Theme 7. Institutional Management: Governance, Human Resources Development, Consolidation of Water Utilities, Public-Private Partnerships

Contents

1. Introduction

Water utilities in Japan are managed at the local level under national government oversight. The Ministry of Health, Labour and Welfare regulates and supervises the technical aspects of the water supply services based on the Water Supply Act. The Ministry of Internal Affairs and Communications is the competent authority for local government administrative and management practices according to the Local Public Enterprise Act.

In the framework of such regulation and supervision, water utilities manage their organization including human resources development.

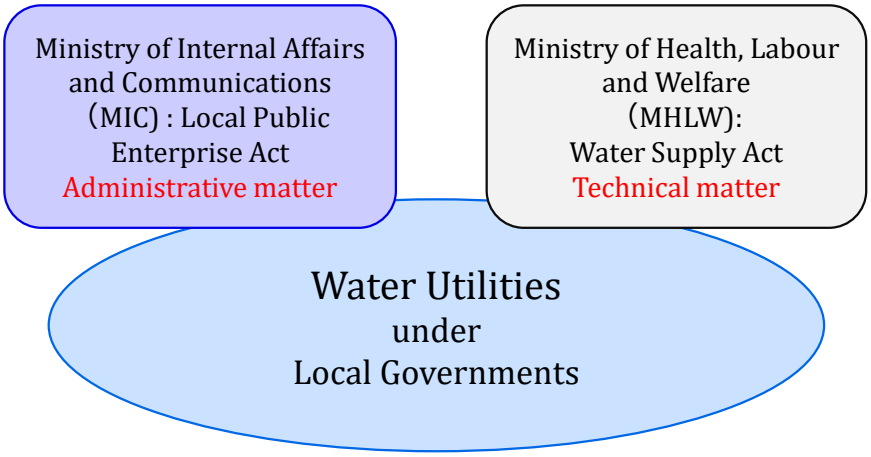


Figure 1. Water Supply Administration (relevant laws and authorities)

This module describes the governance structure and management practices of Japanese water utilities under this administrative structure (Figure 1) by explaining the following questions frequently asked from the participants of water supply training courses.

Q1. What is the governance of Japan's water utilities? Who and how are they supervised as a "public enterprise"?

Q2. Why do Japan's water utilities emphasize business planning? What are the contents business plans?

Q3. How do Japan's water utilities develop capacities of human resources? How to train engineers when a lot of human resources were needed during the expansion of water supply system?

Q4. Do small- and medium-scale water supply utilities have any problems with finance and human resources? If they have problems, how do they attempt to overcome the problems?

Q5. How does Japan promote public-private partnerships in the field of water supply? How to deal with issues such as ensuring safety, public benefit, etc. in public-private partnership?

The following sections attempt to provide answers to these questions:

2. Governance (Q1)
3. Business plans and PDCA Cycle (Q2)
4. Human Resources Development (Q3)
5. Consolidation of small- and medium-scale water utilities and regional collaboration (Q4)
6. Private-Public Partnership (Q5)

2. Governance

(1) Responsibilities of the National Government, Water Utilities and Citizens

The Water Supply Act of Japan specifies the responsibilities of the national government, water utilities and citizens. A water utility is obligated to establish the water supply contracts and disclose them to the public.

Article 2 of the Water Supply Act of Japan lays out clearly the responsibilities of each party as follows: (1) the national government shall prepare and promote basic and comprehensive policies on water resources and water supply development, and provide technical and financial support to water utilities; (2) water utilities shall proceed with phased water supply development and appropriate and efficient management; and (3) the citizens shall respect the national and local (water utilities') policies and ensure proper and reasonable use of water.

Figure 2. Responsibilities of the National and Local Governments (water utilities) and Citizens in the Water Supply Business

A water utility is obliged to establish contracts with its customers for the services set forth in the water supply rules. The information on water tariffs, allocation of expenses for installation of service connections and supply conditions has to be disclosed to the public in the water supply contracts.

(2) Executive Managing Director

The water supply business (excluding Small Scale Public Water Supply) is managed and operated under the Local Public Enterprise Act. A water utility is independent from local general administrative organizations. The executive managing director has the authority and responsibility for the operations of the utility. The annual management plan and annual budget has to be approved by local assembly as a check on the proper management of the utility.

Water utilities in Japan must comply with the Local Public Enterprise Act in their management practices and business operations. Application of the Act for Small Scale Public Water Supply is determined by the ordinance of the local government. The Local Public Enterprise Act also covers other sectors such as power, gas and transportation. These public enterprises are required to serve the public good as well as run an economically sound business.

The Local Public Enterprise Act requires that an executive managing director[1] of a local public enterprise be under the guidance and supervision of the head of the local government (the mayor). He/she is appointed by the mayor for 4-year renewable terms, based on the individual's competence in management. He/she cannot be dismissed against his/her will except as otherwise provided by the Act. The mayor has the right to "provide necessary directions to the executive managing director about the execution of an operation which may have a critical influence on the welfare of the residents." The mayor does not provide general guidance and supervision. The mayor can only provide "direction on a limited scope", even if invoked as an exception. The executive managing director manages the utility efficiently and effectively on his/her own initiative. His/her authority is strengthened by the separation of the water supply business from other local administrative organizations. The executive managing director appoints and dismisses staff, establishes divisions for clerical duties and sets management rules. The mayor, not the executive managing director, adjusts budgets and proposes various bills. Salary scale is based on performance, cost of living, and should be comparable to employees in similar public and private enterprises.

The annual management plan (annual budget) has to be approved by local assembly as a check on the proper management of the utility.

As Japanese water utilities are managed at arm length from the municipal government, they improve the capabilities of their staff by managing their own human resources development according to their needs, and reward staff for their performance.

[1] It is also called "a director general" in water utilities.

Example: Staff Recruitment at the Bureau of Waterworks, Tokyo Metropolitan Government (BWTMG)

There are two types of employees in a water utility in Japan: general staff and laborers for simple tasks. They have different compensation packages. General staff has to pass a civil service examination administered by the local government. Laborers are recruited based on the criteria of the water utility (at present there are very few such recruitments).

BWTMG used to hire its own workforce, recruiting laborers through local acquaintances or connections. In some cases, children of the farmer who lived in the expropriated land were employed for the construction of the new facility. Performance based incentives were available for meter readers and water tariff collectors.

BWTMG was able to improve its operation by giving incentives to meter readers and bill collectors according to the number of meters read and money collected.

(3) Technical Administrator

The Water Supply Act requires that a Technical Administrator be in charge of the operations of a water utility.

Article 19 of the Water Supply Act sets the requirement for a qualified Technical Administrator. The Technical Administrator must have a combination of formal education, training for qualification and practical experience in the water supply field.

The Technical Administrator is responsible for (1) inspecting whether or not water supply facilities meet facilities standards, (2) conducting water quality inspection and facility inspection when main water supply facilities are constructed, expanded and/or alternated, (3) conducting inspection to check if the structure and material of service connections meet standards, (4) periodical and extra water quality testing, (5) worker health checkups, (6) sanitary measures including disinfection with regard to management and operation of water supply facilities, and (7) emergency suspension of water supply, etc.

The success of water supply management in Japan can be attributed to both qualified Technical Administrators who are responsible for operations and executive managing directors who have the authority for institutional management.

(4) Checks & Balances and Interdepartmental Cooperation

Checks and balances are set in place in water utilities to reduce mistakes, prevent improper behavior or avoid concentration of power and foster cooperation. Utilities also establish and utilize task forces to address challenges and work together across organizations.

Checks and balances are important because decisions made in one department can affect other operations. Water utilities have reduced mistakes and prevented improper behavior by having a check-and-balance system within the organization. When dealing with specific challenges, task forces can be established by bringing together efforts across related sections.

Example: The Bureau of Waterworks, Tokyo Metropolitan Government

Meter reading and bill collection were assigned to separate units so that workers could not exploit their professional position for personal benefits. Other examples were separation of bill collection from accounting, and planning from field operations. During the period of high economic growth, the planning department proposed facility expansions and the finance department should balance these against other expenses in order to maintain the overall financial viability of the organization. Departments were required to understand each other's situation, accommodate and adjust to one another's needs. It took several rounds of discussion with involved parties to resolve an issue and the process would start over again for the next issue. The process was disclosed and forged cohesiveness and strong teamwork, and aligns competing interests to serve the ultimate common goals. The business has been operated in an effective manner by using the PDCA cycle.

BWTMG dealt with water leakage problems by having staff from related departments work together to come up with the practical measures.

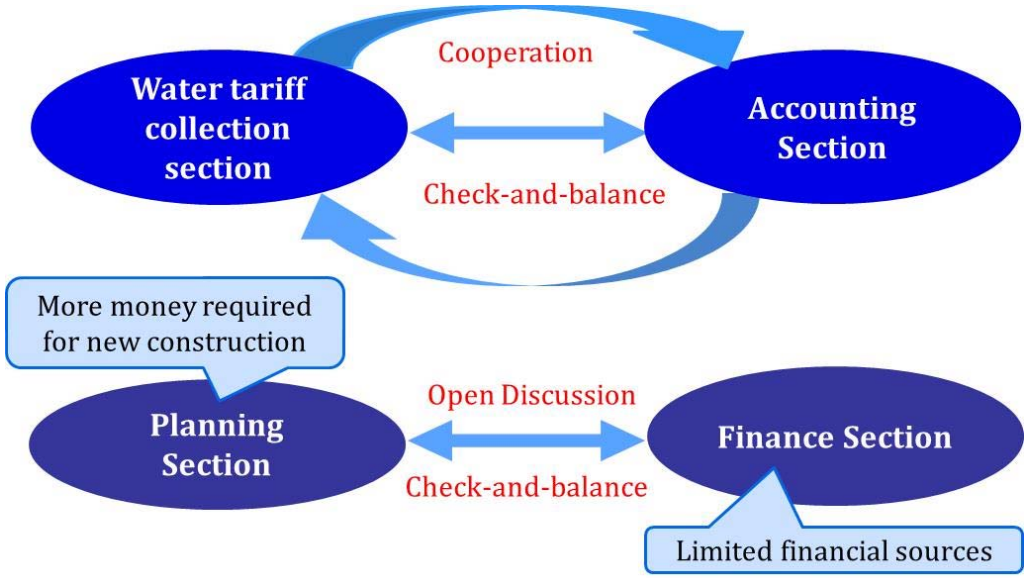


Figure 3. Concept of Check and Balance between Sections

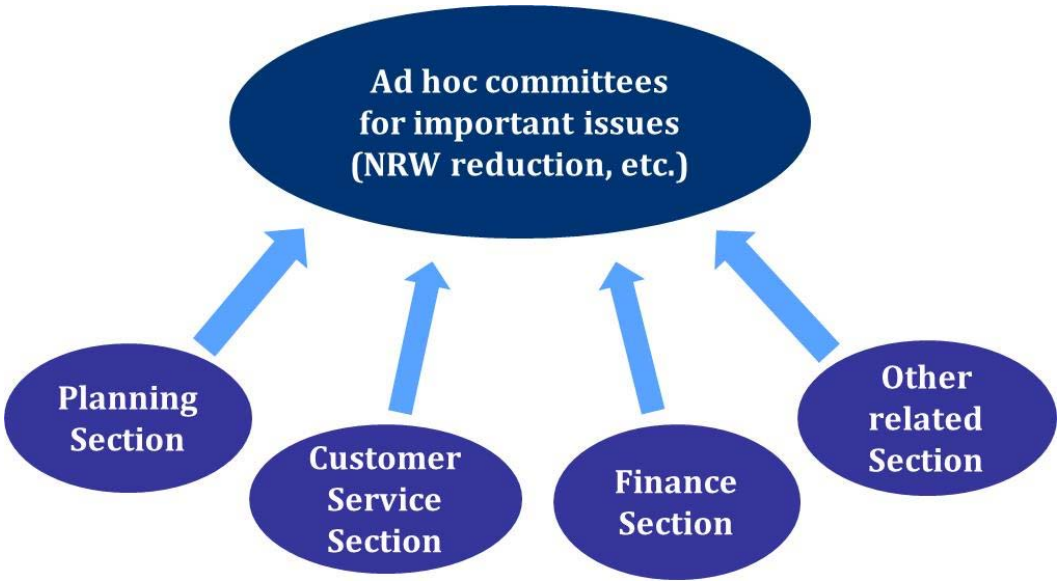


Figure 4. Concept of Ad hoc Committees for Dealing with Important Issues

(5) Advisory Committee

An advisory committee is a local government's auxiliary body that provides information and advice to assist the utility on governance issues such as policy development, financial problems, and decision making on matters of importance.

The advisory committee is an affiliated organization that conducts reviews, deliberations, and investigations on behalf of the local government. The composition and number of members in the committee is prescribed by local ordinance. Generally the committee is comprised of representatives from academia, business sector, citizen's groups and individuals selected from the public. They are tasked by the mayor or the executive managing director of the utility to report on consultations on important matters such as operation and management policy, or financial issues.

An advisory committee provides the opportunity for the utility to: (1) explain its operations, disclose details to demonstrate transparency and accountability; (2) secure objective external advice; (3) tap into expertise not available internally; and (4) engage the customers and the public to better understand their needs and secure their participation.

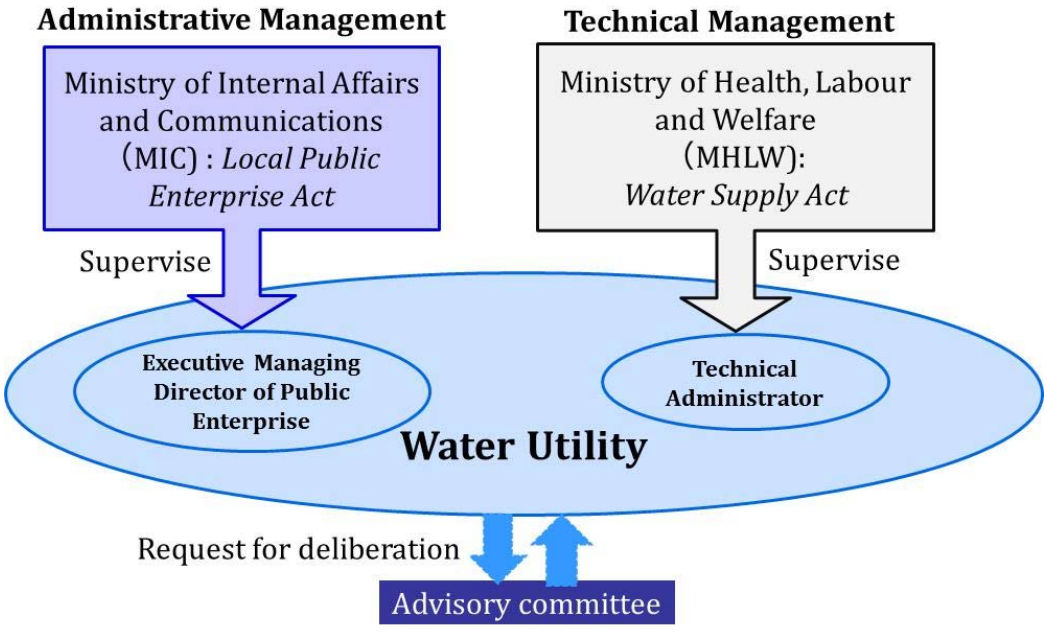


Figure 5. Concept of Governance of a Water Utility

3. Business Plans and PDCA Cycle

During the period when construction and expansion of water supply systems were required, water utilities constructed their facilities based on master plans. Currently, operation and maintenance is their main concern. The focus has shifted to improving the existing status by engaging in careful analyses and developing long term visions. PDCA (plan-do-check-act) is the iterative four step management method used to control and continually improve the processes and services in the water supply business.

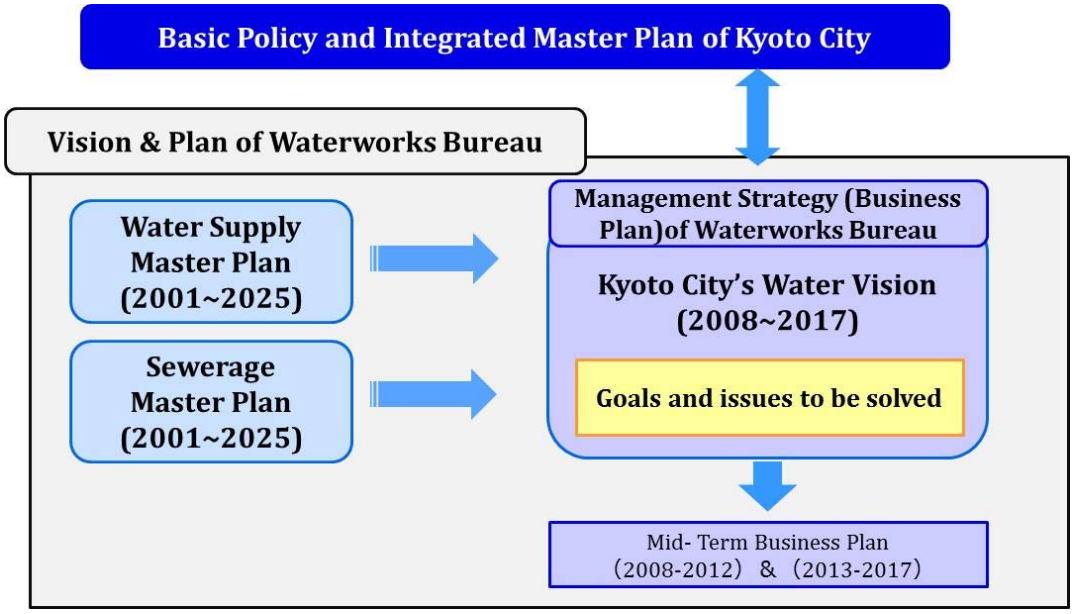
During the peak of water supply development in Japan, every water utility carried out construction of facilities according to its master plan. After the period of expansion, operation and maintenance became the main concern. Some utilities formulated medium and long term plans, analyzed and evaluated the present status and future projections; and presented a future vision and the road map to achieve the targeted outcomes. However, not all utilities have done so.

The Ministry of Health, Labour and Welfare (MHLW) stated the important issues and policies for future water supply in the "*Water Supply Vision*" in 2004. The *2005 Manual for the Development of Local Water Supply Vision* was prepared to systematically implement the Water Supply Vision. The Manual calls for the development of future plans by every utility. Utilities have to analyze their business environments and formulate their management strategies. The exercise can be summarized into the following steps: (1) analyze and evaluate the present business status; (2) set a future vision; (3) set medium and long term goals; (4) develop strategies to realize the future vision; and (5) set a review process to evaluate strategies, based on local conditions. Performance indicators (PIs) are recommended for the analysis and evaluation of present status. Asset management and the formulation of “water safety plans” and “earthquake-response plans” are mandatory in considering implementation strategies. Water utilities must establish a system to continually evaluate their progress and improve their performance. Plans should be revised based on the progress and feedback from concerned parties.

Example: Kyoto City Waterworks Bureau

Kyoto City prepared a Water Supply Master Plan (2001 - 2025) based on its Basic Policy for the period. In 2004, the water bureau and the sewerage bureau were consolidated into the Kyoto City Waterworks Bureau. In 2008 the "Kyoto City Water Vision (2008-2017)" was prepared to integrate water supply and sewerage plans and to describe the challenges and operational goals. 5-year management plans (2008 - 2012, 2013 - 2017) were subsequently prepared to explain the management strategy and targets for every year for achieving the vision.

The Bureau releases information on its annual operation policy, implementation plan and target levels. The Bureau promotes the public's understanding of its business and incorporates citizens' opinions in formulating its business plans. The status of various initiatives is available to the public on its website. Formulation of business plans can help clarify the goals of the organization and reaffirms these among managers and staff. The Bureau promotes the PDCA approach for analyzing, evaluating and improving performance and reflecting the results in the policy for next year. The PDCA cycle is very effective for this process.



Source: created from Kyoto City Waterworks Bureau, "*Kyoto City Water Vision*"

Figure 6. Kyoto City Water Vision and Related Plans

4. Human Resources Development

(1) National Initiative on Human Resources Development

The national government utilized higher education institutions concerning public health to develop the human resources required to develop water supply system in Japan.

The National Institute of Public Health under the Ministry of Health, Labour and Welfare trained the engineers required at the early stages of the national water supply development. These engineers worked in prefectural offices, provided technical advices to municipal governments and led the development of water supply facilities. Later, public health engineering departments were established in national universities and supplied the required expertise. The development of human resources in higher education institutions as a national initiative contributed to the successful nationwide water supply coverage in Japan. Subsequently, public and private universities began to offer courses on public health engineering to develop the capability in the water supply business.

Column: Department of Public Health Engineering, the National Institute of Public Health

The National Institute of Public Health was established under the Ministry of Health, Labor and Welfare in 1938 with financial assistance from the US Rockefeller Foundation for the research & development and training of public health engineers in Japan. Its Public Health Engineering Department became the first research body of public health engineering in the country. Until then, very few people acquired this expertise through formal training. In 1948, the first short-term training course (a 3-month course) on public health engineering was provided for engineers working in municipal water and sewerage or sanitation facilities. By 1970, 662 engineers completed the curriculum. They played substantial roles in the development of water and sanitation facilities.

(2) Human Resources Development in Water Utilities

Employees are trained mainly on the job (OJT; On-the-Job Training) and occasionally sent on courses offered by Japan Water Works Association (JWWA) and other organizations. Some utilities have in-house training centers and develop in-house instructors for knowledge transfer.

Utilities develop their staff capabilities on the job, supplementing this with training programs offered by JWWA and other related institutions. Only some large utilities have their own training centers and their programs are open to other utilities. Training in these various forms is continuous and systematic.

Example: Training at Nagoya City Waterworks and Sewerage Bureau

After World War II, staff working on restoration projects in Nagoya did not have the required training or skills. Nagoya City Waterworks and Sewerage Bureau faced an urgent need to secure labor force and improve their skills for the rapid expansion of water supply facilities. From the late 1950s to early 1960s the Bureau hired junior high school graduates and gave them one year training to develop the workforce. Later the training system was abolished and new employees were trained on the job by more experienced staff. The training became inconsistent and practical skills were taught without basic knowledge. The necessity for standardized training was recognized and the Technical Training Center was established in 1984.

The Technical Training Center identifies the knowledge and skill requirements within the Bureau, delivers standardized programs to constructors, and provides training for credentials as public officers.

Water leakage repair is conducted by private sector based on the qualification program in Nagoya City. Private company workers can be trained and certified through the Technical Training Center programs. The Center also provides training courses for staff from other utilities through JWWA programs and overseas participants of JICA training programs.

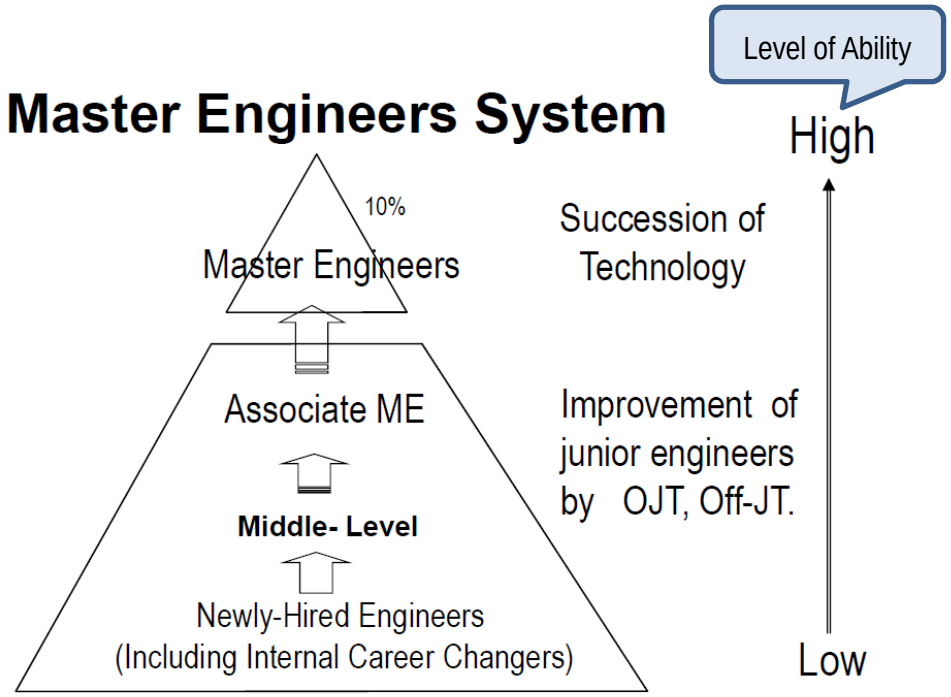
Senior engineers are assigned as full time trainers of the Center. As trainers are assigned in the Center, training courses are planned in cooperation with the job sites taking care not to lose touch with the current needs of the sites.

Source: Presentation materials by the Nagoya City Waterworks and Sewerage Bureau for "*The Third Executive Forum for Enhancing Sustainability on Urban Water Service in Asian Region, 2014*"

Photo 1. Training Program at the Technical Training Center of the Nagoya City Waterworks and Sewerage Bureau

Example: Human resources development at Yokohama Waterworks Bureau

Yokohama Waterworks Bureau develops its human resources along two converging tracks to achieve the knowledge and skill by setting clear goals for its employees. One track develops individual capability through OJT and other trainings. The other uses performance review for career development. Yokohama Waterworks Bureau has a Master Engineers System to mentor junior engineers as a part of succession planning.



Source: Presentation materials by the Yokohama Waterworks Bureau for "*The Third Executive Forum for Enhancing Sustainability on Urban Water Service in Asian Region, 2014*"

Figure 7. Master Engineers System

Column: Training Courses of JWWA and the Japan Small Scale Water Works Association

JWWA is a public interest corporation mainly for the members of Japan's water utilities and engages in research and standardization of water equipment, training programs and publications related to waterworks. The training offered by JWWA includes basic courses on water supply, workshops on water supply business administration, treatment plant equipment, leakage prevention, managing unpaid charges, earthquake response and technical administrator and executive managing director training.

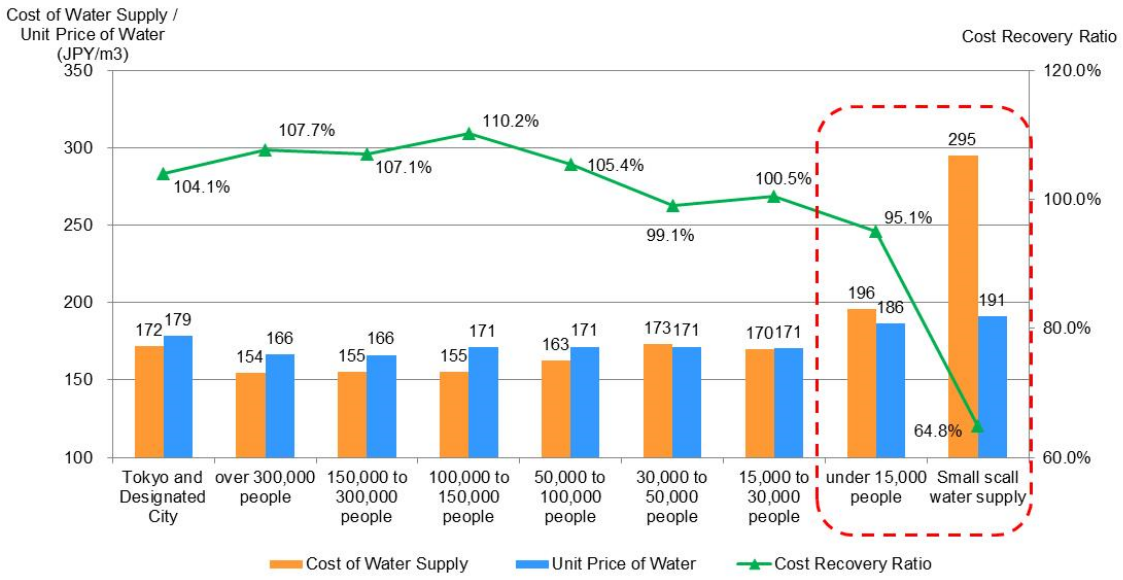
The Japan Small Scale Water Works Association, established to promote Small Scale Public Water Supply in 1955, provides annual training programs for staff of small-scale utilities and Public Health Centers.

5. Consolidation of Small- and Medium-scale Utilities and Regional Collaboration

(1) Challenges of Small- and medium-scale Water Supply Management

Small utilities usually do not collect enough tariff revenue to cover expenses. They also have staff shortages. Consolidation of these utilities can gain economies of scale. Merging of management and administrative functions or plant operations and outsourcing to private sector are also alternatives that can achieve improved efficiency.

It is important to achieve cost recovery based on tariff income. However, Figure 8 shows that the smaller the service population, the larger the relative service cost, making it impossible for small-scale utilities to achieve cost recovery by tariffs alone.



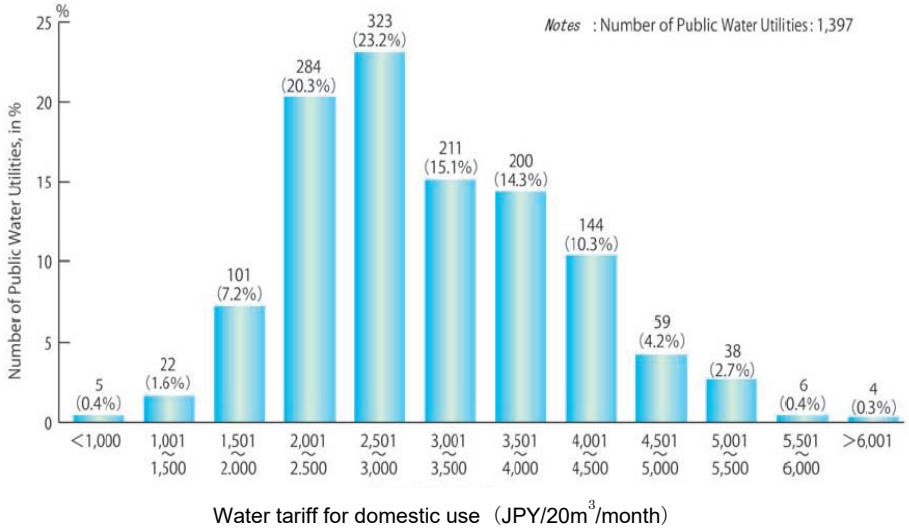
Source: Created from the data of Ministry of Internal Affairs and Communications, *"Survey of Financial Status of Local Public Enterprises, FY 2014*," http://www.soumu.go.jp/main_sosiki/c-zaisei/kouei26/html/mokuji.html

Figure 8. Cost Recovery in Water Supply Business by Size of Operation (2014)

Therefore, there is a problem of water tariff difference between water utilities. The national government has to address this by providing subsidy to Small Scale Public Water Supply. Small utilities also have the issue of lack of human resources. They have to consolidate their operations to gain economies of scale and/or outsource their tasks to a private company.

Column: Differences in Water Tariffs

The location, type of water source (groundwater, dam and Bulk Water Supply), degree of urbanization, category of customers, influence the water tariffs charged by the utility. The monthly average water tariffs vary among utilities, and the difference is more pronounced for the smaller utilities.



Source: JWWA, *Comfortable Life with Water Supply and Transition of Water Supply Volume*, http://www.jwwa.or.jp/shiryou/water/water.html

Figure 9. Number of Water Utilities by Water Tariff (2013)
(JPY/20 m^3/month, including Consumption Tax)

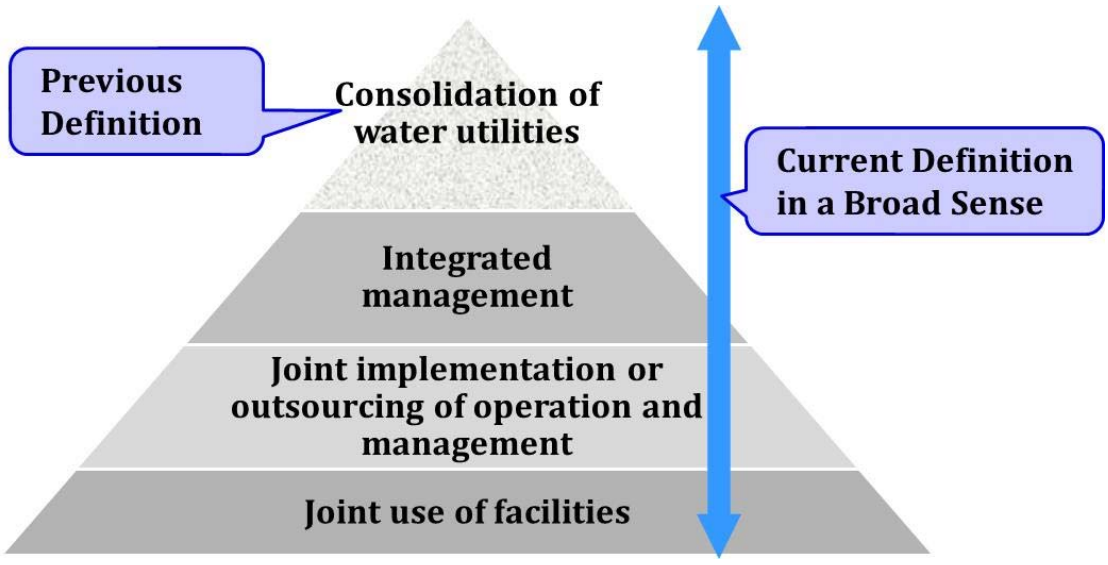
Utilities, with high capital expenses for new construction and upgrade under difficult conditions, need to generate substantial revenue. They can obtain financial resources from the general account of the local governments and allocate from local taxes to avoid higher tariffs.

(2) Towards Regional Collaboration

Bulk water supply system was established in the reorganization of water supply in Japan. Subsidies for the consolidation of water utilities were also provided. The concept of regional collaboration explores various means of integrated management and administration of water utilities.

In the mid-1960s, water supply services in Japan was facing issues such as rising demand, higher construction costs, pollution of water sources, inadequate operation and maintenance of small utilities. Initiatives at the local and national government levels were undertaken to resolve these issues. In 1966, part of the Local Public Enterprise Act was revised and the Water Supply Authority System was established (Paragraph 1, Article 39-2 of the Local Public Enterprise Act), and water supply authorities began to provide bulk water supply to some water utilities. The national government granted subsidies to promote restructuring and consolidation of utilities. However, more needed to be done.

In 1977, the Water Supply Act was revised to incorporate a plan to consolidate water utilities. Consolidation through Bulk Water Supply System was only implemented for a small part of the country. By the early 2000s, the policy was expanded from consolidation to integrated management and sharing of facilities. The Water Supply Act was revised again in 2001 and introduced the system for delegation to a third party. This opened the way for securing services from large utilities and the private sector. (See Figure 10)



Source: JWWA "*Guidelines for the Consideration of Broadening of Water Supply: For the Promotion of Water Supply Vision*"

Figure 10. Previous and New Definition of Regional Collaboration

(3) Constraints on Consolidation

Consolidation of water utilities has many challenges: disparities of facilities development, water tariffs and other administrative aspects, differences in operational issues, local politics, legal systems and procedures.

Consolidation would secure stable water sources, improve management efficiency and gain savings in sharing operations. However, there are many challenges. There are big differences between water utilities in terms of facilities, operational procedures, water tariff structure, priority issues, local government control and legal provisions. Utilities had to work out these differences with the help of national subsidies, before integration can take place successfully. “Program for Promotion of Consolidation of Water Utilities” started in 2010 provides subsidies for small utilities (population served is less than 100,000) to rehabilitate aging facilities when they are consolidated. Large utilities or bulk water supply authorities, which consolidate small utilities, are also provided subsidies to construct and/or rehabilitate their facilities under the Program.

There is much to be gained by merging smaller utilities with a large one to raise the level of service in the region. Okinawa is making a moderate shift from coordination to consolidation with the Okinawa Prefectural Enterprise Bureau providing technical support to small utilities including those on surrounding islands.

However, the process requires time and efforts for difficult adjustments, compromises and building of consensus among stakeholders including customers of water supply. At the initial planning stage for water supply developments, especially for small utilities, consideration should be given to serve a wider area, to gain the economies of scale in terms of operation and maintenance and performance.

6. Private-Public Partnership

(1) Public Ownership Principle of Water Supply

Water supply facilities have been owned and developed by waterworks bureau or waterworks department of municipalities in Japan.

During the early stages of water supply development, public funds were not enough to cover the construction costs of facilities. Private investments were used when the recovery of investment and satisfactory returns could be expected. However, the private companies had only distributed water and public health concerns such as water quality, were not inherent responsibilities for private companies. The Waterworks Ordinance proclaimed in 1890, gave the ownership and public health responsibility to the municipalities. Water utilities developed facilities by securing public funds with favorable conditions depending on their creditworthiness as public enterprises.

(2) Increasing Roles of Private Sector

Utilities in Japan used to rely on their own staff and expertise to carry out all their tasks such as design and construction. Over time more and more operations are entrusted to private enterprises to gain efficiency.

The involvement of the private sector in the water supply business started with construction of facilities. Before the World War II, most constructions were implemented directly by water utilities. These were gradually commissioned to private companies.

The Federation of Water Authorities (the predecessor of JWWA), formulated the first standards for cast iron pipes in 1914. Since 1928 JWWA has conducted inspections of materials on behalf of water utilities. In 1962, MHLW issued the notice on “the Use of Materials for Waterworks” requiring the use of standardized products that passed inspections. Private companies often work with utilities to develop better materials and equipment through joint research and experiments. These developments contribute to more efficient operation and maintenance and the improvement of services.

The first consulting firm for planning and design of water supply facilities was established in 1951 and many more were established thereafter. Utilities with no in-house expertise could

contract out the planning and design. This has helped to expand the coverage of water supply, especially for utilities in small- and medium sized cities. A qualification system for consulting engineers engaged in planning and design was introduced in 1957, with the passage of the Professional Engineer Act.

The legislated standards and regulations and certification systems, combined to guarantee the high quality of the private sector contributions to the development and operation of the water supply systems.

The Bureau of Waterworks, Tokyo Metropolitan Government (BWTMG), the Yokohama Waterworks Bureau (YWB) and other utilities brought the involvement of the private sector to another level by investing in companies or establishing joint ventures for some of their operations. TSS Tokyo Water Co., Ltd., established in 1987, with 51% BWTMG ownership managed the distribution networks, water purification facilities, technical development, and procurement of equipment and materials as well as related consulting and investigative tasks. Yokohama Water Co., Ltd. 100% owned by YWB was established in 2010 and is responsible for the utility's management, operation, design, construction, investigation, testing and training.

Column: History of Domestic Products for Water Supply

During the early stages of waterworks in Japan, western technologies and products were widely used. The use of domestic technologies and products began to take off after 1912. Good quality cast iron pipes were manufactured in six companies, including Kubota Iron Works Co., Ltd. After the Federation of Water Authorities set the standards for cast iron pipes in 1914, production started in Kurimoto Ltd. Soon after almost all products were supplied domestically. In 1913 water meters were manufactured for the first time domestically. Since then Osaka Machinery Works (present OKK Corporation) and Kimmon Shokai (present Azbil Kimmon Co., Ltd.) have been manufacturing water meters. The manufacturing of water spiral pumps began in 1915. Ebara Corporation, Hitachi, Ltd. and Mitsubishi Zosen (present Mitsubishi Heavy Industries, Ltd.) are producing pumps as good as any foreign products.

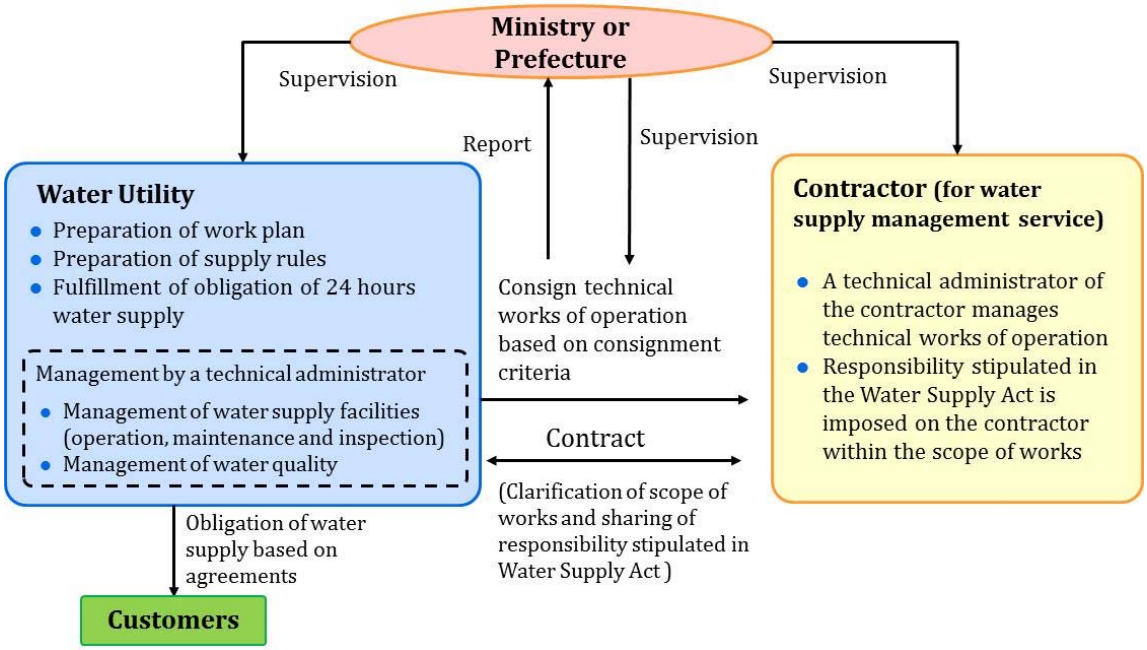
Private companies worked closely with utilities in the rapid expansion of water supply systems to meet the rising demand. In 1966, the Federation of Japan Water Industries, Inc. was formed to foster the development of the water industry including industrial water and sewage management.

(3) Third-Party Consignment

The third-party consignment system was established in 2001 to allow a third party other than the water utility and users to implement technical operations related to the management of water supply.

Since the 1960s, many water utilities have been outsourcing meter reading, tariff collection, counter services, water quality testing, maintenance of measuring devices, computers, electric and machinery equipment. These operations are entrusted under the discretion and responsibility of each utility.

The Water Supply Act revision in 2001 sets the legal framework for the commissioning of technical operations with the liability to a third party (Figure 11). In third-party consignment, regulations of the Water Supply Act are applied to the contractor within the scope of the commissioned work under the direct supervision of the national or prefectural government, which can impose penalties to the contractor.



Source: Ministry of Health, Labour and Welfare "*Third-Party Consignment for Water Supply*"
http://www.mhlw.go.jp/topics/bukyoku/kenkou/suido/kaisei/gaiyo/2-2.html

Figure 11. Framework for Third Party Consignment

(4) Designated Administrator System

The Designated Administrator System allows the comprehensive management of the administrative, financial and technical operations of public sector utilities by private companies, incorporated foundations, or NPOs.

The Designated Administrator System was introduced in 2003. Local governments can commission the operation and management of public facilities to private enterprises, foundations, or NPOs in a comprehensive manner with approval by the local assembly. Until then, only the corporation receiving capital contribution from a local public body was allowed to undertake the operation and management of public facilities.

The system has two contract types: tariffs based on usage (independent accounting system) that is received directly by facilities operated and maintained by the designated administrator; and commission-based tariff in which facility management fees are paid by the local government to the designated administrator.

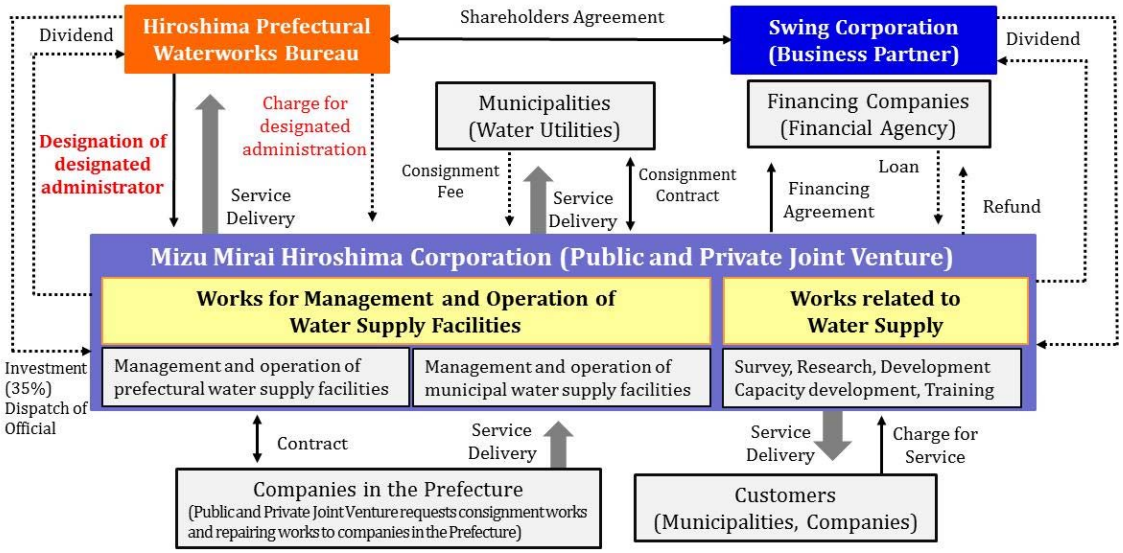
The procedures are more complicated than third-party consignment as the system requires amendment of ordinances and approval by the assembly of local government. Therefore it is less often used in the water supply sector. However, while the scope of third-party consignment is limited to technical operations, all operations of a utility can be commissioned under the Designated Administrator System. Hiroshima Prefectural Public Enterprise Bureau took advantage of both systems in the management of its operations.

Example: Mizu Mirai Hiroshima

Hiroshima Prefectural Government had issues such as declining water demand, rising costs for replacement of aging facilities and attrition of skilled workers. The Prefectural Government contracted operation and maintenance of the water treatment plants of its bulk water supply and industrial water supply to a private company. The scope of work was determined in detail at the bidding process. The tasks of the private company were limited under this arrangement and it was difficult for the company to propose and promote innovative ideas. Furthermore, the consolidation of water utilities to which the Prefectural Government supplies bulk water was not fully implemented due to the difference in water tariffs and slow progress of the initiative.

Therefore, to establish integrated management for regional collaboration of water utilities the

public-private consortium (Mizu Mirai Hiroshima Corporation) was established between the Prefectural Government and the private company, using the third-party consignment system and the designated administrator system.



Source: Mizu Mirai Hiroshima Corporation "*Joint efforts of citizens in Mizu Mirai Hiroshima*", Water Technology Journal, October 2014.

Figure 12. Functional scheme of Mizu Mirai Hiroshima Corporation

Mizu Mirai Hiroshima became the designated administrator of the Prefectural Government's waterworks, and makes use of the know-how and technical skills of the public and private entities. The Prefectural Government retains the authority for water tariff design, facility ownership and licenses for water use (the water rights). Mizu Mirai Hiroshima is in charge of the operation and maintenance of water supply facilities and water quality management. The Prefectural Government is responsible for the company's compliance with the operation and business standards and has developed a monitoring system with which it can provide guidance as needed.

(5) Private Finance Initiative (PFI)

PFI is a way of establishing public-private partnerships for construction, operation & maintenance and management of public facilities by funding public infrastructure projects with private capital and by utilizing technical and management capabilities of the private sector in Japan.

The Act on Promotion of Private Finance Initiative (the PFI Act) came into effect in 1999. Construction, operation & maintenance and management of public facilities can be conducted using funds, management and technical capabilities of the private sector. Unlike the third-party consignment and the designated administrator system, funds are procured by private entities, not the utilities. Utilities can limit their fiscal expenditures for the development of facilities. It is not necessary for a utility to pay construction costs during construction periods (a short-term), but the utility pays fixed contract prices on a regular basis during the PFI contract period (a long-term). BWTMG developed power-generating facilities (cogeneration system) in their water treatment plants in Asaka and Kanamachi using the PFI scheme. Many facilities have been developed by PFI.

PFI projects from design and construction to operation and maintenance have long term contracts that involve many diverse and complex elements with respect to the technical, legal and financial aspects of the business. The MHLW *"Guideline for introduction of PFI projects in waterworks*" and local government guidelines are available to assist with the smooth implementation of PFIs.

In PPP projects private sector contributions include supply of qualified engineers and management capability, and improved efficiency. It is necessary to give serious consideration to the necessity and rationale (such as proactive use of new technologies, procurement of materials at lower costs, streamlining of personnel) before commissioning to a private company. A clear plan on how to achieve the organizational objectives must be developed. The public health concern and the monopolistic nature of the water supply business also require a robust legislative framework to ensure the delivery of safe, reliable and affordable services. Identification of risks and their allocations with the private partners are also required for PPP projects.

7. Lessons Learned

The following Japanese experience could be useful for other countries.

- **(Governance of Water Utilities)** In Japan, water utilities are managed as independent public enterprises, under the supervision of the local governments. They are responsible for their own human resources management, having the ability to improve staff competence. They could provide incentives to achieve more efficient management when they promoted expansion of water supply facilities. The job and qualification of the technical administrator is clearly defined and the utilities take the responsibility for all technical matters and for managing the operations effectively. It is important to give water utilities the authority for management including technical matters.

- **(Supervision by the Local Government)** While a utility is independent in its operations, the local assembly maintains the oversight responsibility through the approval of annual budgets and business plans. An advisory committee supports the utility's management by providing opinions and recommendations.

- **(Business Plan and PDCA Cycle)** In the past business plans focused on new construction and facility expansion. Now there is more emphasis on asset management, water safety plans and earthquake-resistance plans in Japan. The business plan guides the utility's staff towards a goal to promote more effective operation. By following the PDCA cycle from a plan to check, the utility also reinforces the operational system.

- **(Training)** In addition to subsidies and the development of technical guidelines/standards, human resources development has been essential to the establishment and operation of water supply systems across the country. Research institutions and universities provide formal training to develop the required expertise. It is necessary for utilities to establish internal training systems and utilize external training programs for sustainable human resources management.

- **(Regional Collaboration)** When constructing water supply systems, sustainability of operation and management after construction needs to be considered. Small-scale utilities built during the implementation of nationwide water supply coverage generally face difficulties with cost recovery and staff shortage. Consolidation and collaboration of operations across a region are the ways to improve the economies of scale and are promoted utilizing the national subsidies.

- **(Private Sector Involvement)** During the early stages of water supply development, private investments were used in Japan. However, the private companies had only distributed water and public health concerns such as water quality, were not inherent responsibilities for those private companies. Then, the ownership and public health responsibility were given to the municipalities. Water utilities of municipalities implemented all works by themselves at first. The private sector began to be involved first in the construction of facilities, then gradually in design, meter reading and operation of water treatment plants. Currently, private consignments on management are promoted.

- **(Regulatory Framework)** As the private sector is getting more involved in the water supply business, qualification system, standards and regulations are established to maintain the quality of products and services without compromising competitiveness, fairness and transparency. A transparent system for supervision is also needed to ensure compliance to regulations on quality of service in the delivery of safe, affordable drinking water. The roles and responsibilities of public and private partners (risk allocation) must be always clearly stated in the contract.