country C	Country D
	organizations	● Technical research is pursued by specialists in each area of technology. It is not led by universities.	engineers. Mainly comprised of university graduates, this society undertakes standardization of engineering in buildings and constructions.	● Once established, this will become a third-party organization to provide effective support for standardization and human resources matters.	assistance in terms of making arrangements between different bodies, personnel development, performance improvement, etc.

2) Human Resources systems

Table 5.2 Survey outcomes on personnel systems

Category	Subcategory	Country A	Country B	Country C	Country D
Recruiting and training personnel	Methods to select the waterworks top management	● The presidents of waterworks agencies are appointed by the prime minister. ● Public waterworks bureaus are composed by government officials seconded from the Ministry of Industry and Handicrafts. Another government official assumes the position of assisting director of the bureau, who is in charge of finances, although this may not be the case in some bureaus. Other employees below this line are recruited by the bureaus. ● There are no explicit, objective guidelines for the selection of top management. ● It is not clear how the top management members are selected for the aforementioned ten government-run waterworks agencies. ● In public agencies for rural waterworks systems, the top may be either an engineer or an administrator. ● There is also top management of dubious credentials.	● Waterworks administrations are arranged differently from one municipality to another. ● At present, the general director and one of the assistant directors of the city development committees are from the military. As such, the top management is generally decided by appointment from previous-military personnel. These military-turned-management executives are in good relationships with the military. ● The current municipal officer in charge of waterworks has no previous experience in waterworks. Therefore, properly competent employees are supporting the actual administration. ● Today, some of the military-descended members are engineers, whereas previously, only administrative officers came from the military.	● The head (director-general) is appointed by provincial governors, who are in turn appointed by the party (in some cases, a party secretary may assume the role of a governor concurrently). ● Generally, the top management of ordinary waterworks agencies are aligned with division managers of provincial waterworks authorities. ● It is not clear who is responsible for choosing the candidates for waterworks top management. ● The present director-general of the public agency has worked in the field throughout his career, but the former director-general lacked experience and expertise in waterworks.	● Director-generals are selected by either the governor of the province or the mayor. The central governments do not have the authority over personnel matters of the agencies. ● There are public agencies that call for their director-generals through open recruitment. Their selection criteria and procedures are highly transparent. Candidates are shortlisted on educations, credentials, and other criteria, as well as through an assessment by external agents. The authority, such as mayors, gives the final approval. ● There are quite many director-generals who are not specialists of waterworks engineering, but who come from general governmental backgrounds. Therefore, it is a mixture of personnel with experience-based skills and those without them.
	Human Resources system for employees	● Employees are hired locally. The Waterworks Bureau has the authority over recruitment of general staff. It is not clear if the staffs hired via this route are officially given the status of civil servants. ● No recruitment by examinations is pursued for general staff recruitment. ● Due to the lack of guidelines for desired personnel, the recruitment for new personnel tends to rely on circumstances of the time. Some agencies hire people without considerations of competence or suitability. ● Promotions for ordinary employees are basically internal promotions. However, promotions are not considered on the basis of qualifying assignments. ● There is room for improvement in terms of the human resources system. There is no clear rationale for placing personnel according to suitable tasks, roles, and responsibilities of positions. This is an issue	● Opportunities for promotions of employees depend on the regime of the time. There have been people who reached the position of general director in the past. At present, one of the two assisting directors that represents the highest rank has ascended from an internal employee through promotion. ● Internal promotions are under the purview of mayors. Regional governments are variously involved in this. ● There is an assignment system for engineers, who are considered for promotion from a sub-assistant engineer to an assistant engineer. ● Education is an important factor in considering personnel matters. A master's degree bears a significant weight in such considerations. ● There are no particular recruitment exams. Some people are hired through personal	● The City, with an extended historical background, maintains the independence of personnel matters at the public waterworks agency. ● The agency also recruits employees autonomously. ● Employees usually start from the bottom rank, and work their way up toward higher ranks. It should be noted, however, that there are only three waterworks utilities that stand on their long operational histories. Most of the utilities started operating around the year 2000, and their circumstances are yet unknown. ● For the posts up to division managers, candidates are decided through internal voting, and they are given director-general's references, and approved by the executive board. There are no selection exams. ● The governor's credential is important in attaining personnel-related approvals. As a	● Personnel matters of the waterworks agencies are handled independently of the regional governments. Directors-general are responsible for them. The waterworks agencies are also responsible for recruitment and payroll management. There is no exchange of personnel between waterworks sections and general administrative sections. ● This system was established in tandem with the beginning of the waterworks agency system. Previously, the mayor was making all personnel decisions. ● It must be noted, however, that some mayors still hold on to their authority over personnel matters regarding their local waterworks agencies. The independence of waterworks agencies will be enhanced in the future as more and more agencies become independent.

Category	Subcategory	Country A	Country B	Country C	Country D
		to be addressed in the future, and the waterworks specialist training project will be working on it to make improvements.	connections.	system, the governor also needs the public trust in order to run for the candidacy.	
	Personnel training plans and evaluation/remuneration systems	● There have been no systematic efforts to train personnel yet. Particular TCPs provide assistance in developing training plans individually. ● Efforts in reforming the metropolitan waterworks agency have seen some results in that employees engage in their work with pride in their professions. However, this high level of morale is not observed among general staff. ● Full-time employees seem to stay on.	● They have a training course in place for on-site technicians. ● They have a scheme to support people to attain master's degrees abroad, and successful candidates are obliged to work in the waterworks sector for certain durations upon returning from their studies abroad. ● The governments are highly motivated in addressing issues themselves. They have the attitude of self-reliant readiness in developing their waterworks systems with their own technology and funding, perhaps due to the fact of a long-term absence of donors. ● Meanwhile, highly skilled talents are likely to leave the work because the average payment is significantly greater at private enterprises than civil servants' salaries.	● The state government undertakes the training of personnel in the waterworks sector. ● Personnel's training for all waterworks agencies is undertaken by the Metropolitan Waterworks Agency and Waterworks Technical Training Center (WTTC). ● Staff members are sincere and hardworking, like in Japan. ● Staff members recruited by the agencies tend to stay on.	● Personnel's training is regarded as one of major pillars of the national waterworks operation reform. ● As a rule, training is provided where Ministry assess it as being "sick." Specifically, the following programs are available: (1) training provided by a "healthy" waterworks agency, (2) OJT training programs, and (3) specialist training provided on finances and other areas at by the country's Water Works Association.

3) Financial foundations

Table 5.3 Survey outcomes on financial foundations

Category	Subcategory	Country A	Country B	Country C	Country D
Appropriate financial management and pricing scheme	Independent municipal waterworks accounts, concept of self-financing, and accounting standards based on double-entry bookkeeping	● The waterworks accounts of the public agencies are independent from the general accounts, and are in surplus. ● As for the government-run waterworks utilities, their accounts are not independent of the national budgets. The Ministry of Finances procures the investment funds, and the waterworks bureaus are not held accountable for the debts. Thus, the funds are not declared in the waterworks account. ● Overall, they are aiming to achieve a self-financing system, by transforming the bureaus into public agencies and separating the accounts from the national finances. The Metropolitan Waterworks Agency is their role model. ● Public agencies are treated in the same way private enterprises are, so they are liable for 20% income tax on their operating profit if	● The waterworks accounts are part of the public accounts. Thus, the revenues from the waterworks are included in the tax revenues, constituting the general accounts. ● Because costs for the maintenance of the waterworks services are requested every time as the necessity arises, it is unlikely that they develop awareness of accurate bookkeeping on the maintenance costs. ● Accounts are roughly rounded up together with the general accounts, making it difficult to discern waterworks revenues and raw costs. There is no awareness of the costs. ● The bureaus do not pay taxes as they are part of the municipal governments. ● The top management gradually understands the notion of self-financing operations, thus opening up to the idea of turning into public agencies. They are also willing to learn from	● Waterworks accounts are on a self-financing basis, and waterworks must be managed through water payments, as they are provided in the Waterworks Law. ● Each agency prepares its financial statements. ● However, they may not be paying thorough attention to appropriate pricing. ● Surplus on profits is distributed among employees as bonuses. ● The waterworks agencies pay tax to the local governments.	● Public agencies conduct structural operations based on their accounting standards. Some of them have not been able to achieve self-reliant operations in some states. ● High-performing public agencies undertake proper budgeting for investment funds, maintenance costs, and labor costs. There is a national scheme to provide governmental advice to agencies that are less competent in accounting. ● It is not fully self-financing in the sense that pipe scheme networks' extensions and major repairs are paid for by the regional governments. ● Deficits are covered by the regional governments in the form of increasing the capital injection.

Category	Subcategory	Country A	Country B	Country C	Country D
		their operations turn into surplus.	Japanese cases.		
	Appropriate budget management	● Public waterworks agencies manage their budgets independently. ● General government-run waterworks request their budgets based on their annual operation plans, and their budgets are determined depending on the size of allocations to their relevant ministries.	● The budget proposal is planned by the waterworks bureaus. The finances department calls for a budget meeting around October, followed by deliberations by executive meetings, the municipal committee, and the regional authority. Cases of certain significance seem to be taken to the federal government, but this is not verifiable for outsiders. ● For most things, the operators do not have the powers to decide on spending and investments for waterworks. It seems that all depend on how big a budget they can earn in the beginning. ● While the budget requests are subjected to thorough reviews, records and control hardly exist over the granted budgets.	● Waterworks decide on plans between January and February, and implement them during the term starting from October until the following September. The accounting year starts in January and ends in December. ● Regarding the public waterworks agencies, the top management is authorized to allocate and execute budgets. ● They submit their budget proposals to the provincial government, and obtain approvals. Nevertheless, they do not seem to pursue budget management as strictly as in Japan.	● Each waterworks agency prepares budget proposals and submits them to the directors-general for authorization.
	Investment for construction, authority over funding procurement	● Public agencies do not register grant-aid in their initial investment account, but yen loan is included and redeemed in the liability accounts. ● General government-run waterworks rely on the national treasury. Investments are included in the budget requests based on annual operation plans, and determined depending on the size of allocations to their relevant ministries. Most of the loans are provided by the ADB, and partly by the World Bank. ● Both public agencies and government-run utilities prepare asset registers for the management of their infrastructure and other properties. ● The government-run utilities lack in consistency because, while allocating depreciation cost, their assets are national properties and, therefore, recognized as permanent assets. This issue should be resolved once the utilities are turned into public agencies.	● Waterworks infrastructure development and asset management are a part of the central governance, and it is too soon to make waterworks accounting independent. ● Investment funds are drawn from the budget for general accounts. ● Large-scale infrastructure such as water treatment plants are mainly funded by the country's national treasury. As the waterworks are not an independent account, these funds do not count as a subsidy or loan. ● The municipal governments aspire to improve the water supply systems, and are planning to build new treatment plants from the regional governments' budget. ● It is not clear who has the authority over investments. Rather, governments do not seem to consider waterworks in a strategic business framework. It is as if they use the budget for construction simply because it is necessary.	● It is generally believed among employees that infrastructure development and asset management are the responsibility of the state government and donors and hence the waterworks utilities are exempt from such responsibilities. ● It seems like fund raising for investment is not seen as their responsibility, since service provision is possible as long as there are donors. 55 percent of the funding for public works relies on donors while the country contributes only ten percent. ● The waterworks sector was mostly funded through grant-aid, but, recently, some funding sources are switching to loans.	● Large-scale investments are undertaken by the regional offices of the Ministry of Public Works and Public Housing. The waterworks agencies act as a maintenance and management body. ● However, the agencies are allowed to utilize funds other than from the national government subsidies, such as grants by regional authorities, water revenues, loans, and private funds, to undertake investments. Plans are prepared and submitted to the mayors and councils for deliberation, just like budget proposals. ● The system prescribes that subsidies for waterworks agencies are granted only if the BPPSPAM assessment results deemed the agency as "healthy." In cases where the outcomes are either "unhealthy" or "sick," the agency has to first engage in operational reforms. ● Since the provincial governments and municipal authorities began their direct involvements in the management of waterworks agencies, fewer financial matters were referred to the regional offices of the Ministry of Public Works and Public Housing. This has resulted in the loss of personnel who can control projects. ● They have introduced a scheme to endorse

Category	Subcategory	Country A	Country B	Country C	Country D
					the loan interest for “healthy” waterworks agencies. However, regional governments and congresses tend to shun away from taking out new loans; thus, the scheme is in fact underused.
	Practice of pricing reviews, clear rationale for rate calculations, and introduction of a use-based charging system	● Pricing reviews are not appropriately conducted. Even if the government-run utilities appeal to the Ministry of Industry and Handicrafts, it is unlikely that it will be approved. ● However, backed by the rapid economic growth and urbanization, many utilities are increasing their users and profits quickly and significantly even without investing in large-scale infrastructure. ● They are aiming to bring financial accounts into surplus, and for the time being they are managing to pay for their maintenance cost. They also budget depreciation properly. ● Nonetheless, the accounting has not reached agreeable standards if investment recovery is taken into consideration for the grant-aid funding. ● There are no guidelines for calculation of prices, for which JICA’s TCP is working with them currently.	● Pricing reviews require approval of the central government. ● Previously, waterworks raised the rates a little in 2012. ● They aspire for a flat rate for water supply services across the nation. However, three major cities have different rates at present. Also, prices may be significantly higher in areas served by rural water supplies. ● There is a tendency that mayors try to avoid pursuing the policies unpopular among their electorates. ● The financing is below the level for appropriate maintenance and management. ● The rationale for rates is never made explicit.	● The rates charged by the Metropolitan Waterworks Agency are decided at the Parliament, while the rates of other agencies are authorized by governors. ● Pricing reviews (price hikes) are relatively frequent at the municipal level. Constant deficit is unlike because the governor’s authorization for price raise is readily obtainable to make up for the deficit. ● Water prices varies greatly from one prefecture to another. ● While urban water prices were unreasonably low earlier, the disparity has been reduced since the pricing review. ● They are able to pay for maintenance and management costs, including depreciation. However, we suspect that the depreciation is not correctly accounted for, considering the historical context of a long period of relying on grant-aid for investments.	● The Ministry of Home Affairs issued an ordinance (2007) to regulate pricing schemes, and there are also guidelines. They clearly establish the principle of aiming to achieve full cost recovery by service revenues. ● Meanwhile, the pricing has an upper limit, which is determined with reference to the minimum wage applicable in a given region. Because of this, there are public agencies that suffer from severe revenue shortage, unable to cover the utility maintenance cost. ● Pricing reviews are negotiated approximately every three to five years. Pricing reviews are deliberated among the mayor, council members, and the directors-general of agencies. The amount to be raised is often held back.
	Cash flow management and customer management	● For both waterworks agencies and government-run utilities, water revenues are deposited in the national treasury, and redistributed in the form of a budget. ● There is a national treasurer’s office in each state, to which waterworks bureaus pay their waterworks revenues. At the end-of-year settlement, they deduct the amount paid as taxes.	● Waterworks revenues are recorded daily, but they are treated as tax revenues.	● Waterworks revenues directly go into the accounts of waterworks agencies. ● They use computer systems to manage the payments.	● Waterworks revenues directly go into the accounts of waterworks agencies. There are counters where people may make payments. Some agencies also provide an ATM payment service.
	Procurement of private funding	● The Metropolitan Waterworks Agency lists stocks on the stock market to procure funding from the private sector. However, this is a very rare case. For a long time, the Metropolitan Waterworks Agency has been the only public agency that succeeded in listing the stocks in this country. This suggests that other agencies are not as transparent as this agency to gain market trust. ● Banks are not often used. The general population mainly keeps their savings at	● There has been no system for pursuing privately funded public works.	● It is still early days since the banking and savings systems started operating, and it is difficult to procure funds from within the city. ● There is a noticeable increase of cases in which foreign companies participate, drawing funds from surrounding countries, and supplying bulk water to waterworks agencies. In 2011, a joint operation started between a public agency and private company. In this way, the private sector is becoming increasingly active in the waterworks sector.	● The collaboration between the public and private sectors is stipulated in a presidential ordinance. ● Funds may be procured through urban banking corporations, but their interest rates are high. For waterworks agencies in a good operational state, bank loans are recommended, and there is a scheme to make up for the interests.

Category	Subcategory	Country A	Country B	Country C	Country D
		home.			
Efforts in payment collection	Fair charges for political parties, military, police forces, and other public institutions	● Recently, governmental offices are fairly charged for water as well. This is largely credited to the efforts by the Metropolitan Waterworks Agency. Modeling on this, similar initiatives are developing in other regions.	● Payment collection from the governmental offices is sporadic, and some offices may not pay for the waterworks services. The Military is exempted. ● At least the municipal authority is aware of the need to do something about it.	● There are cases where government offices, hospitals, and other institutions do not pay for water despite the rates being charged. They use the lack of budget as an excuse for the nonpayment. However, water supply cannot be halted in these cases. ● In some cases, the payments are made a year or two later. About 10% of the nonpayment is recorded as operating loss.	● There are different rate categories. They include rates for governments, exclusive residences, factories, public facilities, mosques, and churches. Some mosques are exempted. ● For charging offices of national government and the military, waterworks agencies do not charge them directly, but send invoices to the Water Works Association, which forwards them to the central government (Ministry of Finance). ● The payments are recovered from the governments without problems.
	Assessment methods for discount/waiver eligibility for the poor	● There is a discount scheme of water rates/service connection charges for underprivileged population (Water for Poor). Users' income levels are speculated from the water use: poorer users use less water while wealthier users use more water. Rates are set low for poor users, and wealthy users pay at higher rates. ● The Metropolitan Waterworks Agency also has a discount scheme to account for urban households of low income with many family members (e.g., factory workers may have ten family members living in one room) whose water use tends to increase, leading to higher water charges.	● No discount schemes for the poor are in place. However, water rates are low in the first place. ● There are some cases where water connection requests are denied due to insufficient supply capacity. ● Buddhist temples are supplied with water free of charge.	● No discount schemes for the poor are in place. In urban areas, many residents are of reasonable income levels. ● The Ministry of Health is pursuing measures for the poorer population with a system of water supply by setting up public water taps.	● The rates for underprivileged users are set low if they use less than 10 m^3 of water a month.
	Responses to customer requests and complaints	● Customer complaints are mainly about poor water quality and water outage. Complaints made regarding rural waterworks networks are not well compiled. JICA's TCP is giving guidance on this. ● A recent major complaint was the 2012 case, in which people took to the streets protesting the price rise proposed by a private waterworks utility.	● There are protests about the non-supply of waterworks. In 2013, residents in the eastern part of the capital city risen to a protest action. The authority responded by expediting the treatment plant construction work, as well as extending the existing pipe scheme network to this area as temporary measures. ● The authority is aware of the potentials of public protests. In reality, however, many other challenges are piling up, such as water shortage and not enough reservoirs.	● No cases of public protests are reported. While electricity is much more expensive, even this does not cause public protests.	● There are cases of customer complaints (via the Internet). The agencies handle these complaints by means of public announcements through their Web sites, newspapers, and other means of public relations.
	Measures against nonpayment and water theft	● Users go to the payment counters to pay for waterworks services. This system prevents undue losses on profits as payment collectors may pocket the collected money or give unauthorized discounts to users.	● Water supply suspension can be imposed as a procedure, but the agencies themselves do not have the power to authorize it, and it must be referred to the executive meeting. Thus, water suspension is nonfunctional.	● Ordinary users make payments as charged. ● Nonpayment results in a suspension of the water supply. ● There are basic practices to maintain and improve high rates of payment collection.	● Waterworks are aware of the necessity to reduce non-revenue water. They consider a replacement of eroding pipes to be one of the viable countermeasures. ● They are also dealing with nonpayment and

Category	Subcategory	Country A	Country B	Country C	Country D
		● Some states set up staffed customer counters, where customer inquiries and complaints are handled. ● Nonpaying users are notified of a grace period; then the supply is suspended if this period expires without payment. The Metropolitan Waterworks Agency controls water thefts very strictly, whereas the rural waterworks utilities are not combating them effectively. ● The Metropolitan Waterworks Agency has a program to reward or penalize meter readers according to the performance rates of their allocated zones. This program contributes to high collection rates.	● No particular campaigns are carried out. ● Dedicated staff undertakes the payment collection. According to them, they recover 100% of the charges.	● TCP is working together to reduce the incidence of water theft. At present, there is 28% of non-revenue water, and it is under investigation to verify how much of it is due to water leakage, and how much is attributed to water theft.	water theft rigorously. Ultimately, they may bring the cases to the police.

Chapter 6. Categorization of waterworks utilities and assistance for each category

6.1 Considerations on analytical method

This chapter proposes a method to analyze each country's operational environments in terms of governance, human resources systems, and financial foundations, based on the data obtained through the survey. As an attempt to visualize the characteristics and situations in these countries, we assigned "y" if the descriptions in the survey items squarely apply to them, and "n" if there are clearly some issues.

It should be noted, however, that the main purpose of this survey is to suggest an evaluation method, and therefore the "y/n" assessment is purely based on the information gathered during this survey, and treated as precursors to interpret the effectiveness of the assistance under consideration. We will discuss ways to improve the feasibility of this evaluation method in the section on future challenges.

Regarding Country A, we distinguished the Metropolitan Waterworks Agency from all the other waterworks agencies due to the significant disparity between them. Similarly, the assessment items for Country D are based on the evaluation categories provided by this country, which they use to assess the soundness of utility operations: H (Healthy), UH (Unhealthy), and S (Sick).

6.2 Analysis outcomes using the data from each country

1) Governance

The analysis outcomes on governance are as follows. State systems are the major factor that characterizes governance, and because they are specific to that country, it is unlikely to find disparities at the level of waterworks utilities in one country.

There is a clear tendency in the "y/n" distributions when legislative/political systems are developed or underdeveloped. This survey shows that in Country B, such systems were mostly underdeveloped whereas Country A is undertaking systematization of its governance but some Water Supply have challenges for its implementation.

Table 6.1 Outcomes of evaluations on governance

Area of concern	Category	Item	Checkpoint	Country A		Country B	Country C	Country D		
				Metropolitan Waterworks Agency	Government-run waterworks	Metropolitan waterworks	Metropolitan Waterworks Agency	H-grade agencies	UH-grade agencies	S-grade agencies
State system	Framework of state government	Political stability/ relationship between the central and regional authorities	Is political regime stable?	y	y	n	y	y	y	y
			Are relationships between the central and regional governments good?	y	y	n	y	y	y	y
		Coherence of ministerial collaborations and legal systems relevant to waterworks	Is there a sufficient cooperation between ministries on waterworks-related issues?	n	n		y	y	y	y
			Are there legislations regarding waterworks in place? Are they coherent?			n				
	Regulatory framework	Water supply authority and established legislations on water supply	Is there an authority established under the state government for governing water supply?	y	y	n	y	y	y	y
			Are established water supply laws enforced and operational?			n	y	y	y	y

Area of concern	Category	Item	Checkpoint	Country A		Country B	Country C	Country D		
				Metropolitan Waterworks Agency	Government-run waterworks	Metropolitan waterworks	Metropolitan Waterworks Agency	H-grade agencies	UH-grade agencies	S-grade agencies
		The authority to control water supplies in rural areas	Is the authority for water supplies in rural areas clearly established?	y	y			y	y	y
		Water resource management systems and relevant rules	Are clear management systems and rules regarding water resources in place and functional?			n	y	y	y	y
		The authority to control finances and funds for waterworks	Is there an established authority for controlling the finances and funds for waterworks?					y	y	y
		Provision and operation of water quality standards	Are water quality standards prepared and implemented?	y	y		y	y	y	y
	Information disclosure	Dissemination of legal information	Is there a system to disseminate information on laws and regulations?					y	y	y

Area of concern	Category	Item	Checkpoint	Country A		Country B	Country C	Country D		
				Metropolitan Waterworks Agency	Government-run waterworks	Metropolitan waterworks	Metropolitan Waterworks Agency	H-grade agencies	UH-grade agencies	S-grade agencies
Planning	Operations based on plans and auditing systems	Progress in preparation and implementation of national strategies on waterworks development	Are the national strategies regarding waterworks already prepared?	y	y	n	y	y	y	y
			Do they pursue their national strategies?		n	n		y	y	y
		Urban waterworks development basic plans for each city	Do municipalities pursue waterworks development according to their plans?	y				y		
		Monitoring of waterworks	Are waterworks utilities under surveillance?	y		n	y	y	y	y
Waterworks agencies	Waterworks utilities' operations fram	Constellation of waterworks utilities and efforts to realize it	Are there clear ideas about who should operate waterworks (public company, public management, etc.)?	y	n	n	y	y	y	
			Are there efforts to realize the designated system?	y	n	n	y	y		n

Area of concern	Category	Item	Checkpoint	Country A		Country B	Country C	Country D		
				Metropolitan Waterworks Agency	Government-run waterworks	Metropolitan waterworks	Metropolitan Waterworks Agency	H-grade agencies	UH-grade agencies	S-grade agencies
	ewor k	Waterw orks associat ion and similar organiza tions	Is a waterworks association established, or a similar organization to the same effect?	y	n			y	y	y

2) Human Resources systems

Unlike governance, human resources systems vary considerably from one organization to another. Overall, many countries and waterworks utilities need some improvement.

Table 6.2 Outcomes of evaluations on personnel systems

Area of concern	Category	Item	Checkpoint	Country A		Country B	Country C	Country D		
				Metropolitan Waterworks Agency	Government-run waterworks	Metropolitan waterworks	Metropolitan Waterworks Agency	H-grade agencies	UH-grade agencies	S-grade agencies
Recruiting and training personnel	Sele ction of comp etent top pers on	Fairness , transpar ency, and validity of the selectio n procedu res	Is the selection of the top management influenced by candidates' connections with politicians?	n	n	n	n			
			Are the selection procedures clear and transparent?			n		y		
			Do the selection procedures involve certain competitive elements such as open recruitment and qualifying assignments?	n	n	n	n	y		

Area of concern	Category	Item	Checkpoint	Country A		Country B	Country C	Country D		
				Metropolitan Waterworks Agency	Government-run waterworks	Metropolitan waterworks	Metropolitan Waterworks Agency	H-grade agencies	UH-grade agencies	S-grade agencies
			Do the selection procedures work out effectively? Does the selected top person have adequate competence and specialist skills?	y				y		
	Recruitment, posting, and training of employees	Personnel system for employees	Are there transparent employee recruitment systems, involving some selection assignments?		n	n		y		
			Does the system have a transparent promotion program for employees involving exams?	y	n			y		
			Is the personnel management division given a degree of freedom and independence that allows for securing personnel necessary for operating waterworks?	y				y		
		Personnel training programs and stable employment	Do they have programs for recruiting and training personnel?	y		y		y	y	y
			Are employees dedicated in their attitude toward waterworks operation?	y	n					
			Do employees seem happy to stay in their positions? If not, what are the reasons for dissatisfaction?	y	y	n	y	y	y	y

3) Financial foundations

There are relatively many utilities with the “y” assessment in terms of customer management and complaint handling. By contrast, many utilities were insufficient in terms of revenue management, funding management, pricing scheme, and other operational aspects.

Table 6.3 Outcomes of evaluations on financial foundations

Area of concern	Category	Item	Checkpoint	Country A		Country B	Country C	Country D		
				Metropolitan Waterworks Agency	Government-run waterworks	Metropolitan waterworks	Metropolitan Waterworks Agency	H-grade agencies	UH-grade agencies	S-grade agencies
Appropriate pricing basis	Revenue management	Independent waterworks account for municipalities and aspirations for self-financing	Do they understand the notion that waterworks should be operated on the basis of self-financing?	y		n				
			Are waterworks accounts independent from municipal financial accounts?	y	n	n				
		Appropriate budget management	Is the budget management appropriate?	y			n			n
	Funding management	Investment for construction, authority over funding procurement	Do waterworks utilities have the authority to pursue relevant infrastructure investments?		n		y		n	n
			Is the funding for infrastructure investments procured at the discretion of waterworks utilities?	y			n			n
	Pricing scheme	Practice of pricing reviews and clear rationale for price calculations	Are they capable of reviewing their rates in order to adjust pricing appropriately?		n	n	y		n	n
			Is there a clear rationale for rate calculations?	y	n	n	n	y	y	

Area of concern	Category	Item	Checkpoint	Country A		Country B	Country C	Country D		
				Metropolitan Waterworks Agency	Government-run waterworks	Metropolitan waterworks	Metropolitan Waterworks Agency	H-grade agencies	UH-grade agencies	S-grade agencies
	Customer management	Cash flow management	Do the waterworks utilities appropriately manage cash flows regarding their revenues?	y			y	y	y	y
	Private funding	Procurement of private funding	Is it possible to have private funding? Do they utilize private sources of funding?	y	n	n		y		n
Efforts in payment collection	Fair pricing schemes	Fair charges for political parties, military, police forces, and other public institutions	Are prices charged equally to those with political powers, such as political parties, military, police forces, and other public institutions?	y		n	n	y	y	y
		Assessment methods for discount/waiver eligibility for the poor	Do they employ appropriate criteria for the assessment of discount/waiver eligibility?	y	y			y	y	y
	Customer services	Responses to customer inquiries and complaints	How do they respond to customer complaints? Are there past cases of customer dissatisfaction developed into collective disputes?	y				y	y	
		Measures against nonpayment and water	Do they implement appropriate measures for nonpayment?	y	y	n	y	y	y	
			Do they implement appropriate measures for water theft?	y	y	n	y	y	y	

Area of concern	Category	Item	Checkpoint	Country A		Country B	Country C	Country D		
				Metropolitan Waterworks Agency	Government-run waterworks	Metropolitan waterworks	Metropolitan Waterworks Agency	H-grade agencies	UH-grade agencies	S-grade agencies
		theft								

4) Summary of the analysis outcomes

The following is a summary of the above analyses by countries for an easy grasp of an overall picture, with signs “Y” standing for the majority of the assessment (more than 50%) results being “y,” and “N” as otherwise.

Table 6.4 National characteristics comparison

Dimension	Area of concern	Category	Country A		Country B	Country C	Country D		
			Metropolitan Waterworks Agency	Government-run waterworks	Metropolitan waterworks	Metropolitan Waterworks Agency	H-grade agencies	UH-grade agencies	S-grade agencies
Governance	State system	Framework of state government			N	Y	Y	Y	Y
		Regulatory framework			N	Y	Y	Y	Y
		Information disclosure					Y	Y	Y
	Planning management	Well-developed operational management and auditing systems	Y		N		Y	Y	Y
	Waterworks agencies	Framework for waterworks operations	Y	N	N	Y	Y	Y	
Personnel systems	Recruiting and training personnel	Appointing competent top	N	N	N	N	Y		
		Employee recruitment, placement, and training	Y	N	N		Y		
Infra	Appropri	Profit management	Y	N	N				N

	ate pricing basis	Funding management		N				N	N
		Pricing scheme		N	N				
		Customer management	Y			Y	Y	Y	Y
		Private funding	Y	N	N		Y		N
	Efforts in payment collection	Fair pricing	Y		N	N	Y	Y	Y
		Customer response	Y	Y	N	Y	Y	Y	

The following are our considerations on each item:

First of all, it is evident that for the countries and waterworks agencies which have “Y” for the most part, they do so in all three dimensions of governance, human resources systems, and financial foundations. This suggests that these entities have a well-developed operational environment for waterworks and tend to leverage the support they receive in these three aspects, whereas countries that do not perform so well are more likely to face with difficulties in many of the three aspects.

Looking at the table by items, the distributions of Y and N tend to swing. For example, the human resources systems as well as profit management, funding management, and pricing schemes under the financial foundations tend to have more Ns, indicating that these are items that are likely to pose difficulties to the efforts to render effective assistance. Meanwhile, governance and some of financial foundations, such as customer management and customer response, yielded more Ys, which indicates that these items are less problematic.

It should be noted, however, that, due to the limited nature of the data, the analysis may also be limited in applicability and generalizability. In order to improve the objective of the analysis, it is necessary that further research are conducted in many countries with many waterworks utilities to accumulate primary data through methods like interviews, and use them to further improve the evaluation criteria using PDCA cycles.

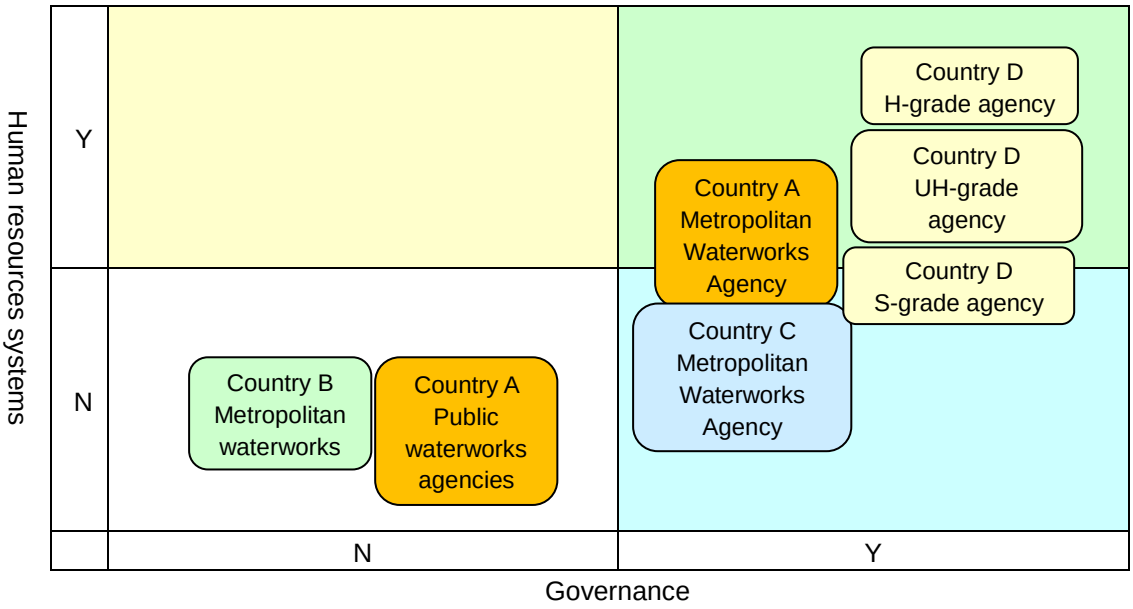
6.3 Visualization of operational environments

To further visualize the operational environments in these countries, we plotted the waterworks utilities on matrixes based on the analysis outcomes regarding two of the three dimensions of governance, human resources systems, and financial foundations.

1) Governance and human resources systems

The first matrix, below has governance on the horizontal axis and human resources systems on the perpendicular axis.

Table 6.5 Matrix of governance and personnel systems

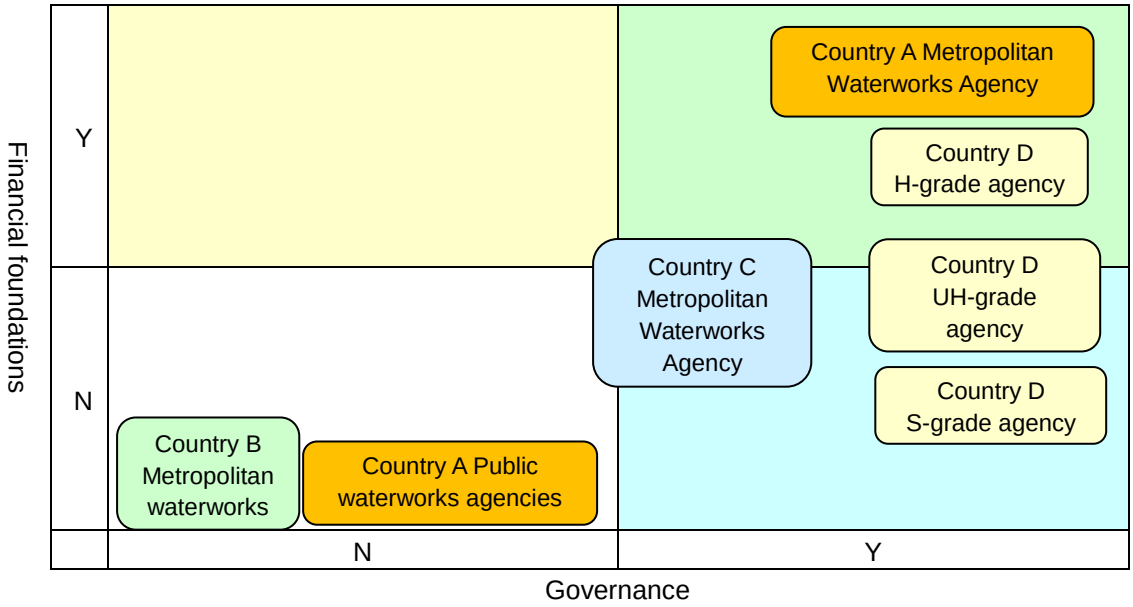


In most cases, countries and utilities with advanced governance have well-developed human resources systems, but there are a few cases where the development of human resources systems lags behind. By contrast, there were no cases in which there is a well-developed human resources system in place requiring governance improvements.

2) Governance and financial foundations

The below table shows the waterworks utilities in each country plotted in the matrix of governance on the horizontal axis and financial foundations on the perpendicular axis. This matrix illustrates the relationship between their financial health and governance.

Table 6.6 Matrix of governance and financial foundations



In most cases, countries and utilities with advanced governance have also developed their

financial foundations well, but there are a few cases where the development of financial foundations lags behind. By contrast, there were no cases in which well-established financial foundations are in place requiring governance improvements. This result resonates with the above-stated result on the relationship between governance and human resources systems.

3) The relationship between the three aspects

Based on the above, we consider some procedures for providing effective assistance in agreement with local operational environments of the developing countries.

The first step should be to gather and analyze data on the state of governance to develop better understanding of the ways in which the given country handles various situations. Many countries pursue relatively advanced governance, and also data on governance are easier to obtain than those concerning the other aspects. For these reasons, it is possible to an extent to make preparatory arrangements. It is conceivable that a starting point would be to formulate support programs by identifying decision-makers and influential entities through research on the systems of governance, and organize the assistance in such a way that would suit them.

In the next step, when the assistance program is brought to the target country or region, it is likely to face with issues in relation to human resources or finances to some extent. These aspects are difficult to forecast due to the facts that actual situations tend to vary depending on the target utilities, and that the actual operations do not necessarily comply with the systems within the governance framework.

Regarding personnel training, it is envisaged that the assistance will be given in the form of capacity building, for which it would be ideal to check whether human resources systems have potential to retain trainees to contribute sustainably to waterworks operations with the acquired skills. While it is not possible to directly influence personnel recruitment and have direct contact with human resources, it would be possible to make recommendations to improve the human resources systems where there are significant obstacles. For the Japanese assistance to be effectively leveraged, the capacity of the counterparts is equally important. Analyzing the human resources systems is also important to provide insights on the counterpart capacity.

It is equally important to understand the financial foundations. A firmly established financial foundation is essential for waterworks operations to be sustainable, and in many cases it requires periodic pricing reviews to keep the rates at appropriate levels. This often involves certain political difficulties and requires persevering negotiations. Thus, it needs efforts to align awareness across the board by checking accounting systems and record-taking, visualizing issues, and proposing necessary measures in a quantitative fashion.

Once a waterworks utility establishes itself adequately in terms of governance, human resources system, and financial foundation, it will gain competence and subsequently stand on their own. It would also signify that the operational environment has developed enough to adopt PPP and other high-level undertakings.

6.4 Discussions on the outcomes of the analysis

We discuss the hitherto-considered matrix plotting and analyses in terms of their mutual relevance.

Overall, the three dimensions of governance, human resources systems, and financial foundations are linked with one another, and in no case did it transpire that certain utilities are exceptionally superior or inferior only in one of these aspects. While governance leads the utilities toward the ideal state of waterworks operations, financial foundations indicate the utilities' present states, and human resources systems drive waterworks reforms. Therefore, it is in a sense logical that they are interlinked.

Seen from the initiatives of individual countries, there are some differences in the way these countries are trying to pursue in order to improve themselves in these three aspects. The following are our observations on some countries:

- In Country D, the central government has established a classification of public waterworks utilities in terms of their operational soundness (healthy: H, unhealthy: UH, and sick: S), and S-graded utilities are given government support to improve their operations, with a focus on personnel training. In this sense, there is a state-level system to improve the waterworks utilities through a combination of financial foundation and human resources system.
- Country A depicted the distributions on the matrixes such that the Metropolitan Waterworks Agency positioned itself in the top right whereas the remaining public agencies came at the bottom left. This is a result of the Metropolitan Waterworks Agency making a remarkable improvement in their financial foundation and human resources system under a powerful leadership of the top management, with JICA's assistance.
- In Country B, governance is under development, and various systems are yet to be developed. Therefore, it is still early for them to engage in the establishment of financial foundation or the development of a human resources system. It is particularly evident in that the top management lacks competence as specialists, and that their posts are more or less fixed, making the organization inflexible. Thus, their responses to international assistance are slow, and it is unlikely that such assistance could start seeing results in the foreseeable future. Nevertheless, the underdeveloped systems give way to the authorities' powerful decision-making that allows for immediate commencement of certain projects. Support efforts must make the most of this unique aspect. It may be a good approach, for example, to invite the waterworks' representatives with authority to Japan, so that they can readily appreciate the Japanese waterworks system, in parallel with Japan's technical support programs, such as water leak expeditions.

As described above, the differences in support strategies by countries become clear if support initiatives in the given country are considered through the visualization of operational environments in each country and utility. Although more observational data are needed in order to improve the accuracy, and enhance the objectivity, of these evaluations, this method has

demonstrated its value as a means to explain tendencies and characteristics of each country.

Chapter 7. Recommendations, challenges, and precautions

This study researched a methodology to analyze the operational environments of each waterworks utilities in the developing countries, aiming to facilitate effective and tailored made assistance recognizing the importance of understanding the current situation of the benefiting countries and waterworks utilities.

As a result, we proposed a method to analyze the operational environments of benefiting countries and regions in terms of the three dimensions of governance, personnel systems, and financial foundations, to understand their current situation. We also conducted a survey to gather information from four countries, and subsequently visualized the differences in the operational environment among these countries, and considered the implementation of the proposed method.

In this chapter, we summarize the outcomes and describe a specific, strategic flow, from surveying the states of governance, through the establishment of human resources systems and financial foundations, to more sophisticated initiatives such as PPP. We also point out some ways to further enhance the implementation of this result.

7.1 Application to strategic assistance

One example of utilizing the outcomes of the analysis on operational environments by countries, as discussed in this study, is to draw a chart of relationships between various assistance programs and the types of operational environments of certain countries, depicting how they can be effectively implemented and what should come first in the respective strategies.

The assistance programs to be considered, originally taken from a list based on the FY 2013 study, have been given a minor amendment in view of the results from this study. First, the table below shows different possible measures depending on whether the given country has well-established systems of governance, personnel systems, and financial foundations.

Table 7.1 The operational environment and corresponding assistance measures

Financial foundations		
Y	(2) Governance and financial foundation are adequately established, but personnel system needs to be developed. Assist with infrastructure development, or give support in planning facility development and personnel training. Training programs to Japan may also be effective.	(4) Governance, personnel systems, and financial foundations reach satisfactory levels. The operational environment is developed enough to carefully pursue more sophisticated improvement measures such as PPP.
N	(1) All three dimensions of governance, personnel systems, and financial foundations are under development. Starting with understanding the state of governance first, it is necessary to gather information on the country's current situation in order to decide where to start from. Efforts must be also made to build up personnel bases for sustainable waterworks operations and know-how on financial management, and to develop the basis for visualization of challenges.	(3) Governance and human resources systems are at certain acceptable levels, but financial foundations need further development. In many cases, the water prices are set too low to recover cost fully. At this level, they would benefit from assistance with setting appropriate pricing and measures to increase the operating profit.
	N	Y

Human resources systems

Assistance may focus on different points, depending on the extent to which governance, human resources systems, and financial foundations are established. As we have shown so far, many countries are relatively advanced in terms of governance. We thus divided the route starting from governance into human resources systems, on the one hand, and into financial foundations, on the other. Assistance in practice may follow flows such as (1) → (2) → (4); (1) → (3) → (4); or (1) → ((2) ＋ (3)) → (4).

(1) The operational environment must be developed comprehensively.
(2) Governance is fairly advanced, but assistance is required in organizational and personnel capacity building.
(3) Governance is fairly advanced, but financial foundations need reinforcement.
(4) Operational environment is basically established adequately.

Considerations on each point from (1) to (4) are as follows:

(1) Survey on governance and building the foundation
If the assistance is given to a country or waterworks utility with poor operational environment,

assuming the bottom left position on the matrix above, it is important to start with a thorough survey to find out about the state of governance in this country, and consider the most effective approaches. To enhance the effects of introducing other measures, it is also important to assess the capacity of the counterparts and its staff, as well as to raise awareness on the importance of measuring control (management of water volume, materials, money, etc.).

Table 7.2 Assistance measures and necessary operational environment (1)

No.	Assistance measure	Description	Notes
A1	Survey on governance	Find out the current states of national governance framework, legislations, and/or accounting systems with regard to waterworks.	
A2	Initial personnel training	Assess the capacity of counterparts, or its staffs, and provide assistance for recruitment of technical staff and provision of training.	
A3	Building a base for measuring control	Raise awareness on the importance of recording various data such as water volume, invested money and equipment, employees, and costs. Make sure these are thoroughly recorded.	

(2) Assistance for personnel training and facility development

As measures to help with the improvement of waterworks operations through technical assistance, possible support items include developing facilities to meet the local needs, improving problematic waterworks facilities, reducing water leakage, enhancing payment collection rates, etc.

Capacity building may be provided to people who engage in these activities.

Table 7.3 Assistance measures and necessary operational environment (2)

No.	Assistance measure	Description	Notes
B1	Development of capacities and solving issues of waterworks facilities	Using revenue increase as a benchmark, pursue faulty corrections and extension of facilities. Promote waterworks utilization in underdeveloped areas through promotional campaigns.	
B2	Countermeasures against unauthorized connections (water theft)	Check non-meter-read households and take other measures to ensure thorough customer management and combat unauthorized connections. If there is a case of nonpayment by governmental offices, negotiate with them. It is also necessary to raise awareness of unauthorized connections among meter readers.	
B3	Enhancement of payment	Ensure that customer ledgers and precise reading are implemented, and payments are charged and	

No.	Assistance measure	Description	Notes
	collection rates	collected without an error. Consider training for meter readers and other systems for correct meter reading.	
B4	Promotion of understanding for payment	Pursue promotional activities to gain understanding by users about paying for water. Make improvements in terms of payment methods.	
B5	Measures against water leaks	Conduct analyses on the quantities of distributed water to understand the current situations and identify areas of high water leakage. Based on such investigations, implement countermeasures such as replacement of eroding pipes, compartmentalization, and introduction of new technologies.	

(3) Development of financial foundations

Taking records will facilitate accounting management. This will in turn make possible to consider waterworks utilities' technical/operational issues statistically. Once the figures are ready, the need for balanced accounts between revenue and spending becomes evident in order to establish a stable financial foundation, leading to the realization of measures for operational improvement. At this stage, it is possible to introduce assistance measures as described below.

Table 7.4 Assistance measures and necessary operational environment (3)

No.	Assistance measure	Description	Notes
C1	Preparation and analysis of financial statements	Through preparation and analysis of financial statements, identify points of consideration for measures and/or items to be deleted. This also gives employees the opportunity to think for themselves.	
C2	Optimization of operating cost	Countermeasures should be considered individually, taking specific circumstances into account. For example, if power cost is high, consider modifying operation patterns or introducing energy-efficient equipment.	
C3	Raising cost awareness among employees and changing the awareness of top management for reform	Pursue awareness among employees outside the management divisions by providing workshops on operational problems, and sharing information on financial situations, systems, issues, and necessary improvements.	
C4	Preparation of operation plans	For example, execute measures to reduce non-revenue water and verify the results in the revenue increase. Then prepare future financial plans	

No.	Assistance measure	Description	Notes
		appropriate to the present situations. Provide assistance in preparing the operational plans and in improving their competence to implement them.	
C5	Pricing	Aim to achieve full cost recovery and determine the rates based on financial statements, calculating how much of the total cost should be recovered by water revenues.	
C6	Pricing reviews	Using data such as financial statements, prepare materials to persuade the authority on pricing (governors, mayors, congresses, government ministries, etc.), and propose it at a calculated timing (mobilization of facilities, etc.).	

(4) Implementation of more sophisticated measures

If the measures described were successful in making governance, human resources systems and financial foundations functional, it is ready to move on to stabilization of waterworks operations towards long-term and sustainable water supply. Further activities may concern promotions of enhanced social welfare, expansion of waterworks by procuring private funding, and so on.

In the same vain, it should be pointed out that a considerable determination and efforts will be required to provide an all-in-one package to cover developments on governance, human resources systems, and financial foundations, if highly sophisticated schemes are to be introduced to a country without a sufficiently developed operational environment (e.g., introducing PPP in the developing countries).

The following table shows various measures that may be effective at this stage.

Table 7.3 Assistance measures and necessary operational environment (4)

No.	Assistance measure	Description	Notes
D1	Pricing structures	Consider the pricing that reflects local conditions, to achieve a "fare distribution of contributions based on appropriate assessment of responsibilities and benefit as well as social welfare policies."	
D2	Audit functions	In order to give incentive for operational improvement, develop an auditing division to check and disclose accounting details and financial statements. Implement the PDCA cycle to promote autonomous and sustained improvement.	
D3	Enhancing reliability	Improve the quality of waterworks services comprehensively and gain customers' understanding about paying for water.	
D4	Improving social	Once the utilities become self-reliant, it will be	

No.	Assistance measure	Description	Notes
	welfare	possible for them to implement measures to widen their social contributions, such as concessions for the low-income population.	
D5	Other measures such as leveraging private funding	Consider ways to deploy private funding such as PPP. It is also important to establish and reinforce regulatory institutions to prevent deteriorations of services through privatization.	

7.2 Future challenges and precautions

To sum up this study, we state some of the efforts to be made in the future so that the analytical method proposed in this study can be utilized effectively and can enhance the assistance programs given to the emerging economies for their waterworks development.

1) Enhancing analytical accuracy through more data collection

This study proposed an analytical method and ways to leverage it. However, its analytical items as well as the criteria for "y/n" evaluation still need improvement. While the data on each country are practical, for being based on interviews and available data, we should remind again that the overall volume of data is far from sufficient to be judged adequate. It should also be noted that the data gathered in this study may be highly biased by personal opinions of the interviewees.

We encourage that the method proposed herein should be employed proactively, so that a wide variety of information is applied to enable reviews of the items, and to enhance the accuracy of the method. Specifically,

- Consider other possible items to be included in the analysis of operational environment. This will require many specialists to participate and gather more diverse information to build up a body of surveys.
- This current study has primarily focused on Asian countries, which are relatively easier to investigate, but it is desirable if the target countries are expanded to minimize the bias. In particular, applying the method to areas outside Asia where regional variance may be great, such as Africa, island regions, and former communist zones would help us to identify points for evaluation in an extended scope.

2) Observations on implementation

The method can be applied to many different aspects of international assistance initiatives when the enriched database has enhanced the accuracy of the method. For example,

- It helps to understand the extent of impact the government or waterworks utilities of a given

country had on the project, in analyzing their successes and/or issues.

- It helps to consider points of precautions for specialists who are preparing for their new assignments in the given country.
- For companies seeking to seize the opportunity in PPP, this method is useful to identify countries or waterworks utilities with well-established operational environment.
- It serves as a starting point in analyzing Japan's international support to be presented in a comparative context.

The present method at its current level of accuracy seems still inadequate to serve as a tool for multidimensional considerations. However, without accumulating and analyzing the data on the experience of international assistance as our knowledge base, it is impossible to prepare strategic plans of assistance in keeping with the realities of the target countries.

If we may reiterate, it is not easy to obtain various data on situations in the developing countries comprehensively. Nevertheless, we hope that this study will be of value in future efforts to accumulate further information and guide our future international assistance.