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FY2016

Report on a Study of International Cooperation in the Water Supply Sector

— Policy Direction for Measures Aimed at Meeting Targets for 2030 —

March 2017
Japan International Corporation of Welfare Services
JICWELS

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Chapter 1 Policy for the FY2016 Study of International Cooperation in the Water Supply Sector

1–1 Details of the Study

1) Past studies (as of last year)

Japan continues to provide international cooperation in order to promote sustainable development in the water supply sector. Its initial cooperation activities focused on providing direct assistance for the construction of waterworks facilities, but this quickly revealed that providing assistance in facility construction and maintenance alone had only a limited effect. Japan then redirected its focus to the development of human resources. This change of course was well received, and the project is being adopted as a model case study for international cooperation in other fields. In recent years, Japan has also started providing assistance in the area of business management in terms of, for example, the strengthening of companies' financial bases and the formulation and appropriate management of phased maintenance plans.

Through the Study Committee on International Cooperation in the Water Supply Sector that was established under this project, Japan's Ministry of Health, Labour and Welfare (MHLW) has been conducting studies and making proposals focused on providing assistance for the development of soft infrastructure. A report on the results of an examination of the issues to be studied was issued by the Review Committee for International Cooperation Projects (Water Supply Sector) in FY2006. This report suggested that activities be implemented using two approaches: (1) the development of human resources that will play a role in international cooperation and (2) the realization of a comprehensive approach to the provision of assistance.

In light of this, studies conducted between FY2009 and FY2011 proposed measures for improving training efficiency, training systems and training organizations through an investigation of various training programs. The FY2012 study was conducted to facilitate discussions on what type of system should be employed to provide assistance for the planning and operation of water utility businesses. The study suggested that projects be introduced in two ways: (1) through measures developed from a facility and a financial perspective, such as providing assistance for the operation and maintenance of overall water operations so as to strengthen a country's fragile financial base, and (2) through a phased system for maintenance and planning that suits the conditions of the individual country or territory. The FY2013 study was focused mainly on the collection and analysis of information concerning financial affairs. This study also proposed the following as desirable methods of providing assistance for the improvement of the water utility business: measures for increasing service revenue, ideas for reducing costs through the streamlining of operations, and methods for utilizing external funding.

The FY2014 study proposed an analytical method for assessing the management circumstances of the water utility businesses in each country, which is a prerequisite for providing assistance, from three perspectives: governance, personnel systems and the financial base. Finally, the FY2015 study organized international cooperation projects carried out by Japan in the water supply sector and summarized proposals on how to communicate and publicize cooperation project outcomes both in Japan and overseas.

2) Background to the theme selected for the FY2016 study

The ODA Charter, which set out the principles and basic rules for Japan's provision of official development assistance (ODA), was revised in February 2015 to produce a new document called the "Development Cooperation Charter." This new charter emphasizes the importance of broader cooperation involving the provision of ODA by not only the central government, but also local governments, the private sector and non-government organizations (NGOs). It also addresses the importance of providing comprehensive assistance that promotes autonomous development in developing countries through the provision of assistance for the development of soft infrastructure (e.g., building capacity in terms of operational management, human resources, and legal systems) as well as hard infrastructure. International cooperation in the water supply sector needs to be promoted from the perspective of the Development Cooperation Charter, as well.

In September 2015, the United Nations adopted the Sustainable Development Goals (SDGs) to replace the Millennium Development Goals (MDGs) as development goals for the international community. The SDGs are actually even more demanding than the MDGs in many respects, as they set goals for advanced countries as well as developing countries, expand the range of sectors that are covered and the targets, and emphasize process management guided by discussions rather than by the leadership of the United Nations. For the water and sanitation field, monitoring is conducted with consideration given to service standards and water-use efficiency has been added as a target. This is consistent with Japan's international cooperation activities in the water supply sector which are intended to improve water quality, enhance management in the water utility business and reduce water leakage. Furthermore, a Partnership for Quality Infrastructure was announced in May 2015 that positioned investment in the water sector as one area.

Given this, a review is being conducted to determine the basic course of action that should be adopted in light of trends in international cooperation initiatives around the world that involve the Japanese government and the United Nations. Under Japan's Development Cooperation Charter in particular, although international cooperation remains the foundation for development assistance, the focus has now shifted to contributing to the achievement of SDGs. Consequently, this is the ideal time for Japan to summarize its efforts to date and to identify sectors and directions that will need to be revised in future initiatives.

3) Direction adopted for the FY2016 study

Taking advantage of the opportunity presented by the review being carried out to assess the basic policy for how Japan and other nations should provide international cooperation, the FY2016 study will confirm the progress that has been made with regard to the ten-year initiative that was proposed in the FY2006 study, which was one of various past international assistance studies conducted to assess international cooperation in the water supply sector. It will also look at the proposals that have been made since then and the perspectives identified in the International Assistance Charter and SDGs.

Following this, an overview of the status of international cooperation projects that have been conducted in the water supply sector over the past decade will be prepared, and the current status of nations to which international cooperation was provided continuously in the water supply sector during this period will be studied to examine how these projects were promoted. Once this has been

done, matters to be revised or added for the promotion of international cooperation will be considered.

Based on the results of the above, a study will be conducted to assess the priorities and a road map will be formulated for the next fiscal year onwards for the specific measures to be implemented.

4) Summarization method

The major objective of the FY2016 study is to identify themes that need to be addressed. Broader targets will be ascertained using the MECE [1)] principle and the target issues will be identified based on the 5W1H concept. With the exception of "When?" (as the target year has already been set in the SDGs as 2030), studies will be conducted under the following categories: "What?"; "How and where?"; and "Who and with whom?" The specific categories for the study are as follows.

- What? Concrete measures for providing international cooperation in the water supply sector
- How? Methods for evaluating the results of measures and initiatives, and the setting of goals based on these results
- Where? Priority regions for activities and initiatives
- Who? Recruitment and development of human resources (e.g., water supply experts) involved in international cooperation activities
- With whom? Cooperation with parties involved in the water supply sector and other sectors

1–2 Task Force for the Study

1) Committee structure

This study was conducted over a one-year period and a report of the study was drawn up through deliberations undertaken at the three meetings held by the Study Evaluation Committee that was established for this purpose. The committee members and the schedule for the committee meetings held in FY2016 are as follows.

Study committee members

Hidetoshi Kitawaki	Toyo University
Hiroki Kusano	Bureau of Waterworks Tokyo Metropolitan Government
○ Shoichi Kunikane	(Former Professor of the Institute for Environmental Science, University of Shizuoka)
Masaki Sagehashi	National Institute of Public Health
Keisuke Sonoda	Saitama City Waterworks Bureau
Satoshi Takizawa	The University of Tokyo
Daigo Takeda	Kitakyushu City Water and Sewer Bureau
Daisuke Nakamura	Yokohama Water Works Bureau

1) An abbreviations of "Mutually Exclusive, Collective Exhaustive," MECE represents the concept of avoiding overlaps and omissions. With this methodology, attention is paid to avoiding omissions and overlaps when categorizing items, investigating matters and organizing factors.

Shigeyuki Matsumoto	Japan International Cooperation Agency (JICA)
Ikuo Mitake	Japan Water Works Association (JWWA)
Tatsuo Morimoto	Japan Water Industries, Inc., Pacific Consultants Co., Ltd.

(○: Chairperson)

Secretariat

Tomoyuki Ozuru	Ministry of Health, Labour and Welfare (MHLW)
Hiroyuki Yamaya	Ministry of Health, Labour and Welfare (MHLW)
Takafumi Nakayama	Ministry of Health, Labour and Welfare (MHLW)
Hiroaki Shoji	Ministry of Health, Labour and Welfare (MHLW)
Yuji Kubo	Ministry of Health, Labour and Welfare (MHLW)
Tetsuo Abe	Japan International Corporation of Welfare Services (JICWELS)
Takeo Yamaguchi	Japan International Corporation of Welfare Services (JICWELS)
Miyu Hayashi	Japan International Corporation of Welfare Services (JICWELS)

2) Schedule for the committee meetings

The Study Evaluation Committee held meetings in FY2016 on the following three dates.

- 1st meeting Tuesday, October 4, 2016
- 2nd meeting Tuesday, January 10, 2017
- 3rd meeting Monday, March 13, 2017

Domestic research

- From September 2016 to March 2017

Overseas research

- From November 20 to 27, 2016

Chapter 2　Goals and Indices for the Water Supply Sector

In this chapter, the direction to be taken for providing international cooperation in the water supply sector is confirmed by organizing the policy goals of recent international cooperation projects as a prerequisite for this study—which includes future courses of action specified in the Development Cooperation Charter, SDGs, etc.—and confirming the initiatives undertaken by the Tokyo International Conference on African Development (TICAD) and water forums held in Japan and other parts of the world.

2–1　Development Cooperation Charter

The Development Cooperation Charter was established when the ODA Charter, which set out the principles and basic rules for Japan's provision of official development assistance (ODA), was revised in 2015. Its main characteristics include an emphasis on broader cooperation involving not only the Japanese government, but also local governments, the private sector and NGOs. It also addresses the importance of providing comprehensive assistance that promotes autonomous development in developing countries through the provision of assistance for the development of soft infrastructure (e.g., building capacity in terms of operational management, human resources, and legal systems) as well as hard infrastructure.

The basic policy covers three points: contributing to peace and prosperity through non-military cooperation, promoting human safety and security, and providing assistance that promotes autonomous development based on self-help assistance and Japan's own experience and expertise. Focused policies are established in accordance with these points.

Focused issues are then identified within these focused policies. Issues related to water supply include first of all the provision of safe water and sanitation as a form of "assistance that is necessary to promote human-centered development that will support people's basic lifestyles" under the category of "(A) quality growth that will help to eradicate poverty." They also include promoting a sound water cycle as a target initiative under the category of "(C) establishment of a sustainable and robust international society through measures that address worldwide issues."

Subsequent policies that are focused of individual regions include providing assistance for the establishment of both hard and soft infrastructure (including the strengthening of connectivity), particularly within the Association of Southeast Asian Nations (ASEAN) region, as well as the execution of projects for improving infrastructure in developing small-island states in South Asia that suffer from insufficient water.

As described above, a key characteristic of the Development Cooperation Charter is its emphasis on pursuing wide-ranging collaborations with other sectors. The statement given below appears in the following part of the Development Cooperation Charter: (b) "Cooperation that takes advantage of Japan's strengths" under (A) "Principles for effective and efficient development cooperation" of (1) "Implementation principles" in "III. Implementation."

> In implementing development cooperation, Japan will proactively adopt proposals from various actors in the private and other sectors. It will also work with universities and research institutions to make good use of their expertise and seek out their untapped capabilities. Japan's assistance in infrastructure development will not be limited to constructing physical infrastructure. It will also address the non-physical aspects that encompass developing

systems for operating and maintaining such infrastructure as well as human resources development and institution building. Such an integrated approach will enable active utilization of Japan's experience and expertise.

Information on the intention behind collaborations involving the public and private sectors, international agencies, other donors and civil society is provided in the next sub-section of the Development Cooperation Charter, "(2) Implementation arrangements."

2–2 Sustainable Development Goals (SDGs)

(1) The aims and background of the development of SDGs

In the 1980s, many developing countries adopted structural adjustment-based development methods, which are reliant on market economy mechanisms. However, these methods did not prove to be effective, and in some cases they actually caused a worsening of poverty. The consensus reached at the 1995 World Summit for Social Development was to focus on the need to place people at the center of development activities, and a goal was set to reduce the proportion of people living in absolute poverty around the world by half. In 1996, the International Development Goals published by the Organisation for Economic Co-operation and Development (OECD) were adopted, one of which was to halve the proportion of people living in extreme poverty by 2015.[2)] As development goals with clear, simple targets that have specific deadlines, the Millennium Development Goals (MDGs), which integrate people-centered approaches to development in wide-ranging manner, became the standard for policy making, resource distribution, and other issues in the international community. Of the many targets laid out in the MDGs, the following was adopted as Target 10 for the water sector: "Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation."

Since the establishment of these goals, the following problems have been identified: the issues have become more complicated; the response to globalization; a failure to notice disparities within the country due to the use of macroeconomic statistical indicators only.

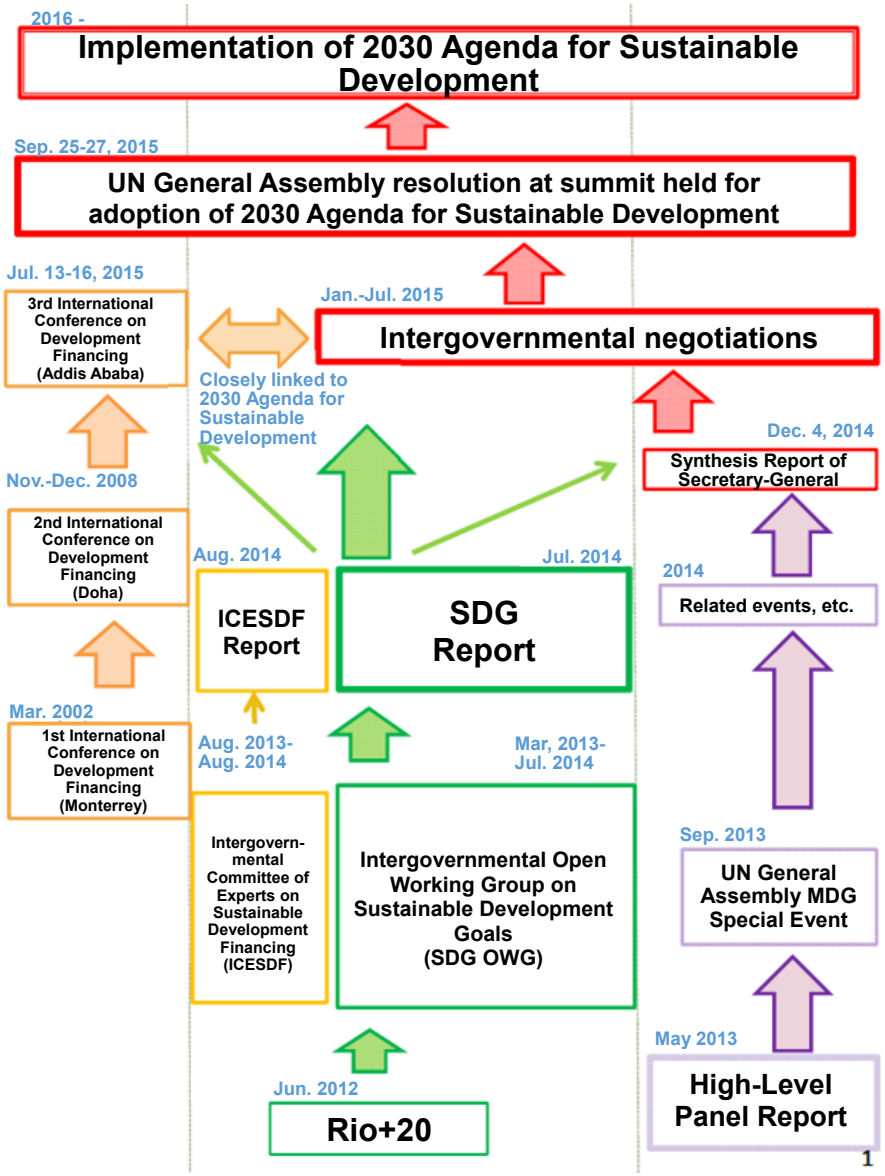
In light of this, United Nations (UN) Secretary-General Ban Ki-moon announced in July 2012 the members who had been appointed to a High-Level Panel set up to provide advice on the post-2015 development agenda. The panel was co-chaired by UK Prime Minister David Cameron, Indonesian President Susilo Bambang Yudhoyono, and Liberian President Ellen Johnson Sirleaf, and its 27 members were selected from UN member governments, the private sector, academia, community leaders, and the like, taking into consideration the need to ensure geographic and gender balance. The members attended meetings of the panel in their private capacities, discussed the vision and direction for the post-2015 development agenda and submitted a report on these matters to the Secretary-General at the end of May 2013. At a special MDG event held at the UN General Assembly in September 2013, the post-2015 development agenda was discussed based on the report provided by the High-Level Panel and the Secretary-General's evaluation.[3)] In October 2013, the United Nations Secretary-Generals' Advisory Board on Water & Sanitation (UNSGAB) developed the "Hashimoto Action Plan III," which recommended that specific targets for water should

2) Ministry of Foreign Affairs, Japan (http://www.mofa.go.jp/mofaj/gaiko/oda/doukou/mdgs/about.html)
3) Ministry of Foreign Affairs, Japan
(http://www.mofa.go.jp/mofaj/gaiko/oda/doukou/mdgs/p_mdgs/index.html)
UNDP (http://www.undp.or.jp/publications/pdf/millennium2012_11.pdf)

definitely be included as part of the post-2015 development agenda.[4)] In December 2014, Secretary-General Ban Ki-moon published a Synthesis Report of the Secretary-General on the post-2015 development agenda.[5)]

In 2012, development issues that supplement the MDGs (later known as SDGs), which were set to end in 2015, were discussed at the United Nations Conference on Sustainable Development (Rio+20). At this conference, it was decided that SDGs should be integrated as a program that is consistent with the post-2015 development agenda and that a 30-member Open Working Group (OWG) should be established to discuss the relevant issues. In January 2013, the vision for the post-2015 development agenda was discussed at a meeting of the UNSGAB,[6)] and a meeting of the OWG for the water and sanitation fields was held in May 2013.[7)] In July 2014, an outcome document was released in which the OWG proposed 17 goals and 169 targets.

4) Ministry of Land, Infrastructure, Transport and Tourism, Japan; "Outline of the United Nations Secretary-Generals' Advisory Board on Water & Sanitation"
(http://www.mlit.go.jp/river/kokusai/international/shimon/pdf/23gaiyou.pdf)
UNDP (http://www.undp.or.jp/publications/pdf/millennium2012_11.pdf)
5) Provisional translation by IGES; "Synthesis Report of the Secretary-General on the Post-2015 Development Agenda"
(http://pub.iges.or.jp/modules/envirolib/upload/5541/attach/UNSG's_Synthesis_Report_JP_IGES_translated_final.pdf)
6) United Nations Department of Economic and Social Affairs
(http://www.un.org/en/development/desa/usg/statements/mr-wu/2014/06/unsgab-opening-remarks.html)
Sustainable Development Knowledge Platform
(https://sustainabledevelopment.un.org/content/documents/1817UNSGAB_post2015_brief.pdf)
7) Sustainable Development Knowledge Platform (https://sustainabledevelopment.un.org/owg3.html)



Source: Ministry of Foreign Affairs website (http://www.mofa.go.jp/mofaj/gaiko/oda/files/000115355.pdf)

Figure 2.1: Establishment of the 2030 Agenda for Sustainable Development

During the review of the post-2015 development agenda, one of the important issues that was raised besides the developmental goals and targets was how to secure the necessary funding. The International Conference on Financing for Development has been hosted by the UN since 2002, and at the third of these conferences, which was held in July 2015, the participating countries carried out review work focused on securing funds for the post-2015 development agenda. The Addis Ababa Action Agenda, which was adopted during the plenary session of the conference, states that under the global framework for financing the post-2015 development agenda, partnerships for sustainable development should be led by national governments and supported by multi-stakeholders while taking various needs into consideration. Specific policies and actions are to be implemented in accordance with the framework.

The issue of funding for post-2015 development agenda was also discussed at the Intergovernmental Committee of Experts on Sustainable Development Financing (ICESDF), which was established in August 2013 in a follow-up to the United Nations Conference on Sustainable Development (Rio+20).

In light of these developments, negotiations involving 193 UN member states were begun in January 2015, and during these negotiations, talks were also held with private businesses and community representatives. In September 2015, the agenda was adopted at the UN Sustainable Development Summit.[8)]

(2) Organizing the transition from MDGs to SDGs

SDGs were established based on the experience and lessons learned from MDGs.[9)] A comparison of both these sets of goals reveals that while MDGs focused on raising living standards in individual developing countries through UN-led initiatives with an emphasis on reducing poverty, SDGs are universal goals that apply to all countries, whether advanced or developing. One characteristic of SDGs is that they set out specific quantitative goals for new, urgent issues that were not sufficiently addressed in MDGs (e.g., combat climate change, conserve biological diversity, address rising unemployment rates, curb food price rises, and tackle growing income inequality).

In the MDs, the water sector was set as a target under the environmental goals. In the SDGs, however, the water sector is classed as an independent goal, with targets set for not only the drinking water supply and sanitation, but also wastewater management, water resources management, and ecosystem conservation. The SDGs also incorporate viewpoints related to matters such as the following: supplying safe, affordably priced drinking water; promoting the efficient use of water; and securing sustainable freshwater withdrawal and supply. These viewpoints were incorporated to address criticism of the fact that, although the goals set for these issues were considered to have been achieved in 2010 under the MDGs in terms of securing supplies of drinking water, the term "improved sources" as defined in the MDGs does not necessarily mean to supply "safe drinking water" and that water quality and other service standards were not taken into account. In addition,

8) Ministry of Foreign Affairs, Japan; "Japan's Official Development Assistance: White Paper 2015" (2016), pp.11-12.
United Nations Information Centre
(http://www.unic.or.jp/activities/economic_social_development/sustainable_development/2030agenda/)
9) United Nations Information Centre; "Millennium Development Goals Report 2015: Final Assessment of Progress Toward Achieving the MDGs" (2015)

the world's population is expected to grow and a further depletion of water resource is forecast. Some of the new perspectives that were incorporated in the SDGs—including wastewater management, water resources management, and water quality management—are matters that Japan has long been engaged in, and they are areas in which Japan can make full use of its experience in carrying out international cooperation activities.

Table 2.1: Comparison of MDGs and SDGs[10)]

MDGs	SDGs
Policies are formulated through a process led by the UN.	Policies are formulated through various processes with the involvement of a diverse range of stakeholders, including member state governments, international organizations, private sector companies and community representatives.
Overall goals established → Outcomes: Even if a goal is achieved, the outcomes vary between regions and within a country. Gender inequality, disparities between the rich and poor, and urban and rural areas. About 800 million people live in extreme poverty.	People-centered Focused on the issue of differences between regions and within a country, the SDGs ensure that socially vulnerable people will not be left behind. The aim is that no one will be left behind.
8 goals, 21 targets, and 60 indicators → (Outcomes) Evolved into an approach where issues are handled in an integrated manner by looking at the big picture, rather than just focusing on specific issues. Impediments to successful outcomes included climate change, environmental deterioration, and disputes.	17 goals, 169 targets, and 230 indicators In addition to further advancing the goals set under the MDGs, the SDGs tackle new issues as well. These issues are to be linked in a coordinated manner.*
Developmental goals are set only for developing countries.	Developmental goals apply to all countries, including advanced ones (universality)
Goal 7: Ensure environmental sustainability	Goal 6. (with 8 targets) Ensure availability and sustainable management of water and sanitation for all
Target 7-C: Halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation	6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all
	6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations
	6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion

10) Ministry of Foreign Affairs, Japan; "Japan's Official Development Assistance: White Paper 2015" (2016), pp.13-16.
Ministry of Foreign Affairs, Japan; "UN Summit for the Adoption of the 2030 Agenda for Sustainable Development" (http://www.mofa.go.jp/mofaj/ic/gic/page3_001387.html)

MDGs	SDGs
	of untreated wastewater and increasing recycling and safe reuse globally
	6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity
	6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate
	6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes
	6.a By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies
	6.b Support and strengthen the participation of local communities in improving water and sanitation management

* "For example, in an effort to provide clean water and sanitation (Goal 6), wells or safe and clean toilets may be installed in a community. This in turn can help to prevent the spread of illnesses (Goal 3: good health and well-being) and prevent malnutrition being caused by diarrhea and other factors (Goal 2: zero hunger). Furthermore, it can free a community's girls from having to fetch water, which can take up to five hours a day, and give them opportunities to attend school (Goal 4: quality education). In addition, as was the case in a rural village in India, if the women in a community are trained to be able to repair the wells and their revenues then increase accordingly, this would also contribute to achieving goals such as no poverty (Goal 1), gender equality (Goal 5), and reduced inequalities (Goal 10)."[11)]

(3) Organizing targets for the water supply sector

Of the 17 SDGs, the one relating to water supply services is Goal 6: "Ensure availability and sustainable management of water and sanitation for all."

As indicated above, this goal has eight targets, and the indicators for assessing the degree of progress have been discussed for each target. Details concerning goals directly related to water supply services are provided below, along with a description of the indicators used to assess these goals and the concepts behind the assessments.[12)]

11) Ministry of Foreign Affairs, Japan; "Japan's Official Development Assistance: White Paper 2015" (2016), p.16.
12) Ministry of Foreign Affairs, Japan; "The 2030 Agenda for Sustainable Development" (provisional translation) (2015), pp.18-19.
Proposal for indicators (proposal stage); Shigeyuki Matsumoto; "19th Water Sector Subcommittee Meeting of the Consultants & JICA Staff Study Group: Trends in JICA Programs" (focused primarily on local governments, coordination with the private sector and SDGs)"

Table 2.2: SDGs indicators in the relevant fields

6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all.

Indicator: Proportion of population using safely managed drinking water services.

Definition of safely managed:

Safely managed water source	Population using a basic drinking water source which is located on premises, available when needed and free of fecal and priority chemical contamination.
Basic drinking water source	Piped water, tube well or borehole, protected dug well/spring, and rainwater. Drinking water source with a total collection time of less than 30 minutes for a round trip, including queuing.
Limited drinking water source	Improved drinking water source that requires 30 minutes or more for a round trip, including queuing.
Unimproved drinking water source	Unprotected spring/dug well, cart equipped with a drum/small tank (vendor-provided), and water tank truck.
Surface water	River, dam, lake, pond, stream, canal, and irrigation channel

6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity.

Indicator (proposed): Change in water-use efficiency over time. Level of water stress: freshwater withdrawal as a proportion of available freshwater resource.

6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate.

Indicator (proposed): Degree of integrated water resources management implementation (0 to 100). Proportion of transboundary basin area with an operational arrangement for water cooperation.

6.a By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies.

Indicator (proposed): Amount of water- and sanitation-related official development assistance that is part of a government-coordinated spending plan.

6.b Support and strengthen the participation of local communities in improving water and sanitation management.

Indicator (proposed): Proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management.

(4) Method used to evaluate the achievement of SDGs

At the global level, a series of global indicators are used to monitor whether the 17 SDGs and 169 targets have been achieved. At least one indicator was specified for each of the targets, and all of the 230 indicators were specified as global indicators with the exception of any duplicate indicators. For some indicators, a conclusion was not reached, so these will be finalized through discussions by the member states after the meeting and a proposal is scheduled to be submitted at the 48th UN Statistical Commission in March 2017.

Reference 1

United Nations Information Centres

(http://www.unic.or.jp/news_press/features_backgrounders/17471/)

How will sustainable development goals be monitored?

- At the global level, a series of global indicators are used to monitor whether the 17 SDGs and 169 targets are monitored and verified using. The framework for global indicators is formulated by the Inter-agency and Expert Group on SDG Indicators (IAEG-SDGs), and is to be agreed at a meeting of the UN Statistical Commission in March 2016. In line with this agreement, the UN Economic and Social Council and General Assembly will adopt these indicators (September 2016).
- The government of each country is to establish national indicators for monitoring progress in terms of the SDGs and the targets.
- Statistical officers from the member states have been working to set two indicators for each target. About 300 indicators will be specified for all targets. However, since some targets are for issues that require cross-cutting approaches, it is likely that the total number will be fewer than 300.
- The follow-up and verification processes will proceed based on an annual report prepared by the UN Secretary-General detailing what progress has been made towards achieving the SDGs.
- The annual meeting of the High-Level Political Forum on Sustainable Development plays a central role in verifying the degree of progress that has been made towards achieving the SDGs at the global level.

The means of implementing the SDGs are monitored and verified according to the guidelines of the Addis Ababa Action Agenda, which is the outcome document for the 3rd International Conference on Financing for Development, to ensure that capital is mobilized effectively in support of the 2030 Agenda for Sustainable Development.

Reference 2

Implementation guidelines provided by the Government of Japan

December 2016 (formulated by the Sustainable Development Goals [SDGs] Promotion Headquarters)

(http://www.kantei.go.jp/jp/singi/sdgs/index.html)

Committed to the vision of "becoming a leader toward a future where improvements are made in an integrated manner in a sustainable, strong and inclusive economy, society and environment," the SDGs Promotion Headquarters was established for the implementation of comprehensive and

effective SDGs policies while cooperating closely with the relevant governmental agencies. Of the eight priority areas and specific policies that are set out under the vision, the following policy is most closely related to the water sector.

Priority issue 4: Sustainable and Resilient Land Use, Promoting Quality Infrastructure

• Promotion of activities for a sound water cycle

Based on the Basic Act on the Water Cycle (Cabinet Decision, 2015), River Basin Management activities that are to be implemented jointly by local governments, businesses, and other organizations will be rolled out across Japan.

• Stable supply of water resources through the construction and maintenance of water resource development facilities

Under the Act on Advancement of Water Resources Development, facilities for the development and utilization of water resources will be built, renovated, and managed to ensure a stable water supply in areas that are in need of more water due to industrial development and population concentrations.

At the first meeting of the Sustainable Development Goals [SDGs] Promotion Headquarters, Prime Minister Shinzo Abe mentioned the 6th Tokyo International Conference on African Development (TICAD VI), which had been held in Nairobi, Kenya in August 2016.[13] The TICAD VI Nairobi Declaration strategically corresponds to the SDGs, and the Nairobi implementation plan features the following items as its pillars.[14]

Pillar 1: Promoting structural economic transformation through economic diversification and industrialization

2.4 Develop high quality infrastructure, which contributes both to improvement of people's daily life and promotion of tourism, such as public transport, food logistics system, water and sewerage, waste management and high speed electronic communications, by utilizing high quality, affordable and resource efficient technology.

Pillar 2: Promoting resilient health systems for quality of life

1.10 Improve access to safe water and sanitation and promote sanitation behavioral change to prevent and control infectious diseases.

4.4 Promote the development of national targets on nutrition and ensure multi-sectoral action through mainstreaming nutrition into related sectors and plans, including health and water.

Pillar 3: Promoting social stability for shared prosperity

3.2 Support efforts for sustainable forest management, integrated water resource management, combating desertification, and sustainable use of terrestrial ecosystems to halt and reverse land degradation and halt biodiversity loss.

13) Prime Minister's Office, Japan; "Sustainable Development Goals (SDGs) Promotion Headquarters" (http://www.kantei.go.jp/jp/97_abe/actions/201605/20sdgs.html)

14) Ministry of Foreign Affairs, Japan; "The 6th Tokyo International Conference on African Development (TICAD VI) (Kenya, August 2016)" (http://www.mofa.go.jp/mofaj/afr/af2/page3_001556.html)

2–3 Trends in International Aid, the World Water Forum, the Japan Water Forum, and TICAD

The two principle approaches to addressing the water resources issue are as follows: (1) to emphasize the importance of access to water and sanitation as one of our basic human needs (BHN) or human rights and (2) to focus on the issues of water resource management and water pollution from the perspective of global environmental issues and the sustainable use of natural resources. Furthermore, concerns over the effects of climate change on water resources have grown in recent years, so water-related issues are now recognized as being one of the most serious global environmental issues in terms of national security.

Recent efforts to address these issues include the adoption of the G8 Water Action Plan at the 2003 G8 Summit and the establishment of UN-Water, a UN body that coordinates its work on water. In 2010, access to drinking water and sanitation facilities were recognized as human rights at a session of the UN Human Rights Council and General Assembly. Furthermore, as demand for water has increased, there has been a growing recognition of the need to adopt a more coordinated approach to using water resources by managing and adjusting their use from an integrated point of view. In light of this, various frameworks have been created to promote integrated water resources management (IWRM). As water usage increases, the management of international rivers and transboundary aquifers is becoming increasingly important, and the United Nations Economic Commission for Europe (UNECE) and other organizations with practical experience of operating in the European Union (EU) are carrying out proactive support activities, such as developing a coordination mechanism, formulating the necessary legislation, and promoting mutual understanding between the concerned parties.[15)]

The following section provides an overview of notable activities carried out over the last decade in line with the Development Cooperation Charter and the SDGs, including the Japan Water Forum, the World Water Forum, and TICAD.

1) Trends in the World Water Forum and the Japan Water Forum

Under the theme of "Water for Our Future," the 7th World Water Forum was held in Daegu and Gyeongju, South Korea, on April 12-17, 2015. Hosting events at a variety of levels, from ministerial meetings to citizen forums, the forum lead to the issuing of ministerial declarations as well as statements by legislators and local governments. The Daegu & Gyeongbuk Implementation Commitment was announced to declare the forum's commitment to follow-up on implementing the resolutions for each theme. At the ministerial conferences, representatives of the Trilateral Ministerial Meeting on Water Resources among the Republic of Korea, Japan, and the People's Republic of China (Minister of Land, Infrastructure, Transport and Tourism Akihiro Ohta participated for Japan) shared their leading-edge approaches, agreed to share their experiences with other countries around the world, and issued a joint declaration.[16)]

15) Data provided by one of the committee members, Mr. Matsumoto.
16) Ministry of Land, Infrastructure, Transport and Tourism, Japan; "The 7th World Water Forum" (http://www.mlit.go.jp/mizukokudo/mizsei/mizukokudo_mizsei_tk2_000010.html)

The 8th World Water Forum is scheduled to be held in Brasilia, Brazil, in March 2018. A preparatory meeting will be held from March to April in 2017.

The Japan Water Forum was originally established based on the concept that Japan would take the lead with regard to water issues in the Asia-Pacific region in line with the actions of the World Water Forum. At the 4th World Water Forum held in Mexico in 2016, it was reaffirmed that water issues should be handled on a regional basis because of the need to take into account differences in regional characteristics. Consequently, it was decided that Japan would be responsible for handling water issues in the Asia-Pacific region.

The Japan Water Forum holds Asia-Pacific Water Summits, at which government leaders and representatives of international organizations from Asia-Pacific countries discuss issues regarding regional water bodies. To date, the Asia-Pacific Water Summits have been held in Japan (Beppu, Oita Prefecture) in 2007 and Thailand in 2013. At the Asia-Pacific leaders meeting that was held at the 1st Asia-Pacific Water Summit, water disasters were defined as being a type of water issue in recognition of the characteristics of the Asia-Pacific region, which has suffered from numerous water disasters. The summit also adopted the "Message from Beppu," which set out goals leading up to 2025 that are one step ahead of the MDGs. The 2nd Asia-Pacific Water Summit discussed the following seven topics: Household Water Security; Economic, Food and Water Security; Urban Water Security; Environmental Water Security; Water Risks and Resilience; Integrated Water Resources Management (IWRM) Process for a Water Secure World; and Water-related Disaster Challenges (Thailand's experience). The Chiang Mai Declaration contains 13 commitments related to water resource issues, and includes suggestions concerning the UN post-2015 development agenda and disaster-related issues.[17] Going forward, activities related to the above issues will be implemented in line with developments at the International Water Association (IWA) World Water Congress & Exhibition that is scheduled to be held in September 2018 and the SDGs.[18]

2) Trends in the Tokyo International Conference on African Development (TICAD)

The TICAD VI Nairobi Declaration was issued at the 6th Tokyo International Conference on African Development (TICAD), which was held in August 2016. It identified three priority areas to be addressed: the decline of global commodity prices; the Ebola outbreak; and the prevalence of violent extremism. In response to these issues, the declaration reaffirmed the following three pillars and corresponding priority actions.

"Pillar 1: Promoting structural economic transformation through economic diversification and industrialization" includes providing support for African enterprises, promoting investment in quality infrastructure, and developing the private sector. "Pillar 2: Promoting resilient health systems for quality of life" includes promoting hygiene and access to safe water, sanitation, and the like, as well as accelerating actions to improve health surveillance, monitoring, and evaluation. "Pillar 3: Promoting social stability for shared prosperity" includes actions to address global issues and challenges, climate change, desertification, and water/energy shortages, and the implementation of the Paris Agreement. Furthermore, the plan for the implementation of these pillars emphasizes the importance of developing quality infrastructure for the supply of water and sewerage services

17) Ministry of Land, Infrastructure, Transport and Tourism, Japan; "Participation in the 2nd Asia-Pacific Water Summit (achievements)" (http://www.mlit.go.jp/report/press/water02_hh_000028.html)
18) Internal documents of the Japan Water Forum, etc.

through the following actions: utilizing high-quality, affordable technologies; improving access to safe water and sanitation; accelerating improvements in hygiene behavior to better prevent and control infections; and supporting efforts to implement integrated water source management.[19)]

3) Partnership for Quality Infrastructure

In May 2015, the Government of Japan announced its Partnership for Quality Infrastructure at the 21st International Conference on the Future of Asia, which was held in Tokyo in May 2015. In coordination with other countries and international organizations, it plans to promote the installation of quality infrastructure, which is an area of strength for Japan, primarily in Asian countries. The Government of Japan also announced the following initiative in May 2016 just before the G7 Ise-Shima Summit: Initiative for the Promotion of High-quality Infrastructure Exports. At the same time, water supply/sewerage systems were included as a new cutting-edge field in the Infrastructure System Export Strategy (FY2016 revised edition). This strategy emphasizes the need to strengthen cooperation between national governments, local governments, and the private sector so as to promote international development by leveraging technologies and know-how in the water supply/sewerage sector. It also supports the overseas expansion of Japanese businesses by utilizing policy support programs for economic cooperation. For the government of the recipient country, its water utilities and other parties involved in matters related to waterworks, the key elements of this strategy in relation to the water supply sector are as follows; (1) the provision of seminars on waterworks and (2) the presentation of solutions to problems.[20)]

2–4 Other Influences on International Cooperation in the Water Supply Sector

Japan's policy-based international cooperation programs are not limited to its activities related to the Development Cooperation Charter and the SDGs. In a review of the activities carried out over the last decade by the Government of Japan that may affect international cooperation in the water supply sector, the general trends described below were observed.

Key
Blue: Programs set out in cooperation agreements with the UN or other countries
Light blue: Programs set out based on programs carried out for the World Water Forum
Purple: Programs led by the Government of Japan that are related to its basic policy for overall international cooperation
Yellow: Programs led by the Government of Japan primarily for the Asian region
Orange: Programs led by the Government of Japan primarily for the African region
No-color: Other important programs for the water supply sector led by the Government of Japan

These programs, all of which affect one another, serve as the basis for goal setting and policy decisions with regard to international cooperation in the water supply sector.

19) Ministry of Foreign Affairs, Japan; "The 6th Tokyo International Conference on African Development (TICAD VI) (Kenya, August 27-28, 2016) (http://www.mofa.go.jp/mofaj/afr/af2/page3_001556.html)
20) Export Strategy for Infrastructure Systems (www.kantei.go.jp/jp/singi/keikyou/dai24/kettei.pdf)

Table 2.3: Policies of the international community and the Japanese government with regard to the water supply sector

Item	Outline
2000: United Nations Millennium Development Goals	The United Nations Millennium Development Goals (MDGs) set clear targets that the **international community** must accomplish by 2015. Target 10 is to "halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation."
2003: Japan's Clean Water for People Initiative	Japan hosted the 3rd World Water Forum. As part of Japan's Clean Water for People Initiative the **Japanese government** announced the establishment of Water Resource Grant Aid and the allocation of 16 billion yen for related projects in its national budget for FY2003.
2003: Revision of the ODA Charter	Based on changing conditions in Japan and overseas with regard to the provision of ODA, the Japanese government revised its ODA Charter in August 2003 for the first time in 11 years. In the revised ODA Charter, Japan identified reducing poverty as a key issue to be tackled and stated its aim to assist developing countries by providing assistance in the water and sanitation sector.
2004: Waterworks Vision	As policy guidelines issued by the MHLW for the entire water utility industry, the Regional Waterworks Vision includes an international perspective.
2006: Water and Sanitation Broad Partnership Initiative (WASABI)	At the 4th World Water Forum, Japan announced the Water and Sanitation Broad Partnership Initiative as its new policy for the provision of ODA in the water supply and sanitation sector. Under this initiative, Japan plans to provide high-quality assistance that makes full use of its experience and technologies, and to promote the following: technology transfers in the water supply sector, the establishment of domestic systems and organizations for overseas expansion, and the enhancement of international competitiveness. Based on this initiative, Japan announced a policy for assisting developing countries in their efforts to strengthen self-reliance in accordance with the following basic directions: **(1) pursuing the sustainability of water use; (2) emphasizing the "human security" perspective; (3) emphasizing capacity development; (4) pursuing synergistic effects through cross-sectoral measures; and (5) considering local conditions and appropriate technology** for the aid-recipient countries.
2006–2007	The Special Mission Committee on Water Security was established by the Liberal Democratic Party of Japan, and meetings of this committee were held frequently. The committee summarized the proposals made by concerned parties to develop the concept that formed the basis of the Asian Gateway Initiative.
2007	The Japanese government's Asian Gateway Initiative set out a policy of promoting assistance for the development of a water control and supply plan in Asia as well as the international expansion of government enterprises, such as water utility companies. The Economic Growth Strategy specified the support to be provided by the Ministry of Internal Affairs and Communications for the international expansion of municipal water utility businesses and the

Item	Outline
	participation of water utility companies in the strategy for infrastructure exports.
2008	At the Hokkaido Toyako G8 Summit, discussions were held concerning the progress that had been made with regard to actions that had been proposed at the Evian G8 Summit in 2003 for the water supply and sanitation sector. At the UN-MDGs High Level Meeting, the Japanese government co-sponsored a side event concerning water and sanitation called "Water and Sanitation for All."
2008 TICAD IV	The Yokohama Action Plan was adopted at the 4th Tokyo International Conference on African Development (TICAD IV), a **ministerial-level international conference** attended by African countries and donor countries. The plan stipulated the following as support for water development in Africa: (1) effective water resource management and (2) access to safe water and sanitation facilities.
2008 International Year of Sanitation	The United Nations adopted a resolution declaring 2008 as the International Year of Sanitation following on from a Japanese initiative aimed at raising people's awareness of issues related to sanitation, mobilizing the necessary resources, and demonstrating the guiding principles that all concerned parties must follow.
2009	At the G8 L'Aquila **Summit**, the G8 leaders reviewed the progress that had been made in implementing the Evian Water Action Plan and agreed to enter into a partnership with Africa.
2009 Water Security Council of Japan	The Water Security Council of Japan was established in January 2009 as an organization comprising politicians, business leaders, academics, and other experts. This organization was established in response to calls for such a body by the following: Yoshiro Mori, the former Prime Minister of Japan; Fujio Mitarai, the former Chairman of the Federation of Economic Organizations; and Norihito Tambo, Professor Emeritus at Hokkaido University and the Open University of Japan. In October 2012, the council announced "Towards a Low-Carbon and Sustainable Water and Material-Circulating Society" as a policy recommendation.
2010	As a follow-up to the International Year of Sanitation, a conference that was cosponsored by the Asian Development Bank and United Nations University was held to discuss the major issues that would need to be overcome in order to achieve the MDGs and resolve sanitation problems.
2013 TICAD V	At the 5th Tokyo International Conference on African Development (TICAD V), which is a **ministerial-level international conference**, the "Yokohama Declaration 2013" and the "Yokohama Action Plan 2013-2017" were adopted with the stated aim of (1) providing assistance for the improvement of water supplies and sanitation and (2) developing human resources for urban waterworks engineering. It was also confirmed that the achievements of TICAD V would serve as an important input for future works aimed at establishing the post-2015 development goals.
2015	The Development Cooperation Charter, which set out the principles and basic

Item	Outline
Establishment of Development Cooperation Charter	rules for the provision of official development assistance (ODA) by the **Government of Japan**, was revised to produce a new charter called the "Development Cooperation Charter." Its main characteristics include an emphasis on broader cooperation involving not only the Japanese government, but also local governments, the private sector, and other relevant bodies. It also addresses the importance of providing **comprehensive assistance that promotes autonomous development in developing countries through the provision of assistance for the development of soft infrastructure (e.g., building capacity in terms of operational management, human resources, and legal systems) as well as hard infrastructure**.
2015 Sustainable Development Goals (SDGs)	The UN 2030 Agenda for Sustainable Development, which sets out shared targets that the **entire international community** needs to achieve between 2016 and 2030, was adopted.
2016 Infrastructure System Export Strategy (revised FY2016)	This strategy is aimed at promoting the installation of quality infrastructure in emerging nations that are considered to have high demand, by making full use of Japan's competitive advantages in technology and know-how. It promotes not only the exporting of machinery, but also the development of various forms of businesses (e.g., receiving orders as a system encompassing construction, operation and management) and the expansion of local business investment.
2016 TICAD VI	At the 6th Tokyo International Conference on African Development (TICAD VI), which is **a ministerial-level international conference**, the Nairobi Declaration was adopted. "Pillar 2: Promoting resilient health systems for quality of life" includes promoting hygiene and access to safe water, while "Pillar 3: Promoting social stability for shared prosperity" includes water shortages as one of the challenges to be addressed.

2–5 Trends in Japan's International Cooperation Activities in the Water Supply Sector

(1) Trends in international cooperation activities in the water supply sector

The results of JICA's international cooperation activities are summarized in JICA's statistical results, and these can be used to keep track of the total expenses and draw up a list of the projects. However, projects in the water supply sector[21)] are sometimes classified into more than one of the sector categories that are used for JICA's statistics. For this reason, JICA extracts data on projects in the water supply sector from data belonging to any of the sector categories that could include water supply projects. In activity outcome reports (e.g., performance reports and PR pamphlets), the outcomes of the various activities are reported by calculating the number of people who received technology transfers and the number of beneficiaries of water supply projects every fiscal year. The

21) In this context, "water supply sector" refers to not only water supply systems in a narrow sense (e.g., piped water supplies), but also various types of water supply projects, including projects for hand-pump water supply services in rural areas.

number of people who received technology transfers can be associated with the achievement of technical cooperation, and the number of beneficiaries of water supply projects can be associated with the achievement of financial cooperation.

This data demonstrates that Japan contributed to increasing the number of beneficiaries of water supply projects by about 36 million people from FY2006 to FY2015, and the total number of people that received technology transfers was more than 42,000.

1) Achievements in terms of technical cooperation

As can be seen in the number of people that received technology transfers, human resource development in the water supply sector has been steadily producing results. In particular, the demand for training in the water supply sector is high. Although the exact number varies from year to year, places for training programs in Japan are always filled. While experts are difficult to recruit, they have been dispatched in a steady manner.

Table 2.4: Trends in technical cooperation achievements

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Number of participants in JICA technology transfer project*1	2,601	3,348	3,410	1,989	5,265	7,255	5,856	2,309	3,984	6,419
Number of experts dispatched by JICA	122	195	221	313	416	422	465	395	414	534
Number of participants in JICA training	420	207	385	301	285	514	768	1,479	993	241

Source: Data provided by JICA

*1 This number includes the following officers and workers who received guidance and training in technical cooperation related to water and hygiene: administrative officers, water utility employees, water control association members, community sanitation training officers, pump repair workers, and toilet construction workers (i.e., counterparts of experts, trainees, seminar participants, etc.)

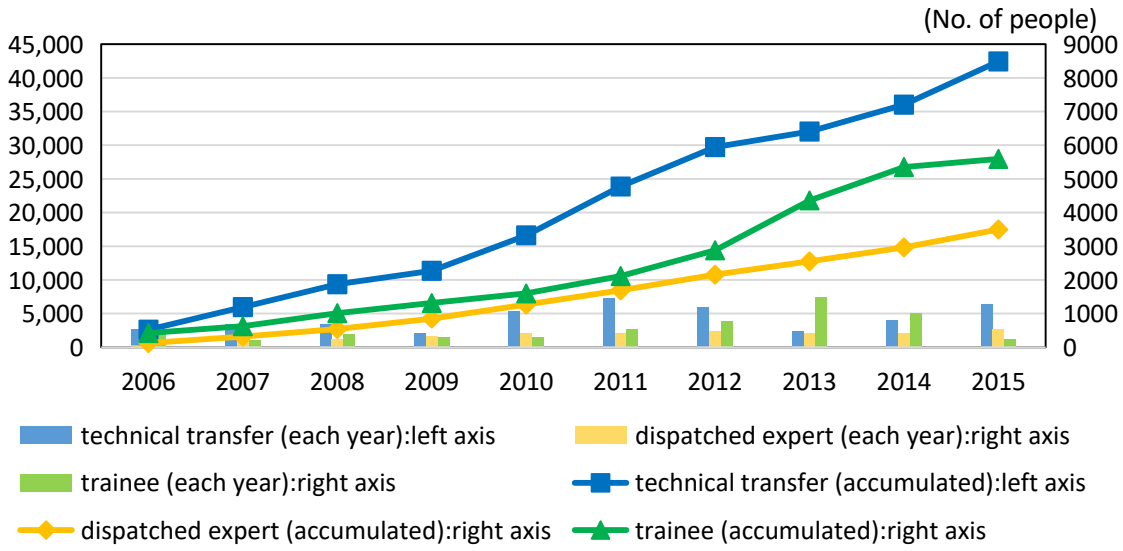


Figure 2.2: Technical cooperation achievements

2) Achievements in terms of financial cooperation

In terms of the number of projects, the number of beneficiaries of water projects, the value of contracts, and the expenditure for technical cooperation projects, financial cooperation projects in the water supply sector vary year-on-year but they have been continuously implemented. In view of the water supply coverage and the levels of water supply technologies, projects should be formulated as reliably as they have been to date or perhaps even more reliably in the future.

Broken down by category, grant aid projects[22)] worth a total of between 10 billion and 20 billion yen are consistently implemented every fiscal year. In contrast, ODA loan projects vary greatly from one year to the next, ranging from zero projects in one fiscal year to projects worth more than 100 billion yen in another. In addition, the number and value of yen loan projects in this field have been decreasing in recent years.

In total, the Japanese government provided ODA loans worth about 800 billion yen and grant aid worth about 160 billion yen from FY2006 to FY2015.

22) This calculation includes only grant aids projects in which JICA was involved.

Table 2.5: Trends in financial cooperation achievements

	2006	2007	2008	2009	2010
Number of beneficiaries in terms of JICA international cooperation projects in the water supply sector (thousand persons) *1	4,666	3,342	6,028	6,010	1,622
Value of loan contracts for JICA international cooperation projects in the water supply sector (100 million yen)	1175.22	673.59	1534.06	1493.06	832.18
Value of grant contracts for JICA international cooperation projects in the water supply sector (100 million yen)	146.78	107.73	148.88	186.77	165.23
Expenditure in JICA technical projects for international cooperation in the water supply sector (100 million yen)	42.20	45.62	49.41	73.24	59.27
	2011	2012	2013	2014	2015
Number of beneficiaries in terms of JICA international cooperation projects in the water supply sector (thousand persons)	2,462	7,304	627	1,705	1,959
Value of loan contracts for JICA international cooperation projects in the water supply sector (100 million yen)	832.18	1296.75	586.00	236.83	251,81
Value of grant contracts for JICA international cooperation projects in the water supply sector (100 million yen)	228.27	126.40	159.92	129.16	172.97
Expenditure in JICA technical projects for international cooperation in the water supply sector (100 million yen)	64.91	54.44	60.53	51.39	52.35

Source: Data provided by JICA

*1 Target number of people who will have access to improved water supply services constructed using grant aid or a yen loan for which an exchange of notes (E/N) was signed within the same fiscal year. The classifications used for the aggregated data, etc., are described in the reference materials.

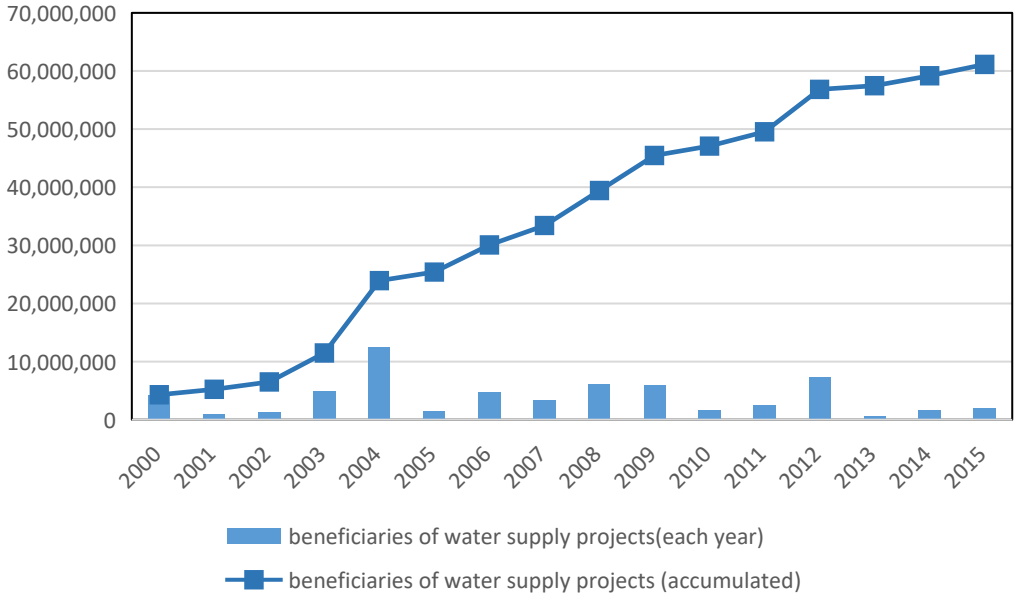


Figure 2.3: Number of beneficiaries of water supply projects

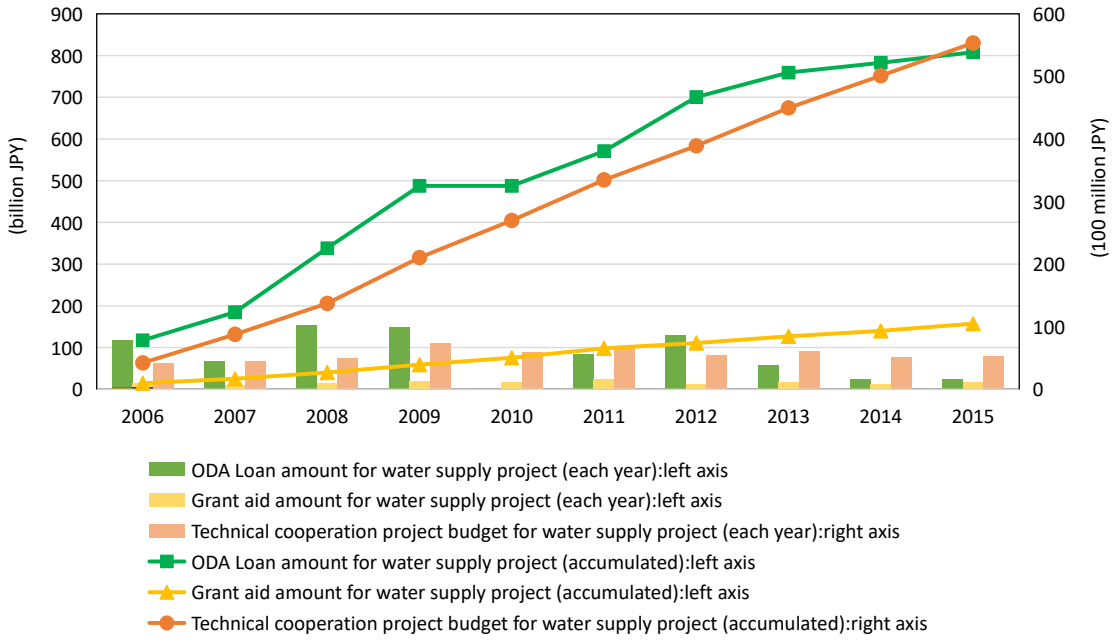


Figure 2.4: Comparison of financial cooperation and technical cooperation projects

3) Regional trends

In accordance with JICA's classification system, the following regional classifications were used in the analysis of cooperation achievements by region.

Table 2.6: Regional classifications used in this document

	Region	Country
Asia	Southeast Asia	Indonesia, Cambodia, Singapore, Thailand, East Timor, Philippines, Brunei, Vietnam, Malaysia, Myanmar, Laos
	East Asia	Republic of Korea, People's Republic of China, Hong Kong, Macao, Mongolia
	South Asia	Afghanistan, India, Sri Lanka, Nepal, Pakistan, Bangladesh, Bhutan, Maldives
	Central Asia	Azerbaijan, Armenia, Uzbekistan, Kazakhstan, Kyrgyzstan, Georgia, Tajikistan, Turkmenistan
Oceania	Oceania	Australia, Kiribati, Guam, Cook Islands, Samoa, Solomon, Tuvalu, Tonga, Nauru, Niue, New Caledonia, New Zealand, Vanuatu, Papua New Guinea, Palau, Fiji, Marshall, Mariana Islands, Micronesia
America	Central America, Caribbean	Antigua and Barbuda, British Monserrat, El Salvador, Guyana, Cuba, Guatemala, Grenada, Costa Rica, Jamaica, Suriname, St. Christopher and Nevis, St. Vincent and the Grenadines, Saint Lucia, Dominica, Dominican Republic, Trinidad and Tobago, Nicaragua, Haiti, Panama, Bahamas, Barbados, Puerto Rico, Belize, Honduras, Mexico, Lanterna Antilles
	South America	Argentina, Uruguay, Ecuador, Colombia, Chile, Paraguay, Brazil, Venezuela, Peru, Bolivia
	North America	United States of America, Canada
Middle East	Middle East including Maghreb	The United Arab Emirates, Algeria, Yemen, Israel, Iraq, Iran, Egypt, Oman, Qatar, Kuwait, Saudi Arabia, Syria, Tunisia, Bahrain, Palestine, Morocco, Jordan, Libya, Lebanon
Africa	Sub-Saharan Africa	Angola, Uganda, Ethiopia, Eritrea, Ghana, Cabo Verde, Gabon, Cameroon, Gambia, Guinea, Guinea Bissau, Kenya, Cote d'Ivoire, Comoro, Republic of the Congo, Democratic Republic of the Congo, Sao Tome and Príncipe, Zambia, Sierra Leone, Djibouti, Zimbabwe, Sudan, Swaziland, Equatorial Guinea, Seychelles, Senegal, Somalia, Tanzania, Chad, Central Africa, Togo, Nigeria, Namibia, Niger, Burkina Faso, Burundi, Benin, Botswana, Madagascar, Malawi, Mali, South Africa, South Sudan, Mozambique, Mauritius, Mauritania, Liberia, Rwanda, Lesotho
Europe	Europe	Iceland, Ireland, Albania, Italy, Ukraine, UK, Estonia, Austria, The Netherlands, Cyprus, Greece, Croatia, Kosovo, Switzerland, Sweden, Spain, Slovakia, Slovenia, Serbia, Czech Republic, Denmark, Germany, Turkey, Norway, Hungary, Finland, France, Bulgaria, Belarus, Belgium, Bosnia and Herzegovina, Poland, Portugal, The former Yugoslav Republic of Macedonia, Malta, Monaco, Moldova, Montenegro, Latvia, Lithuania, Luxembourg, Romania, Russia

Reference: https://www.jica.go.jp/about/report/2016/ku57pq00001uy0ve-att/2016_J_bessatsu.pdf

Figure 2.5 shows the number of technical cooperation projects, grant aid projects, and ODA loan projects that have been carried out over the last decade broken down by region. Although a simple comparison is difficult because the budgets for these projects differ greatly, a look at the number of projects reveals that many of the grant aid projects and technical cooperation projects were implemented in Africa, many of the ODA loan projects were implemented in South Asia, Southeast Asia, and East Asia.

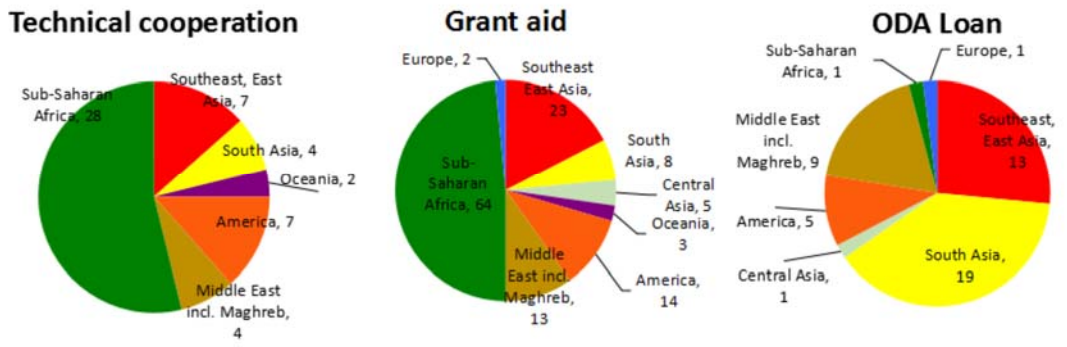


Figure 2.5: Number of financial cooperation projects and technical cooperation projects by region (2006–2015)

Table 2.7: Number of ODA loan projects by country

(Number of projects)

Region	Country	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	total
Southeast Asia	Indonesia	1	1									2
	Cambodia	1			1	1			1		1	5
	Timor-Leste	2			1	1						4
	Philippines									1		1
	Viet Nam	1									1	2
	Laos	1						1				2
	Myanmar						1		1		2	4
East Asia	Mongolia	1		1		1						3
South Asia	Afghanistan							1				1
	Sri Lanka						1					1
	Pakistan			1	1	1				1	1	5
	Bangladesh							1				1
Central Asia	Tajikistan		1				1	1	1		1	5
Oceania	Samoa								1			1
	Solomon Islands				1							1
	Palau										1	1
Central America, Carribean	Guyana	1		1								2
	Guatemala	2										2
	Haiti								1			1
	Honduras		1									1
South America	Ecuador	2										2
	Paraguay			1			1			1		3
	Bolivia			2				1				3
North America												
Middle East incl. Maghreb	Yemen				1							1
	Egypt	2										2
	Tunisia				1					1		2
	Jordan	2	1	1	1	1			1		1	8
Sub-Saharan Africa	Angola	1										1
	Uganda								1			1
	Ethiopia	2	1	2	1				1	1		8
	Eritrea	1										1
	Cape Verde			1								1
	Cameroon	1						1	1			3
	Gambia	1			1							2
	Guinea		1							1		2
	Kenya	1		1		1	1	2				6
	D.R.Congo				1							1
	Zambia		1				2			1		4
	Sierra Leone					1						1
	Djibouti					1						1
	Sudan						2				1	3
	Senegal			1	1							2
	Tanzania	1	1	3				1				6
	Togo						1					1
	Nigeria		1		1		1					3
	Niger	1		1	1							3
	Burkina Faso			1				1				2
	Benin			1							1	2
	Malawi	1				1		1				3
	Mali	1	1									2
	South Sudan							1				1
	Mozambique			1								1
	Rwanda	1			1					1		3
Europe	Serbia	1										1
	Montenegro					1						1

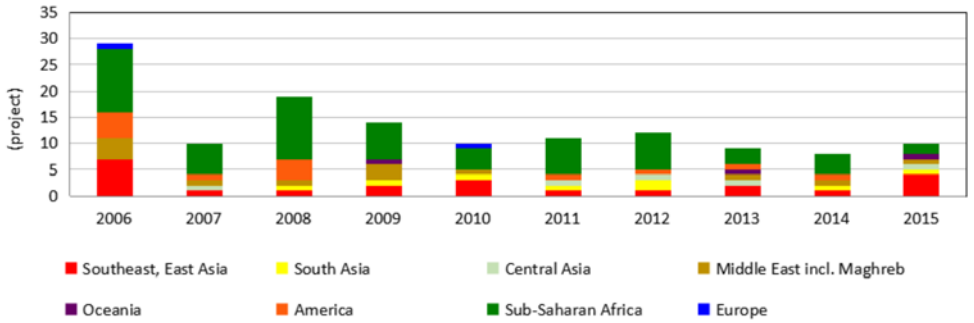


Figure 2.6: Number of ODA loan projects by region and by fiscal year[23)]

23) If more than one exchange of notes (E/N) was issued for a grant aid project, the fiscal year in which the first E/N was issued is indicated.

Table 2.8: Value of grant aid by country

(100 million Yen)

Region	Country	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	total
Southeast Asia	Indonesia	5.25	8.80									14.05
	Cambodia	4.31			3.69	27.60			10.37	10.46	13.21	69.64
	Timor-Leste	12.43	3.22		6.94	2.72						25.31
	Philippines									11.65		11.65
	Viet Nam	0.35	4.08	9.12	6.92						21.96	42.43
	Laos	3.77	16.96	8.02				0.41	1.44	8.90	6.09	45.59
	Myanmar						6.29		19.00		37.97	63.26
East Asia	Mongolia	9.52		0.43	2.53	7.89	2.33	9.73	15.80	5.19		53.42
South Asia	Afghanistan							25.61				25.61
	Sri Lanka						6.77				2.48	9.25
	Pakistan			4.58	0.53	12.36	39.95	12.04		0.57	3.73	73.76
	Bangladesh							7.28				7.28
Central Asia	Tajikistan		0.49	0.42	5.81		7.79	6.02	0.42	0.89	12.57	34.41
Oceania	Samoa								18.31			18.31
	Solomon Islands				0.52	6.59	13.79					20.90
	Palau										18.43	18.43
Central America, Carribean	Guyana	6.51		8.67								15.18
	Guatemala	14.94										14.94
	Haiti								6.69			6.69
	Honduras		5.16	0.55	9.63	2.94						18.28
South America	Ecuador	6.28	8.04	9.49								23.81
	Paraguay			8.64	19.92		14.89			2.72	13.70	59.87
	Bolivia			0.76	5.40	19.65	0.26	5.66				31.73
North America												
Middle East incl. Maghreb	Yemen				0.86	2.53	7.20	6.21				16.80
	Egypt	10.57	12.21	11.28								34.06
	Tunisia				10.00	3.32						13.32
	Jordan	14.42	14.79	11.92	11.32	0.47	2.68	11.33	30.20	0.76	5.58	103.47
Sub-Saharan Africa	Angola	4.32										4.32
	Uganda								9.73			9.73
	Ethiopia	5.67	3.42	8.13	11.17	7.65	10.02	3.13	6.33	13.24		68.76
	Eritrea	0.51	3.16	10.12	1.96							15.75
	Cape Verde			8.29								8.29
	Cameroon	5.15	4.78					7.68	3.74			21.35
	Gambia	2.96			8.97							11.93
	Guinea		7.45							13.19		20.64
	Kenya	4.97		0.90	4.92	18.39	18.88	11.25	1.08	12.78	9.78	82.95
	D.R.Congo				20.25	3.54	26.04	6.75				56.58
	Zambia		0.70	1.57	4.05	0.79	28.28			8.58		43.97
	Sierra Leone					8.05						8.05
	Djibouti					4.89			13.38			18.27
	Sudan						11.82	4.52			0.59	16.93
	Senegal			10.00	13.00							23.00
	Tanzania	12.30	8.18	23.29	2.03	4.52	3.67	0.76	0.70	9.87	7.35	72.67
	Togo						8.99					8.99
	Nigeria		2.65		5.05		11.63					19.33
	Niger	4.31		0.59	6.21	3.81	1.28					16.20
	Burkina Faso			0.67	3.65	6.16	4.78	0.47	2.25	3.94	3.49	25.41
	Benin			0.60	2.14	6.74	0.93				10.71	21.12
	Malawi	3.71	2.87			4.26		5.63				16.47
	Mali	4.48	0.77	0.84	4.95	4.40						15.44
	South Sudan							1.92	20.48	16.29	5.33	44.02
	Mozambique			10.00								10.00
	Rwanda	5.51			14.35					10.13		29.99
Europe	Serbia	4.54										4.54
	Montenegro					5.96						5.96

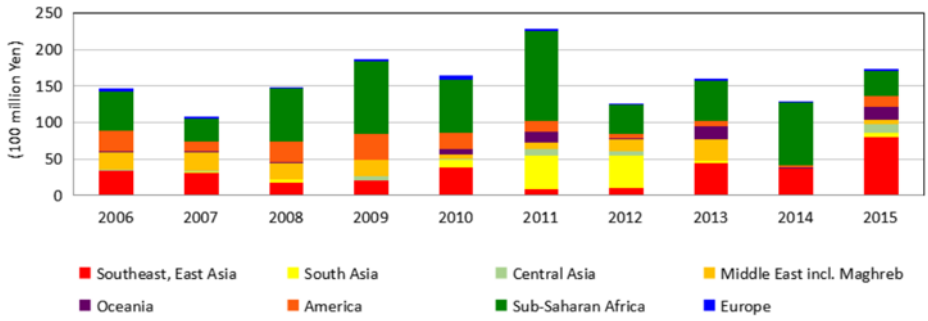


Figure 2.7: Value of grant aid by region[24)]

24) If more than one exchange of notes (E/N) was issued for a grant aid project, the amount was included in the fiscal year in which the E/N was issued.

Table 2.9: Number of ODA loan projects by country

(Number of projects)

Region	Country	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	total
Southeast Asia	Indonesia	1							1			2
	Cambodia			1			1					2
	Thailand				1							1
	Viet Nam				1			3			1	5
	Myanmar								1	1		2
	Laos										1	1
East Asia												
South Asia	India	2	3	3				3	1			12
	Sri Lanka	1		1	1			1				4
	Bangladesh	1					1	1				3
Central Asia	Azerbaidjan				1							1
Oceania												
Central America, Carribean												
South America	Brazil						1					1
	Peru			1	1		1	1				4
North America												
Middle East incl. Maghreb	Iraq			2	1							3
	Tunisia	1					1					2
	Morocco	1	1		1		1					4
Sub-Saharan Africa	Cape Verde								1			1
Europe	Turkey				1							1

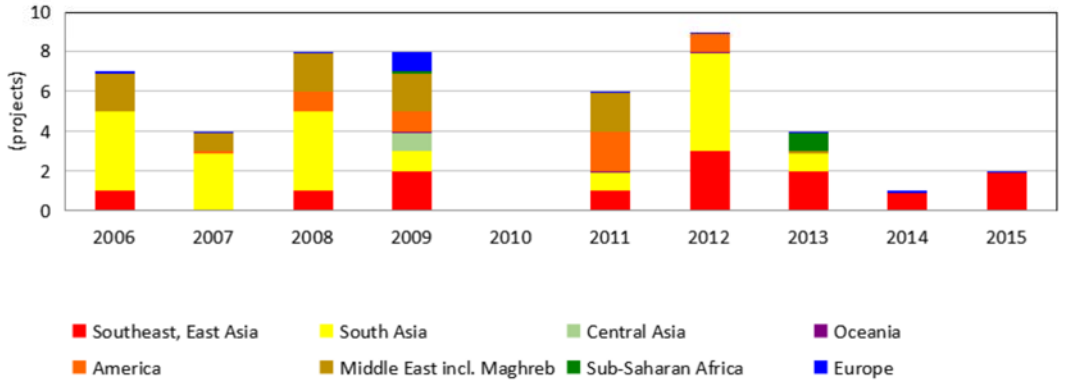


Figure 2.8: Number of ODA loan projects by region[25)]

25) The number of projects was 0 in FY2010 as a result of the timing of the formulation of projects or the issuance of exchange of notes (E/N).

Table 2.10: Value of ODA loans by country

(million Yen)

Region	Country	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	total
Southeast Asia	Indonesia	23,519							10,029			33,548
	Cambodia			3,513			7,161					10,674
	Thailand				4,462							4,462
	Viet Nam				17,952			3,786			14,910	36,648
	Myanmar								17,000	23,683		40,683
	Laos										10,271	10,271
East Asia												-
South Asia	India	57,599	53,744	59,275				80,798	16,279			267,695
	Sri Lanka	13,231		8,388	4,904		15,729	5,166				47,418
	Bangladesh	12,224						34,847				47,071
Central Asia	Azerbaidjan				32,851							32,851
Oceania												-
Central America, Carribean												-
South America	Brazil						33,584					33,584
	Peru			4,995	5,550		3,210	5,078				18,833
North America												-
Middle East incl. Maghreb	Iraq			77,235	41,274							118,509
	Tunisia	5,412					6,094					11,506
	Morocco	5,537	13,615		15,487		17,440					52,079
Sub-Saharan Africa	Cape Verde								15,292			15,292
Europe	Turkey				26,826							26,826

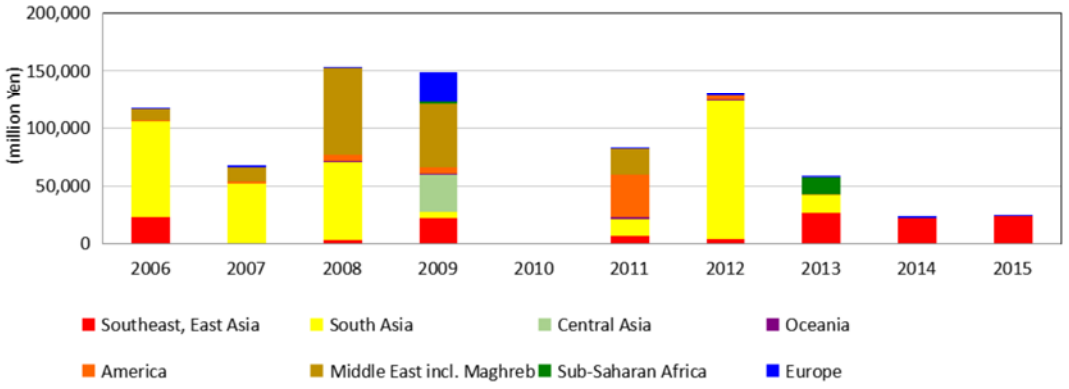


Figure 2.9: Value of ODA loans by region

Table 2.11: Number of technical cooperation projects by country

(Number of projects)

Region	Country	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	total
Southeast Asia	Indonesia									1		1
	Cambodia		1					1				2
	Timor-Leste			1								1
	Viet Nam	1										1
	Myanmar	1										1
	Laos							1				1
East Asia												
South Asia	India										1	1
	Nepal			1								1
	Pakistan									1		1
	Bangladesh									1		1
Central Asia												
Oceania	Samoa								1			1
	Solomon Islands							1				1
Central America, Carribean	El Salvador			1								1
	Guatemala				1							1
	Jamaica	1										1
	Nicaragua											
South America	Brazil	1				1						2
	Peru			1								1
	Bolivia			1								1
North America												
Middle East incl. Maghreb	Iraq						1					1
	Egypt		1			1						2
	Jordan			1								1
Sub-Saharan Africa	Uganda										1	1
	Ethiopia		1					1				2
	Kenya				1							1
	Zambia		1				1					2
	Sierra Leone	1										1
	Sudan			1		1	1				1	4
	Senegal	1										1
	Tanzania	1	2				3					6
	Nigeria									1		1
	Burkina Faso			1							1	2
	Madagascar			1								1
	Malawi					1						1
	South Sudan										1	1
	Mozambique	1						1				2
	Rwanda									1	1	2
Europe												

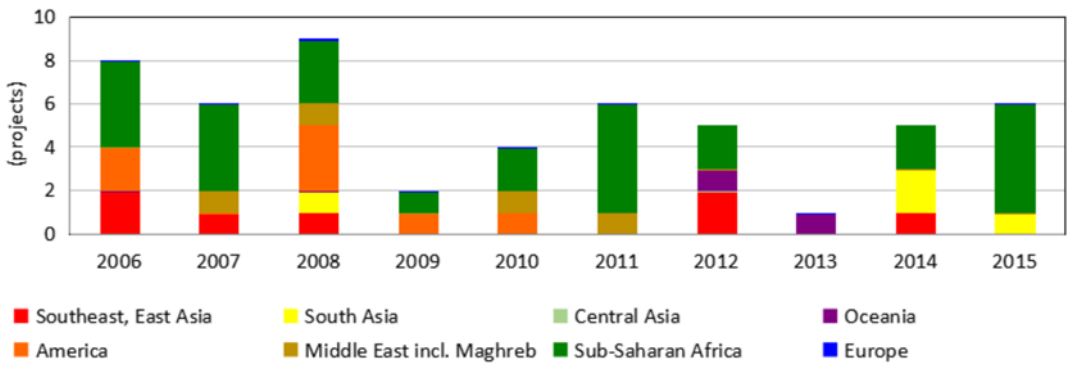


Figure 2.10: Number of technical cooperation projects by region

The JICA Partnership Program is not included in the figures provided in Table 2.11 or Figure 2.10, but several projects have been adopted and implemented every year, mainly in Southeast Asia. The titles of the projects are listed in the Data Book.

Table 2.12: Number of trainees by region

Trainees trained in Japan	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	total
Southeast Asia	263	60	33	38	98	161	103	56	94	71	977
East Asia	4	4	6	1	3	3	8				29
South Asia	17	12	13	41	22	61	56	17	37	34	310
Central Asia	17	16	19	17	17	7	5		2	3	103
Oceania	3	1	5	3	3	3	4	17	28	29	96
America	3	54	55	58	37	33	24	25	15	5	309
Middle East incl. Maghreb	34	25	27	17	28	21	19	12	14	18	215
Sub-Saharan Africa	66	22	215	107	64	210	546	1349	801	78	3458
Europe	13	13	12	19	13	15	3	3	2	3	96
total	420	207	385	301	285	514	768	1479	993	241	5593

Table 2.13: Number of long-term experts dispatched by region (MHLW, MLIT, and national universities)

Long-term experts (excl. JICA)	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	total
Southeast Asia	3	4	5	5	2	3	7	6	5	7	47
South Asia	3	1	1	1	1						7
Oceania									1	1	2
America		1	1	1	1						4
Sub-Saharan Africa					1	1	1	1			4
total	6	6	7	7	5	4	8	7	6	8	64

Table 2.14: Number of short-term experts dispatched by region (MHLW, MLIT, and national universities)

Short-term experts (excl. JICA)	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	total
Southeast Asia	14	13	16	9	20	23	31	18	17	24	185
South Asia		1					18				19
Oceania									2	4	6
America		1	2	2	6	5	6	3	1		26
Sub-Saharan Africa				2							2
total	14	15	18	13	26	28	55	21	20	28	238

Chapter 3　Results of a Field Survey in Laos

3–1　Purpose of the Field Survey

1) Selecting a country suited to the purpose of the field survey

In order to more accurately ascertain the status of the international cooperation activities that had been proposed and carried out so far, we decided to conduct a field survey in Laos, a country to which Japan had provided continuous international cooperation in the water supply sector for more than 10 years.

To ascertain the situation from the viewpoint of this study, we surveyed a wide range of international cooperation activities that had been undertaken in Vientiane (the capital of Laos) and its peripheral cities. We selected Laos because Japan has been carrying out international cooperation activities in the water supply sector there almost continuously over a long period of time (more than 10 years), and these activities have been carried out throughout the country, not just in particular cities. Other reasons for this selection include the following: experienced experts are stationed on site; we would be able to see the results of MDGs; Laos will be an important beneficiary country for the activities that Japan will undertake under the SDGs; and we would be able to see how Japan's international cooperation activities in the water supply sector would change over the long term. From the viewpoint of this study, international cooperation activities in Laos have the following characteristics.

- What? Various activities have been carried out, including reductions in non-revenue water and management improvements.
- How? Thought-provoking experiences have been gained through the current technical cooperation projects, which emphasize improvement activities based on accumulating records and evaluating them quantitatively.
- Where? It is impossible to focus on differences between countries, but it is possible to obtain information about activities not only in the capital, but also in local cities because the activities have been carried out throughout the country.
- Who? Experts have been dispatched from water utilities in Saitama City and other areas of Japan, so it is also possible to get tips on recruiting and developing Japanese experts in the water supply sector who are capable of engaging in international cooperation.
- With whom? It is possible to research the status of collaborations between the water supply sector and other sectors.

3–2　Overview of Cooperation in Laos

Japan first provided assistance to Laos in 1963 in the form of a grant aid project, and then carried out various other projects that were mainly for the maintenance, expansion and improvement of facilities in the country's capital, Vientiane. In parallel with these facility maintenance projects, Japan has provided carious types of technical cooperation since around 2000, including the dispatching of experts in water supply planning and in the maintenance of water supply facilities and the implementation of a human resource development project. In addition, facility maintenance projects have been expanded to include not only the capital but also the country's second and third cities. In recent years, Japan has provided assistance by employing various schemes that will allow it

to meet needs that are constantly changing over time and in accordance with the project environment. Examples of these schemes include facility maintenance projects that are funded by foreign private capital and under public-private partnership (PPP) agreements, as well as expansion projects for water treatment plants that are funded by yen loans. The main projects are listed in Table 3.1.

Table 3.1: History of projects in Laos[26)]

Year	Description of assistance provided	Remarks (project area or donor organization)
1963	Project for Construction of the Kaolieo Water Treatment Plant (Grant aid)	
1973	Project for Repair of the Vientiane Water Supply Facilities (Grant aid)	
1981	Project for Construction of the Vientiane Water Tower (Grant aid)	
1983	Project for Improvement of the Vientiane Water Supply System (Grant aid)	
1992–96	Project for Development of the Vientiane's Water Supply (Grant aid)	
1992–	*Project for Groundwater Development in Vientiane Province (Grant aid)*	*Suburbs of the capital*
1997–2000	*Groundwater Development Project in Champasak and Salavan Provinces (Grant aid)*	*Provinces*
2000	Project for Water Supply Planning (Dispatch of experts)	Saitama City
2000–02	Project for Maintenance of Water Supply Facilities (Dispatch of experts)	Saitama City
2000–03	*Project for Rehabilitation of Water Supply Facilities in Savannakhet Area (Grant aid)*	*Third city*
2003–04	Study on Vientiane Water Supply Development Project (Technical cooperation)	
2003–06	Project for the Development of Human Resources for Water Supply Systems (Technical cooperation) Beneficiary organizations: Water supply state enterprises (Vientiane Capital, Luang Prabang and Champasak)	Saitama City
2004–09	Project for the Vientiane Water Supply Development (Grant aid)	
2006–08	Project for Improvement of Maintenance Technologies for Water Supply and Distribution Pipes (JICA Partnership Program) Beneficiary organizations: Water supply state enterprises (Vientiane Capital, Champasak, Savannakhet, Luang Prabang and Khammouane)	Saitama City
2012–17	Capacity Development Project for Improvement of Management Ability of Water Supply Authorities (Technical cooperation) Beneficiary organizations: Water supply state enterprises (Vientiane Capital, Luang Prabang and Khammouane)	Saitama City (Saitama Prefecture), Kawasaki City, Yokohama City and Matsuyama City
2013–17	*Thakhek Water Supply Development Project (Grant aid)*	
2015–18	Project for Improving Water Treatment Plant Operations and Maintenance Management of the Water Supply State Enterprises (JICA Partnership Program) Beneficiary organizations: Water supply state enterprises (Vientiane, Luang Prabang and Khammouane)	Saitama Prefecture Bureau of Public Enterprise
2016–	Vientiane Capital Water Supply Expansion Project (ODA loan)	

Note: Grant aid projects, ODA loan projects and technical cooperation projects are highlighted in yellow, blue and green, respectively, and the names of provincial projects are in italics.

(1) Assistance in the facility construction and maintenance

26) Masahiro Shimomura (2016); "The 5th Installment of the News from Mittaphab: Japanese Support and Project MaWaSU"; *Journal of Water Supply*, Vol. 61(1), 38-44 (p. 41).
JICA; "Results of Cooperation Activities in Laos' Water Supply Sector"; 2015

Japan first provided assistance to Laos in 1963 in the form of a project for the construction of the Kaolieo Water Treatment Plant.[27] This was done as post-war quasi-reparations (i.e., assistance provided to a country that has refused to receive reparations). This project was followed by the first grant aid project in the water supply sector in 1973, the Vientiane Water Supply Facilities Repair Project in the Lao PDR (150 million yen)[28] in 1983 to 1984, the renovation of the Kaolieo Water Treatment Plant in 1983, the expansion and renovation of the Chinaimo Water Treatment Plant in 1992 to 1996, the extension and renovation of the Kaolieo Water Treatment Plant and the improvement of the Chinaimo Water Treatment Plant in 2004 to 2009, and other projects for water supply facilities.

The Thakhek Water Supply Development Project is a provincial project that was carried out from 2013 to 2016 with the aim of increasing the water supply coverage in Thakhek (the capital of Khammouane Province in the southern part of Laos) from 50% to 80%. The project resulted in the construction of a new water treatment plant (with a capacity of 15,000 m^3/day) as a substitute for the old water treatment plant, as well as the installation of water supply and distribution pipes and two elevated water tanks (with a total capacity of 1,300 m^3).[29]

In Vientiane, an ODA loan project called the Vientiane Capital Water Supply Expansion Project is to be implemented with the aim of extending and renewing the Chinaimo Water Treatment Plant and the water supply and distribution pipes.[30]

(2) Human resource development activities

In 1999, the Prime Minister of Lao issued an order for the establishment of a city water supply system that would ensure stable supply of safe water 24 hours a day for 80% of the urban population by 2020.[31] In response to this, Japan launched the Project for the Development of Human Resources for Water Supply Systems in 2003 with the aim of developing engineers engaged in the operation and maintenance of water supply facilities and the management of water treatment plants as well as instructors for providing training on water supply services. During this project, 18 trainees received training in Laos and at the National Water Technology Training Institute (NWTTI) in Thailand, and 5 of these trainees also received training in Japan to be certified as instructors. In addition, 108 chief

27) Masahiro Shimomura (2016); "The 5th Installment of the News from Mittaphab: Japanese Support and Project MaWaSU"; *Journal of Water Supply*, Vol. 61(1), 38-44 (p. 40).
Yasuhiko Kobayashi (1995); "Encouragement of International Exchanges in the Water and Environmental Sanitation Field"; Japan Environmental Sanitation Center (JESC), 1995, p. 22.
Ministry of Foreign Affairs, Japan; "Diplomatic Bluebook Vol. 11, 1967"
Nobutaka Shinonaga; "Japanese Quasi-reparations to and Economic Cooperation with Laos and Cambodia"; Collection of Economic Papers; Daito Bunka University, 82-2, 2004. 2, p. 22.
28) Norihito Tambo, Sadao Sakazaki, Haruo Iwahori, Yasuhiko Kobayashi, Nariyuki Okamoto, and Yasumoto Magara; "Round-table Discussions in Celebration of Winning the JICA Distinguished Service Award"; *Journal of Japan Water Works Association*; March 1994, 2-25. (p. 6)
JICA; "Transfer of Technologies in the Water and Sanitation Field: Trends in and Information on Assistance Activities"; 1989, p. 115.
29) JICA; "Preparatory Survey on Thakhek Water Supply Development Project in Khammouane Province in Lao People's Democratic Republic"; 2013, pp. S-7, 8.
30) JICA website (http://www.jica.go.jp/press/2015/20160323_01.html)
31) JICA; "Report on Evaluation at Completion of Capacity Development for Water Supply Systems in the Lao PDR"; 2007, p. S-2.
JICA; "Notification of Completion of the Thakhek Water Supply Development Project in the Lao PDR (Type-A Project Financed by National Bonds)"; 2016, p. 1-3.

engineers received training in Laos, and 40 of these trainees also received training at the NWTTI. In total, 268 field engineers received training.[32] This project was implemented in parallel with other projects such as the "Project for the Development of the Vientiane Water Supply," and information was exchanged among the various projects.[33] In Vientiane, a water environment survey was conducted from 2009 to 2011, and a master plan was developed for the provision of legislation and environmental education.[34]

It was necessary to follow up on the above-mentioned projects and there was an urgent need to implement measures to prevent water leakage under the increased water pressure resulting from the improvements to water treatment plants. To meet these needs, a JICA Partnership Program called the "Project for Improvement of Maintenance Technologies for Water Supply and Distribution Pipes" was implemented from 2006 to 2008.

A Prime Minister's Order issued in 1999 obliged water supply state enterprises to run efficient, self-sustaining operations based on short-term plans while covering facility maintenance costs and other such expenses. Since 2010, the Water Supply Regulation Office (WASRO) of the Ministry of Public Works and Transport (MPWT) has obliged water supply state enterprises to set annual performance indicator targets and to monitor and report the results. However, few water supply state enterprises were able to fulfill these obligations, and concerns were raised about the adverse effects of developing ad hoc short-term plans that fail to take into account medium- to long-term views and of introducing short-sighted PPPs. The business operations made little progress in terms of efficiency improvements. Of the 17 water supply state enterprises in Laos' capital and its provinces, only 4 were making a profit in 2009. To address this issue, the "Capacity Development Project for Improvement of Management Ability of Water Supply Authorities" is being implemented from 2012 to 2017 to help water supply state enterprises deliver sustainable business management. Under this project, the Luang Prabang Water Supply State Enterprise, the Vientiane Capital Water Supply State Enterprise and the Khammouane Water Supply State Enterprise were designated as pilot water supply authorities and served as instructors and leaders in the northern, central and southern regions, respectively, to expand the activities into all of the provinces of Laos.[35] The Saitama City Waterworks Bureau, the Saitama Prefecture Bureau of Public Enterprise, the Waterworks Bureau, the City of Kawasaki, the Yokohama Waterworks Bureau and the Matsuyama City Waterworks Bureau took on leadership roles in this project in terms of the dispatching of experts and accepting trainees.[36]

As described above, Japan has provided Laos with assistance appropriate to the local conditions through ODA loan projects and grant aid projects for the construction and maintenance of facilities, technical cooperation projects and JICA Partnership Program projects.

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32) JICA; "Report on Evaluation at Completion of Capacity Development for Water Supply Systems in the Lao PDR"; 2007, p. 9.
33) JICA; "Report on Evaluation at Completion of Capacity Development for Water Supply Systems in the Lao PDR"; 2007, p. 20.
34) JICA; "Final Report on the Study on Improvement of Water Environment in Vientiane City: Main Report"; 2011
35) JICA; "Mid-term Review Report on the Capacity Development Project for Improvement of Management Ability of Water Supply Authorities"; 2015, pp. A3-1, 2.
36) JICA; "Mid-term Review Report on the Capacity Development Project for Improvement of Management Ability of Water Supply Authorities in Lao PDR"; 2015, pp. 1-3.

3–3 Members of the Field Survey Team

Table 3.2: Members of the Laos field survey team

(Titles omitted)

Member	Position	Remarks
Takafumi Nakayama	Assistant Director, International Affairs Division, International Cooperation Office, Minister's Secretariat, MHLW	
Hiroaki Shoji	Section Chief, Office of International Cooperation International Affairs Division, Minister's Secretariat, MHLW	
Keisuke Sonoda	Civil Engineer, Management and Planning Division, Operation Department, Saitama City Waterworks Bureau	Committee member
Toru Tomioka	Senior Advisor, CEO Office, Swing Corporation (Formerly worked in the International Division, Japan Water Works Association)	
Tatsuo Morimoto	Senior Advisor, Federation of Japan Water Industries, Inc. (Formerly served as General Manager of Oversea Division, Disaster Reduction and Water Development Department, Pacific Consultants Co., Ltd.)	Committee member
Takeo Yamaguchi	Technical Adviser, Japan International Corporation of Welfare Services	Secretariat

3–4 Organizations Visited

Table 3.3: List of organizations visited for the field survey

(Titles omitted)

Organization visited	Interviewee	Remarks	Position
Department of Housing and Urban Planning (DHUP), Ministry of Public Works and Transport (MPWT), Lao PDR	Mr. Khamthavy Thaiphachanh (Director General)	Until recently, Mr. Khamthavy had been managing water supply services for a long time, so he is very knowledgeable about the history of water supply administration.	Mr. Khamthavy Thaiphachanh Director General Department of Housing and Urban Planning, Ministry of Public Works and Transport Lao People's Democratic Republic
Department of Water Supply (DWS), Ministry of Public Works and Transport (MPWT), Lao PDR	Mr. Phomma Veoravanh (Director General) and Mr. Khanthone Vorachith (Head of Water Supply Division, DHUP)	Mr. Phomma is currently managing water supply services. Mr. Khanthone has been managing water supply services for a long time.	Mr. Phomma Veoravanh Director General Department of Water Supply, Ministry of Public Works and Transport Lao People's Democratic Republic
Vientiane Capital Water Supply State Enterprise (NPNL)	Mr. Khampheuy Vongsakhamphoui (General Manager)	The largest and longest-running water supply authority in Laos, NPNL has received a lot of assistance from Japan. Mr. Khampheuy knows a lot about past projects.	Mr. Khampheuy Vongsakhamphoui General Manager Vientiane Capital Water Supply State Enterprise
Luang Prabang Water Supply State Enterprise (NPLP)	Mr. Soulith Chindamany (General Manager), Mr. Chanthone Sanaphay (Deputy General Manager) and Mr. Ladda Philavong (Head of Planning in Materials Section and also serves as an interpreter)	Human resource development and other projects are in progress.	Mr. Soulith Chindamany General Manager Luang Prabang Water Supply State Enterprise
Khammouane Water Supply State Enterprise (Thakhek) (NPKM)	Mr. Khanngeun Sengiem (General Manager) and Mr. Khampasith Sinthepphavong (Head of Technical Section)	Human resource development and other projects are in progress.	Mr. Khanngeun Sengiem General Manager Khammouane Water Supply State Enterprise

3–5 Schedule for the Field Survey

Table 3.4: Schedule for the field survey in Laos

Date	Purpose	Schedule and place		Interviewees
Nov. 20 Sun.	Travel by air	10:00 - 13:55 16:40 - 17:50 19:00 - 21:00	VN311 Narita - Hanoi (transit) VN2897 Hanoi - Vientiane Team member meeting	
Nov. 21 Mon.	Survey Observation Survey Survey	09:00 - 10:20 10:40 - 12:10 14:00 - 15:30 17:00 - 20:00	Vientiane Capital Water Supply State Enterprise (NPNL) Tour of Dongmakkhay Water Treatment Plant Department of Water Supply (DWS), Ministry of Public Works and Transport (MPWT), Lao PDR JICA experts	 Mr. Phomma Veoravanh (Director General) Mr. Khanthone Vorachith (Chief of Water Supply Division, DHUP) Mr. Shimomura (Expert) Mr. Kinoshita (Expert)
Nov. 22 Tue.	Survey Survey Survey Observation	10:00 - 12:00 13:00 - 14:20 14:50 - 15:20 15:50 - 17:00	Department of Housing and Urban Planning (DHUP), Ministry of Public Works and Transport (MPWT) Vientiane Capital Water Supply State Enterprise (NPNL) Visit to JICA Laos Office Tour of Chinaimo Water Treatment Plant	Mr. Khamthavy Thaiphachanh (Director General) Mr. Khampheuy Vongsakhamphoui (General Manager) Ms. Makimoto (Senior Representative) Mr. Ogura (Person in charge)
Nov. 23 Wed.	Travel by land Observation Observation	08:00 - 11:00 11:00 - 11:20 11:30 - 12:00 12:00 - 16:00 16:00 - 17:00	Travel by car Greeting at Bolikhamsai Water Supply State Enterprise Visit to site of Tohkemy Corporation's water treatment plant Travel by car Greeting at Khammouane Water Supply State Enterprise Tour of new Thakhek Water Treatment Plant	
Nov. 24 Thu.	Survey Travel by land	09:00 - 10:30 10:30 - 17:00	Interviews at Khammouane Water Supply State Enterprise (NPKM) Travel by car	Mr. Khanngeun Sengiem (General Manager) Mr. Khampasith Sinthepphavong (Head of Technical Section)
Nov. 25 Fri.	Travel by air Survey Observation Observation	09:10 - 10:00 11:00 - 12:50 14:30 - 14:50 15:10 - 15:30 16:00 - 18:00	QV111 Vientiane - Luang Prabang Interviews at Luang Prabang Water Supply State Enterprise (NPLP) Tour of Pupung Water Treatment Plant Tour of Thailand Asia Water Treatment Plant Tour of Nam Khan Water Treatment Plant	 Mr. Soulith Chindamany (General Manager) Mr. Chanthone Sanaphay (Deputy General Manager) Mr. Ladda Philavong (Head of Planning in Materials Section)
Nov. 26 Sat.	 Travel by air	09:00 - 17:00 19:10 - 20:05	Team member meeting and organization of data and materials VN930 Luang Prabang – Hanoi (transit)	
Nov. 27 Sun.	Travel by air	00:25 - 07:00	VN310 Hanoi - Narita	

3–6 Details of the Field Survey

1) Details of interview research

In this field survey, we conducted interviews to conduct research into the local conditions. The research was classified into categories (A) to (E) below based on the data and materials organized to date. The purposes of the various research categories are summarized below.

- (A) Research was conducted to obtain statistics and conduct monitoring. This is classified as research for measuring the achievements of international cooperation. (How?)
- (B) Research was conducted to ascertain specific details concerning activities focused on reducing non-revenue water and carrying out water quality management. This is classified as research for ascertaining specific details concerning international cooperation activities in the water supply sector. (What?)
- (C) Research was conducted to ascertain the status of human resource development based on the purposes of the technical cooperation projects. This is classified as research to ascertain specific details concerning international cooperation activities in the water supply sector. (Who?)
- (D) Research was conducted to ascertain the status of relationship building with various entities from the perspective of collaborations with other sectors and organizations. This is classified as research to ascertain collaborations among parties involved in water supply services and collaborations between the water supply sector and other sectors. (With whom?)
- (E) Research was conducted to ascertain the status of the recruitment and development of experts by interviewing local experts from the perspective of recruiting and developing Japanese experts in the water supply sector who are capable of engaging in international cooperation. (Who?)

Table 3.5: Interview research conducted in the field survey

Category	Topic	Aim of research	Experience in Laos
(A) Statistics and monitoring		To ascertain how data was collected so as to develop various PIs (e.g., the water supply coverage and the continuous water supply). Once the findings have been extracted, determine what kind of data can be obtained accurately and what kind of data is difficult to obtain for a quantitative evaluation of the degree of attainment, which is an important step in achieving the SDGs.	It is possible to gain valuable insights by ascertaining how data collection and recording systems were established in Laos.
(B) Activities	(1) NRW	To ascertain the implementation status of measures to reduce non-revenue water (e.g., transferring of water leakage detection technologies and management of construction works) as priority measures.	The aim of this research is to ascertain the implementation status of priority measures that were proposed in the 2006 study report as measures to be taken globally.
	(2) Water quality management	To ascertain the implementation status of measures related to water quality management (e.g., monitoring of water quality, supplying of chemicals and the like, and establishment of standards) as priority measures.	
(C) HRM	(1) HRM system	To ascertain what is being done to recruit and develop water supply personnel. Specifically, acquire information on the personnel management systems used for executives and for workers, including in terms of recruitment, promotion, qualifications and rewards.	The aim of this research is to find out what activities are being undertaken in Laos and the outcomes of these activities in order to ascertain the implementation status of the specific measures for human resource development that were identified as being important in the 2006 study report.
	(2) Human resource development	To ascertain the implementation status of the training system used for human resource development. Specifically, acquire information on the purpose and details of the training, the selection of trainees, the securing of training facilities and teaching materials, and collaborations with Japan and other countries.	
	(3) Morale improvements	To ascertain what measures are being taken to retain employees and keep them motivated.	
(D) Cooperation with other sectors and organizations	(1) Residents	To ascertain how public water suppliers build relationships with local residents and to determine whether local residents participate in the promotion of the water supply business.	The aim of this research is to ascertain the status of collaborations with various sectors and organizations other than the water supply sector and to gain insights on collaborations. This aim is in accordance with the 2006 study report, which emphasized the importance of coordinating efforts to introduce the comprehensive assistance approach.
	(2) Other sectors	To examine the possibility of collaboration with other sectors (e.g., agriculture and power generation) to maintain or operate the water supply system.	
	(3) Private water supply	To determine whether there has been any collaborations or conflict with public water suppliers.	
	(4) Japanese companies	To examine the possibility of collaboration with Japanese companies and to determine what proved to be a barrier to entry for Japanese companies.	
	(5) Other countries or donors	To learn about efforts made by other donor countries and adopt their good practices, if any.	
(E) Recruitment and development of experts		To ascertain how on-site employees feel about measures to recruit Japanese personnel capable of playing an active role overseas.	The aim of this research is to gain insights into the measures for recruiting human resources identified in the 2006 study.

2) Questionnaire

The following questionnaire was used in the survey.

Table 3.6: Questionnaire used in the field survey

Category	Topic	Question
(A) Statistics and monitoring		Please let us know how you collected the data used to develop the various PIs, such as the water supply coverage and the continuous water supply. ● Population served (No. of people) ● Connections (existing and new) (No.) ● Meters replaced (No.) ● Water produced (m^3) ● Water sold (m^3) ● Water rate accounting (LAK) ● Connection fee accounting (LAK) ● Non-payment (No.) (%) ● Complaints (No.) ● P/L & B/S ● Length of pipeline network and extensions (m) ● Construction and repair record ● Rate of restricted water supply (%) ● Water supply pressure inadequacies ● Hours of water interruption (%) ● Non-revenue water (NRW) (%) ● Aging of treatment facilities (%) ● Aging of mains (%) ● Monitoring of water quality to manage water safety
(B) Activities	(1) NRW	Please let us know what you have done and what you intend to do to reduce non-revenue water (e.g., transferring of water leakage detection technologies and management of construction works).
	(2) Water quality management	Please let us know what you have done and what you will do to manage water quality (e.g., monitoring of water quality, suppling of chemicals and the like, and establishment of standards).
(C) HRM	(1) HRM system	Please let us know what you do to recruit and develop water supply personnel. Specifically, please let us know about the personnel management systems you use for executives and for workers, including in terms of recruitment, promotion, qualifications and rewards.
	(2) Human resource development	Please let us know about the training system you use for human resource development in terms of the following: ● Determining the purpose and details of training ● Selecting trainees ● Securing training facilities and teaching materials ● Collaborating with Japan and other countries
	(3) Morale improvements	Please let us know what kind of measures you take to retain your employees and boost their motivation.

Category	Topic	Question
(D) Cooperation with other sectors and organizations	(1) Residents	Please let us know what you do to enhance communication between public water suppliers and local residents. Have local residents ever participated in the promotion of the water supply business?
	(2) Other sectors	Have you ever collaborated with other sectors (e.g., agriculture and power generation) to maintain or operate your water supply system?
	(3) Private water supply	Are you undertaking water supply management in collaboration with private water suppliers? Have you ever had a conflict with a private water supplier?
	(4) Japanese companies	Have you ever been approached by a Japanese company? If yes, what proved to be a barrier to their entry?
	(5) Other countries or donors	What were the advantages of the projects proposed by other donor countries, if any?
(E) Recruitment and development of experts		Please share any opinions, requests, ideas or any other comments you may have about measures for recruiting Japanese personnel capable of playing an active role overseas. (This question is for Japanese experts only.)

3–7 Results of the Field Survey

The results of a field survey conducted on two state organizations, three water supply state enterprises, and JICA-related personnel are as follows.

1) State organizations and JICA-related personnel

Table 3.7: Field survey results (state organizations and JICA-related personnel)

Category	Target	Department of Housing and Urban Planning (DHUP)	Department of Water Supply (DWS)	Additional opinions from Japanese experts and JICA
(A) Statistics and monitoring	Population served		Information is still being gathered on Laotian water utilities. Little information is available on regional areas in particular. JICA is carrying out surveys to collect basic information. An assessment of the results is scheduled for February. Information is being collected via the regional water utilities (provincial departments for public works and transport, as well as water supply state enterprises (WSSE)).	The population census conducted every decade was last conducted in 2015 (as well as in 1995 and 2005), and interviews has been conducted with the mayors of each village to determine their populations. There may be some discrepancies with the actual population, as the size of the population increase following the census has been used as the basis for calculations.
	Accounting/rates revenue management			Rates may be paid at the convenience of the residents. The entire extended family lives as a single unit and most family members work. All assets are shared. Basically, the meter readers attend the properties to collect the rates. A bill is left when the meter is read.
	Pipe management & pipe ledger management			There are few facility records or design drawings. There are not enough construction records or histories. However, this is being improved through the MaWaSU Project. Almost all water pipes have been laid within the last twenty years, so aging is not yet a

Category	Target	Department of Housing and Urban Planning (DHUP)	Department of Water Supply (DWS)	Additional opinions from Japanese experts and JICA
				problem.
(B) Activities	(1) Measures for non-revenue water	NRW measures were launched in 2005 with the support of JICA. They first implemented in Vientiane. They were originally part of a JICA human resource development project. Under this project, people were trained to develop leakage management skills. The first trainees were trained in Japan so that they could learn how to instruct others. These instructors brought together trainees from all over the country to train them. The key issue is that management system and HR training is provided in relation to NRW.	We have learned that NRW accounts for about 25% in most WSSEs. NRW measures are being strengthened in order to deal with this. Initiatives are under way to reduce the amount of NRW, using related measures in addition to improving new water supply facilities. The ADB Project is being implemented in six locations. A special program is being implemented for Vientiane, while a Chinese project is being implemented to replace aging pipes. Other WSSEs have not been established for long and they lack expertise in leakage management, and they are not yet actively engaging in initiatives. The government intends to find funds for new equipment and facilities, including for the refurbishing of existing ones, by raising the water rates. However, there are limits as to how much rates can be revised under the current rules.	
	(2) Water quality management	Water quality management has started, to an extent, with the construction of the first water treatment plant. With ADB support from 2010, a water quality management system has been established nationwide and an office has been set up within the DHUP. The Water Quality Control Committee manages water quality standards. The results of water quality checks are reported by each WSSE. The ADB has proposed and budgeted for the	WHO Water Safety Planning Guidelines have been prepared. We will consult with the Training Center (TC) and other areas on how to develop expertise. In the first stage, initiatives were carried out at a number of state enterprises between 2008 and 2010. In the second stage, initial completion in nine regions was scheduled for 2016. Going forward, we intend to look at local communities that use regional water utilities, especially those that use	

Category	Target	Department of Housing and Urban Planning (DHUP)	Department of Water Supply (DWS)	Additional opinions from Japanese experts and JICA
		establishment of a water quality management corporation, but this has not realized, so water quality management, water safety planning, and the like are done in tandem with the WASRO, which is the monitoring organization for waterworks (indices). Japanese cases are also studied. However, the WSSEs still need to made major improvements to water quality management.	natural water sources. In the third stage, a program for improving skills will be implemented. Along with identifying the key management points, key personnel will be trained, who will then share their expertise in water quality management nationwide.	
(C) Personnel	(1) HRM system		At present, each WSSE uses their own system, but in the future, HR strategies and system development will be promoted to establish a strategic HR system.	
	(2) Human resource development	Human resource development is generally handled by each organization, but the HR Training Center can also be used. Support is provided not only by the Laotian government but also by organizations from other countries, including the ADB, JICA, and KOIKA. The ADB focuses mainly on training graduates in civil engineering fields. Under the MaWaSU Project[37], HR training is being conducted at three WSSEs (Vientiane Capital, Luang Prabang, and Khammouane), each of which will provide instructors for the rest of the country as well.	The Chinaimo water treatment plant (CWTP; run by the Vientiane Capital WSSE) has an attached training center called the Chinaimo Training Center, which provides training on the country's waterworks as a whole. Since 2008, newly hired staff and regional WSSE staff have been trained here in accordance with a state directive. People are also sent to the JICA TC at the Thai PWA, and instructors come from Thailand as well. Training is based on O&M. Currently, the basics are being taught, and the longest courses take one month. We feel instructors and the TCs themselves need to be enhanced.	
	(3) Morale improvements	Effective ways of boosting morale include rewarding good workers (e.g., awarding	Measures against corruption have been promoted. Going forward, the focus will be on ensuring	

37) The abbreviation commonly used to refer to the Capacity Development Project for Improvement of Management Ability of Water Supply Authorities.

Category	Target	Department of Housing and Urban Planning (DHUP)	Department of Water Supply (DWS)	Additional opinions from Japanese experts and JICA
		medals or certificates), selecting some workers for overseas study or training, and giving promotions.	transparency and accountability. It is hard to use pay rises as rewards in state enterprises.	
(D) Cooperation with other sectors and organizations	(1) Residents	If no assistance projects are being conducted in areas without waterworks, the Laotian government will provide funding as a strategic initiative.	State enterprises are encouraged to establish call centers to build better relationships with customers. Such centers have been established at the Vientiane Capital, Luang Prabang, Khammouane (Thakhek), and Savannakhet WSSEs (Vientiane Capital's initiative is an HR development project, while Luang Prabang's and Khammouane's initiatives are MaWaSU Projects). PI assesses the building of relationships with customers and how complaints are dealt with. Client needs are understood and compared with the previous year's report. Survey targets will be expanded (MaWaSU Project initiative).	
	(2) Other sectors	Water used in agriculture falls under the jurisdiction of the Department of Irrigation in the Ministry of Agriculture and Forestry, while hydropower generation falls under the jurisdiction of the Ministry of Energy and Mines, so water resource issues are discussed with both of these departments. During national conventions, debates are held on how to best use water and what to do about dam development. There are generally no problems in terms of water volume. The huge Mekong River is a source of water, as are its numerous tributaries. There are also no problems in terms of water intake volumes. However, there are insufficient	The government coordinates and handles compensation, and it also negotiates with the Department of Irrigation and other relevant bodies in regulating the amount of pesticides used and protecting water catchments through measures such as forest management. The Ministry of Energy and Mines has jurisdiction over water use, so parties wishing to use water must seek the ministry's agreement by submitting an application to them. This system was launched last year. Based on agreements formed in this way, water sources are preserved and water is shared in accordance with the commitments made by the regional governments.	

Category	Target	Department of Housing and Urban Planning (DHUP)	Department of Water Supply (DWS)	Additional opinions from Japanese experts and JICA
		treatment plants.		
	(3) Private water supply		Following discussions with the JICA team regarding relationships with private-sector companies, JICA's support was requested. There are no guidelines in place for the governance of private-sector water supplies. This means that no checks are made, which is a problem. As there is a high demand for water, regional governments are increasingly entering into contracts with private companies to provide water. Some private companies have been contracted by provincial governments to sell water to them. Some of these companies are good, while others are not. There is a conflict between water quality and price. Tariff policies are set by the province. Rates are controlled here. Funding, including private capital, is required by small towns, but as they have no money, they attract no money. While the situation differs by region, private water supply companies tend not to actively expand their supply regions. Instead, they concentrate only on large-scale customers, so they do not contribute to making water available to the entire population.	JICA: The government tends to be weak, so while water supply and other private companies are entering the market, there are concerns that they are essentially being left to their own devices. Private companies include not only Laotian ones, but also Thai and other foreign-based ones. The government is keen to establish links with sound foreign corporations and private companies. Chinese capital is also making inroads, and it is expanding extremely rapidly. However, Laotian WSSEs are provided with incomplete facilities and left with no subsequent warranties or maintenance plans. Laos itself is well aware of these issues, but is unable to deal with the speed at which China is moving in. An issue that needs to be tackled is that legal systems have not been established for PPP. One reason for this is that funds cannot be obtained. While Capital Vientiane SE, for example, has to rely on the private sector for investment, it also had to take over a facility from a Vietnamese company when the latter was no longer able to maintain the facility. The need for regulation, including for the private sector, remains an issue.

Category	Target	Department of Housing and Urban Planning (DHUP)	Department of Water Supply (DWS)	Additional opinions from Japanese experts and JICA
	(4) Connections with Japanese companies	The Tohkemy Project[38] is expected to be a 100% private-sector project in the end. The framework is expected to be expanded in the same way going forward by, for example, JICA covering the survey costs. (Equipment costs are covered by JICA, structural costs are covered by the Bolikhamsai Province WSSE, and chemical and electricity costs are covered by Tohkemy. JICA acted as an intermediary in identifying a suitable timing and sites for the project.)	Currently a Tohkemy Project. Eventually, we want to encourage participation by other Japanese companies. We want them to learn how jobs are done in Japan (not just in terms of water supply), including setups and the creation of rules. We look forward to the eventual implementation of comprehensive urban development, energy and other projects, or life-cycle, smart city, and similar projects.	
	(5) Other countries or donors	Small-scale facilities with a capacity of up to 500 m^3/day are being developed through close links with UN-Habitat. The design, etc., will be done by the government, while the construction will be done by getting residents involved in the civil engineering work. Funds will be supplied by the government and residents, and residents will run the facility.	We hope to see greater collaboration. China is also carrying out capacity building. There are close links with the PWA. Support has been given to GIS. Support is also being provided by the Southeast Asian Water Utilities Network (SEAWUN). In general, the support from Japan is proving effective. Japan is providing flexible support that fits the situation. Support is being expanded regionally as well, and in terms of OJT, the support provided to hydro engineers builds on their experience in Japan. In terms of technical support, we can expect to see scholarships being offered for the hydro-engineering fields.	

38) Funded using commissions fees from the Small Town Water Supply Project Feasibility Survey (an Official Development Assistance and Overseas Economic Cooperation Project launched in FY2013 by the Ministry of Foreign Affairs (Promotion of Support for Developing Countries by Disseminating Japanese Technologies)), a joint venture between Tohkemy Corporation and Pacific Consultants Co., Ltd. Water is treated using a fiber filtration system for surface flow raw water and then connected to existing water pipes for supply.

Category	Target	Department of Housing and Urban Planning (DHUP)	Department of Water Supply (DWS)	Additional opinions from Japanese experts and JICA
			We would like to dispatch one or two staff members working in a water bureau to Japan so that they can learn about Japanese technologies.	

2) Water supply state enterprises

Table 3.8: Field survey results (water supply state enterprises)

Category	Target	Vientiane Capital WSSE (NPNL)	Luang Prabang WSSE (NPLP)	Khammouane (Thakhek) WSSE (NPKM)
(A) Statistics and monitoring	Population served		The population served is calculated by multiplying the average number of people per general household for each type of use by the number of water taps.	The population is estimated from population data provided by the DPWT (broken down by province, county, and village), which is applied to the water supply area.
	Number of water supply connections	The number of meters and connections is managed using a database.	The number of meters and connections is managed using a database.	The number of meters and connections is managed using a database.
	Volume of water produced	Since two or three years ago, the flow volume of the water that is produced has been checked monthly. If it drops, the meters are checked for problems. The installation rate for water supply meters is approaching 100%.	Although there are concerns over the accuracy of clean water meters, they are installed at all water treatment plants. The installation rate for water supply meters is approaching 100%.	Clean water meters are in use. The installation rate for water supply meters is approaching 100%.
	Accounting/ rates revenue management	Accounting is done on an annual basis.	Accounting is managed using an accounting system developed within Laos. It was probably set up by a consultant (donor). However, the system cannot be linked with the sales office.	Ten staff members from the Finance Dept. manage the funds and costs. The LAO System (API Lao System) is used. All of the invoices are stored. Electricity prices are increasing annually. The rates collection rate from general households is good.
	Pipe management &	Pipe routes are managed using GIS mapping. This system was developed five years ago with	The total pipe length is managed using Excel. Ledger charts are managed using AutoCAD.	There are design plans but no completion plans, so the accuracy of the pipe route data is

Category	Target	Vientiane Capital WSSE (NPNL)	Luang Prabang WSSE (NPLP)	Khammouane (Thakhek) WSSE (NPKM)
	pipe ledger management	the support of the French Development Agency (Agence Française de Développement; AFD).	Each sales office has its own area of responsibility, and the WSSE manages them as a single volume.	still being improved by checking the actual sites, etc. Data is entered into and managed in AutoCAD. This system was adopted in 2015 to check the existing pipe routes when the MaWaSU Project began.
	Repair records and leak management	A repair team is contacted if a leak is found. Repair records have been kept for about two years. The water pressure is checked weekly using a pressure gauge.		The water pressure in supply regions is checked regularly, and work to search for leaks is mainly conducted in areas with high pressure. Leak repairs are sometimes done at night.
(B) Activities	(1) NRW	Five years ago, the NRW was about 34%, but measures to reduce this have been applied continuously ever since the need for such measures was recognized. Before that, damaged areas were repaired, and that was about the extent of it. The lack of a budget prevents strategic implementation. Repairs are carried out after investigations using a leak sound detection bar, thereby allowing the NRW percentage to be reduced from 30–39% to 20–29%. Several years ago during the first stage, a direct leakage control team was assembled with the support of the MaWaSU Project. The team used mini hoes and other equipment for their work. In the second stage, technical training was provided for leakage detection and repairs. In the third stage, the number of staff involved in measures to reduce water leakage was increased through seminars, etc.	The pipe routes are aging. Some pipes have been in use since 1969. The replacement of aging pipes has a high priority. No accurate information is available for NRW. While there is an inadequate supply of water, data collection is also not possible. A figure of around 25% is reported externally every year, but this is not accurate.	Measures to reduce NRW were started under the MaWaSU Project. At present, the volume of distributed water and the volume of supplied water are measured, NRW has been increasing in recent years, reaching around 22% to 23%. The cause is believed to be the increased length of pipes being used due to the completion of the new Thakhek water treatment plant, but the details are still being investigated.

Category	Target	Vientiane Capital WSSE (NPNL)	Luang Prabang WSSE (NPLP)	Khammouane (Thakhek) WSSE (NPKM)
		Aging pipes are being replaced not only under JICA Technical Cooperation Projects, but also through loans from China. About 20 km of PVC piping needs to be replaced.		
	(2) Water quality management	Water quality monitoring has been conducted annually for ten years. In the first stage, JICA volunteers trained water quality staff at the Chinaimo Water Treatment Plant. There were no water quality specialists before that. In the second stage, staff were taught the importance of water quality management under the MaWaSU Project. Checks are now conducted right until the end stage, not just during the treatment process. A water safety plan project is in the start-up stage. The entire water supply region is covered. The supply of chemicals is inadequate in part.	Staff were only able to do a limited amount of water quality management prior to the MaWaSU Project as they lacked expertise. Water quality management capabilities have improved thanks to the MaWaSU Project. It has improved staff capabilities, provided water quality management training in Laos and overseas and supplied water quality inspection equipment. A water safety plan is also be prepared. Water quality management is being strengthened based on the water quality standards of the Laotian Ministry of Health. This has resulted in better water quality than before. No problems have been encountered in terms of securing the required amount of chemicals. The chemicals used include flocculants and chlorine. Polymers are used for high turbidity. The goal is to ensure appropriate water quality and supply potable water by 2020.	The old Thakhek water treatment plant was developed in 2003. Of its three wells, one is fine but the other two have poor-quality water. Water quality is checked based on 23 indicators, and since the launch of the MaWaSU Project, management has been carried out properly. Before the MaWaSU Project, inspection equipment was used at the treatment plant, but it was made in Laos and of poor quality. A laboratory was built when the new Thakhek water treatment plant was constructed, thereby allowing monthly checks to be carried out. Chemicals are purchased from companies. Few chemicals were used before the construction of the new treatment plant. There are no problems at present. The costs can be covered within the scope of the water rates. The new treatment plant started operation this year, and while comments have been collected from customers via questionnaires on a yearly basis, this year there were no complaints about the water quality. This is no doubt due to the improvements in water quality.
(C) Personnel	(1) HRM system	There were no hiring standards until a year ago, but some were created in 2015. Under the new hiring system, specialist knowledge in	There are 138 staff members. The hiring of specialists, especially those with knowledge of pumps and electricity, is still an issue.	New hires were not brought on in a planned way before, but as a result of the MaWaSU Project, a staff hiring plan is now being

Category	Target	Vientiane Capital WSSE (NPNL)	Luang Prabang WSSE (NPLP)	Khammouane (Thakhek) WSSE (NPKM)
		areas such as finance, law, technology, computers, and English are considered in addition to education. After that, interviews are conducted. Seepan, a counterpart of the MaWaSU Project, created a hiring system. Before then, employment was based on personal connections. Some 200 to 300 people applied for jobs, and 30% were hired. Other WSSEs are struggling to secure personnel. Private companies pay better but these smaller companies tend to be unstable, so the more stable WSSEs are popular. Recruitment for management jobs is conducted openly through newspaper ads, and hiring decisions are made by committees.	Judgments on specializations are made based on a format for assessing staff skills. The factors that are checked include number of years of experience, academic qualifications, and specialist knowledge. This format was introduced as part of the MaWaSU Project. In the waterworks bureau, staff skills are mutually assessed. If they are judged to lack knowledge or skills, they are sent for training. There are employment exams for some fields, such as finance. Hiring is conducted based on recommendations from personal connections rather than through open recruitment, but new hires must still pass the exams before they are hired.	created. At present, however, it is not possible to get enough applicants through general recruitment practices, such as newspaper advertisements. When the new treatment plant was built last year, personal connections were used to hire staff. The same situation applies for new hires every year. This WSSE employs 170 staff, but it is hard for them to hire engineers as there are no suitable applicants.
	(2) Human resource development	The Vientiane Capital WSSE has a training center. The MaWaSU Project is also contributing to HR development. There is also a program for exchanging staff with HueWACO staff in Vietnam.	For training conducted outside the MaWaSU Project, staff visit the training center in Thailand as part of the ADB Project. Funds are set aside for the training carried out by the Vientiane Capital WSSE at the Chinaimo Training Center.	A training plan is formulated each year. Staff are trained at the Chinaimo Training Center in Vientiane, but the budget is limited. Training is also conducted at Thong Kam in Thailand. These activities are carried out by the MaWaSU Project, so the WSSEs do not run any independent training programs.
	(3) Morale improvements	Staff visiting sites to see advanced water supply systems such as those used in Japan has a positive impact. External training like this also helps with motivation.	Some people quit as soon as they are hired, but this is generally due to health or family issues. There have been some illegal dismissals. A bonus system is employed to provide awards. Also, staff who have met a given performance target within the previous three months are given a positive evaluation. Opportunities are provided to forward-looking	Pay is directly connected to morale. However, pay is not changed based on performance or detailed evaluations. If staff get a good evaluation for their work, they can receive training overseas or be promoted faster. Workers who perform poorly are dismissed.

Category	Target	Vientiane Capital WSSE (NPNL)	Luang Prabang WSSE (NPLP)	Khammouane (Thakhek) WSSE (NPKM)
			staff. Performance evaluations are not conducted in the form of evaluations of the subordinate by the supervisor. Instead, they involve self-evaluations and mutual evaluations between workers, which the supervisors then compile. This system is essentially the same as the one used throughout the country.	
(D) Other groups, etc.	(1) Residents	A water-saving campaign aimed at residents was carried out as part of a JICA Technical Cooperation Project (HR Development Project). In addition, the number of classes that are conducted for primary-age children on the subject of waterworks is being increased under the MaWaSU Project. A website has been created to provide information.	No public relations activities were conducted prior to the MaWaSU Project. Now, the agreement of residents is sought through customer questionnaires, etc. Classes on the subject of waterworks are held and call center information is digitized. Questionnaires are also sent to areas that lack piped water, where there is a strong need for water.	Each household is sent a letter if the water rates are to be changed. Classes on the subject of waterworks are held in schools. This initiative was begun under the MaWaSU Project. Complaints and other telephone calls to the call center are recorded and digitized. This was also introduced as part of the MaWaSU Project, starting in 2014.
	(2) Other sectors	There are often close links with road construction. Pipe materials are supplied.	The ADB's small-town initiative is interesting. UN-Habitat, Japan-Habitat and other such bodies are implementing this initiative.	
	(3) Private water supply	A PPP is being carried out in Pangun County (1,000 m^3/day). We think this will be a good thing if a budget can be secured through private-sector investment. It is moving ahead quickly. The project is expected to run for 30 to 50 years, and the rates have been set by the government. BOT projects are being conducted in the two regions of Thadeua and Sendin. The WSSE checks the water quality. The problem at the moment is that the water	In 2013, a town was created in the north of Luang Prabang to rehouse residents living in the environs of the airport. However, as the province's budget did not extend to the provision of a water supply, the private company Thai Asia developed a treatment plant and laid some of the necessary piping. Residents of the town purchase water from this treatment plant. Both sides struggled for the first two years, but in the third year, monthly meetings were held	All tasks—including water supply, repairs, and provision—are carried out directly by the WSSE. No tasks are outsourced to private enterprises. There are no private water supply enterprises, but the WSSEs do rent heavy machinery during construction.

Category	Target	Vientiane Capital WSSE (NPNL)	Luang Prabang WSSE (NPLP)	Khammouane (Thakhek) WSSE (NPKM)
		rates are set low in provincial areas, and even if attempts were made to increase them, revenue would remain low.	to discuss water quality and an expansion of the service so both sides were able to coordinate with each other. The southern part of the city is targeted for expansion, and a private-sector corporation called DEMCO plans to expand the area by constructing a new water treatment plant. Completion is scheduled for May 2017. The contract was drafted following talks between the WSSE and DEMCO. A tender was not conducted. The contract was not drafted in accordance with any guidelines or regulations. A proposal and plan was submitted, and their content was discussed within the WSSE. After that, the provincial board of directors made their decision, and the provincial governor, the Ministry of Public Works and Transport, the Ministry of Planning and Investment, and others gave their approval. There are two types of contract: a contract related to water rates (the WSSE contract) and a contract related to ensuring concessions and land (the state/province contract). The province takes the lead in implementation.	
	(4) Japanese companies	The only Japanese company that the WSSE is aware of is Tohkemy.	Consultant companies such as Nippon Koei and Metawater. Only related tasks such as JICA surveys.	No approaches have been received from Japanese enterprises.
	(5) Other countries or donors	We would like to see some improvement in the time span required for JICA initiatives.	The water supply system for Luang Prabang was established in 1969 with financial support from Germany. In addition to Japan's assistance, support has also been received from	Only ADB loans. In the past, NORAD operated water treatment facilities in four villages, while KOICA was responsible for staff training.

Category	Target	Vientiane Capital WSSE (NPNL)	Luang Prabang WSSE (NPLP)	Khammouane (Thakhek) WSSE (NPKM)
			France, the ADB, UN-Habitat, Japan-Habitat and so on.	

(3) Other matters not included in the questionnaire

Importance of PIs and records management (Shimomura)

Initially, the ADB introduced nine KPIs[39] for a cooperation loan. However, data was not collected properly and the formulae to be used were not appropriately defined. The consultants hired by the ADB just carried out surveys with WASRO and made very rough estimates.

A system for using the nine KPIs was initially created under the MaWaSU Project, but this proved to be insufficient when it came to actually evaluating water supplies, and it was not possible to forecast the future. Given this, water supply coverage was included and the number of KPIs was increased to 23.

At first, it was hard to get local workers to understand the necessity of monitoring and why it was carried out. As a result, we prepared some guidelines on defining waterworks. Initially, no one knew about concepts such as PIs, but they began to understand and the staff were eventually able to report PIs of their own business operations. This cannot be achieved by sending trainees to Japan to study; it needs to be done as a collective effort, starting from the collection of local data. A large number of records are made, and the required items are selected. Some items need to be measured using equipment.

PI calculations are not something that can be done immediately. At first, we were asked why PIs are needed, so we explained that they are required to forecast the future, that PIs allows you to learn what things are like now and how they have changed, and that you have to judge matters based on the current situation.

Assume that system changes will cause confusion (JICA Office)

The division of duties is not yet clear because the Ministry of Public Works and Transport has changed to a new system and the Investment Promotion Act has been revised. Major system changes like these are typical of Laos. In this sort of situation, it is important to carefully consider at the state level what the water supply system should be like and what the regional public works bureaus should do regarding piped water supplies in the provinces. Appropriate plans must be made and the skills required to make such plans must be developed. A particularly serious issue that needs to be addressed is that improvements to the water supply for small villages always end up being delayed.

Recruiting overseas personnel (Shimomura)

People from a range of waterworks bodies have been involved in the MaWaSU Project. Recruiting people engaged in waterworks-related jobs to work overseas like this is good in that it helps to create contact networks and find people with an interest in improving waterworks.

There are always some slight differences between international jobs and domestic ones, so it is necessary to recruit specialists who want to try working overseas and make them master the skills and mindset required for that. The situation that the other party is in must be understood before anything can be done. Sitting back and thinking that everything is fine just won’t play.

In the waterworks industry, global horizontal connections are passed down to the next generation of workers. This means that working hard as a team is important at overseas waterworks sites. Developing human resources in Japan is not enough on its own. It is necessary for senior staff in an organization to understand the effects of fostering the next generation and provide support for this. Moreover,

39) Key performance indicators. These are the most important performance indicators (PIs), and they serve as indexes for measuring whether processes employed to achieve goals are being carried out appropriately.

international cooperation should be carried out to promote Japan, not for incentives or remuneration—that is the mindset that citizens need to have.

3–8 Summary of the Field Survey in Laos

The results of the field survey conducted in Laos can be summarized from the perspective of the survey as described below. In the next chapter, we consider future initiatives based on these findings.

What? Improvements are being made to project planning, monitoring, operation and maintenance capabilities, and project management skills through technical cooperation. Measures to reduce NRW are being implemented through the creation of systems, but there are a lot of newly laid pipes in regional areas and there is still little awareness of the need to address this issue. There is an awareness of the importance of water quality management and systems are being constructed, but numerous issues still need to be tackled. These initiatives were started by the central WSSE (Vientiane Capital WSSE) through the development of facilities and the transferring of technologies, and then spread to regional WSSEs, local waterworks, and community waterworks. Furthermore, GIS information has been added to pipe route ledgers and a database has been constructed using AutoCAD with the help of other donors.

How? Initially, there was no awareness of the necessity to conduct monitoring, let alone performance indicators (PIs). However, as a result of efforts to raise awareness of how necessary and important they are through a technical cooperation project, there is now a greater understanding of these issues and staff can now use PIs to explain project issues to third parties. Going forward, forecasts will be created from an accurate data-based understanding of the current reality and used to make project plans. However, there are still no underpinnings for information collection in the regional areas and a system for this is still being developed. Data needs to be collected from the entire country, assessed, and its validity verified.

Where? As noted above, the development of facilities and the transferring of technologies started in Vientiane, after which it was expanded into the country's second and third cities and then into other areas. However, many of the smaller villages are being left out and expansion into these areas has been postponed.

Who? Not enough people have been trained in waterworks techniques, and in regional areas in particular, it is hard to hire engineers. Therefore, the skills of hired staff are being improved through locally run technical cooperation projects and training in Japan and Thailand. Japan's cooperation is being carried out in stages, starting with the dispatching of volunteers, the dispatching of experts, the provision of technical cooperation (dispatching experts from multiple enterprises), and the conducting of grassroots exchanges. As the ones providing the technology transfers, we need to be fully aware of the local situation before providing any cooperation.

With whom? In collaborations with other ministries and agencies, the coordination of water rights is mainly done through discussions with the agricultural and power industries. Collaborations with waterworks entities are forming a network among WSSEs. To build better relationships with customers, a call center for dealing with customers has been established and a system is being put into place for storing details of complaints or requests. In relationships with private-sector companies, a high level of interest in waterworks businesses is being shown by companies. However, they tend to concentrate on urban areas where they can get a better return on investment and are less interested in expanding into more sparsely populated rural areas. The government is not happy about this state of affairs. In addition, no guidelines have been established for public-private partnerships, and it has been noted that in light of the government's competence, there is a risk that it may not be possible to control the entry of private enterprises. There is a significant chance that the business environment will change as well in line with revisions to related laws and the restructuring of the ministries and departments in charge.

Chapter 4　Analysis of International Cooperation Initiatives

4–1　Examination of Potential Future Initiatives

To identify future initiatives for promoting international cooperation in the water supply sector, a study has been conducted to evaluate matters such as the policy objectives of the Development Cooperation Charter, the status of past cooperation initiatives, and field studies in Laos.

Based on the results of this study, this chapter examines current and future initiatives based mainly on the implementation status of initiatives proposed in the FY2006 study and additional information obtained through the examination processes.

1) Classification of measures

In the FY2016 study, future measures for international cooperation in the water supply sector were identified. To better organize this extremely diverse range of measures, this study basically uses the 5W1H method, as shown below. "When?" has been omitted, however, because the target year has already been set as 2030, which is the same as for the SDGs.

- What?　Concrete measures for providing international cooperation in the water supply sector
- How?　Methods for evaluating the results of measures and initiatives, and the setting of goals based on these results
- Where?　Priority regions for activities and initiatives
- Who?　Recruitment and development of human resources (e.g., water supply experts) involved in international cooperation activities
- With whom?　Cooperation with parties involved in the water supply sector and other sectors

The structure and order of priority for these measures are represented in the figure below. Located in the center of the diagram, the “(A) What?” category represents concrete measures for improving the environment in developing countries through the provision of water supply services. This category is surrounded by the following factors for effectively implementing these measures: “(B) How?” (Evaluations and goal setting); “(C) Where?” (Priority regions); “(D) Who?” (Recruiting human resources); and “(E) With whom?” (Cooperation). Of these, (B) and (C) to the right and at the top share commonality in terms of selecting targets for international cooperation, while (D) and (E) to the left and at the bottom share commonality in terms of recruiting human resources for conducting international cooperation.

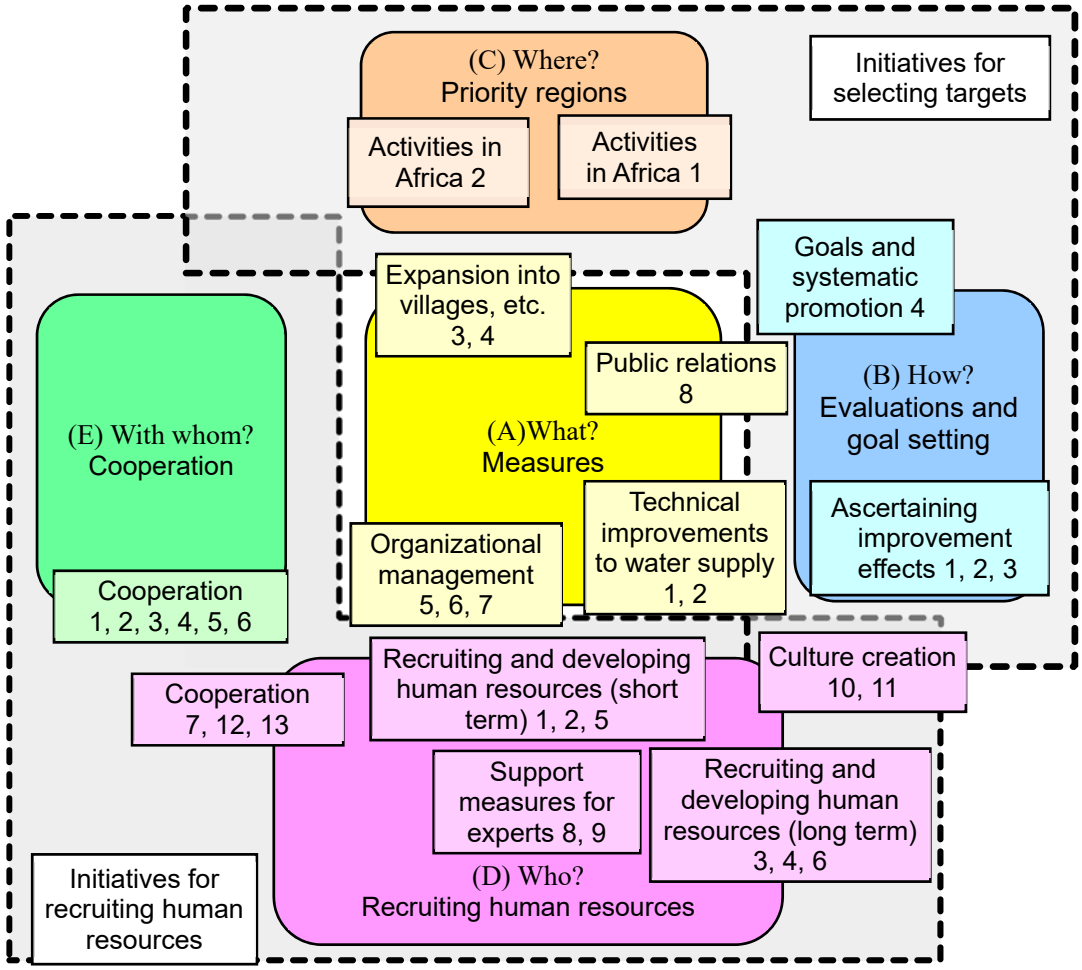

Figure 4.1: Factors considered in international cooperation

2) Analysis method

Next, the perspectives used in examining the measures are organized as follows.

- Proposals made in studies conducted since FY2006, in field studies, etc.
  First of all, the study items are selected mainly from the future initiatives proposed in the FY2006 study, and then the perspectives to be used for future initiatives are extracted and organized from among the proposals made in studies conducted since the subsequent fiscal year, statements obtained in field studies, etc.

- Current situation, specific systems, etc.
  Comments are made on currently operating systems and initiatives based on past proposals. If there are no applicable systems or initiatives, comments are made on the current situation.

- Issues clarified through initiatives implemented since FY2006, findings of the Laos study, etc.
  Information on the following is summarized: issues clarified through initiatives and studies conducted since FY2006, changes in circumstances, and the findings of field studies conducted to assess the implementation status of current initiatives and the direction to be taken for future initiatives. Current issues, if any, are also explained here.

- Direction of future initiatives
  Information on the efficiency of current measures and specific improvement measures is summarized.

- Remarks and comments
  Information on the following non-direct measures is summarized: comments on matters related to the SDGs, considerations for dealing with the relevant items, and remarks about relationships with other items.

4–2 Results of the Examination of Potential Future Initiatives

This section describes the results of individual examinations on the various initiatives.

1) Measures for international cooperation (What?)

In this study, the main measures and support options are listed as comprehensively as possible to form the basis for considering what types of measures should be implemented from the next fiscal year onwards. In the FY2006 study, the following five priority measures were identified as being required: non-revenue water countermeasures, water quality management measures (urban water supply), rural water supply measures, groundwater pollution control measures, and human resource development measures. In addition, the current situation was reviewed and future initiatives were examined in terms of management improvements, operations and maintenance, and public relations, all of which had been mentioned in past studies and this examination meeting.

From the next fiscal year onwards, the needs and current circumstances of our partner countries will be analyzed in detail based on the results of this study, and our actual cooperation options will be considered by matching them with Japan's advantages. If Japan lacks the knowledge or human resources to be able to address certain needs itself, we need to investigate measures for responding to them.

Table 4.1: Current situation and future direction for international cooperation measures (What?)

Classifi-cation	Item	Proposals made in studies conducted since FY2006, in field studies, etc.	Current situation, specific systems, etc.	Issues clarified through initiatives implemented since FY2006, findings of Laos study, etc.	Future direction	Remarks and comments
A1 Measures (What?)	Measures for reducing non-reven ue water	Awareness of the importance of managing water supply distribution facilities can be evaluated based on whether non-revenue water countermeasures are understood correctly. To compensate for deficiencies in piping construction technologies, it is necessary to employ adequately trained full-time administrators and prepare training systems for construction work management and technical staff. (FY2006 Study)	A series of measures for reducing NRW have been actively implemented, and they have proved to be effective.	As a result of Japan's experts having emphasized the importance of NRW reduction measures to many overseas water supply utilities, awareness of their importance has become widespread. In addition, support for reductions in NRW has also been systematically promoted. Non-revenue water countermeasures essentially involve overall management of the water distribution pressure, pipelines, and water supply equipment. However, some countries that have not benefited from Japan's cooperation promote only the introduction of district metering areas (DMAs) based on a superficial understanding of the matter. Issues that need to be addressed (e.g., ensuring the accuracy of data) are also becoming clearer.	The key issue is technical management of the construction firms. It is advisable for work on the following to be carried out comprehensively to establish a reliable system through cooperation: introduction of water leakage detection and DMAs, provision of equipment, and control of water supply takeout and meter accuracy. Achievements are being made thanks to the effects of Japan's proactive activities. These activities are currently based on the knowledge and experience of the business entities and experts involved, and this know-how has not yet been fully clarified and shared. Knowledge needs to be deepened and shared for further expansion.	SDG 6.1: Universal and equitable access to safe and affordable drinking water for all SDG 6.4: Substantially increase water-use efficiency These should be undertaken as measures intended to promote the efficient use of water and management improvements as a package, not just in the narrow sense of water leakage prevention being carried out to reduce NRW.
A2 Measures (What?)	Measures for promoting water quality managem ent (urban water supply)	Even in many of the big cities with modern water supply systems, it is not always possible for residual chlorine to be detected at the end of water pipes. It is necessary to continue promoting measures for monitoring water quality, supplying chemicals, and establishing water quality standards in accordance with the circumstances of the individual country.	Capacity building is actively conducted to ensure the provision of safe water.	The provision of safe water is the most important aspect of water supply services, and the improvement of water quality management has been actively supported. Depending on the country, however, there have been cases where policy-level support is required, such as the development of laws governing water supply and water quality standards. In addition to implementing water safety plans and capacity building for water quality management, it is also necessary to ensure the stable provision of chemicals and the establishment of water quality standards, taking into account the regional characteristics.	It is necessary to organize the overall activities (both legal and administrative systems) to ensure the provision of safe water, taking into account the individual country's circumstances. It is important to develop operable water quality standards and inspection systems in accordance with the circumstances of the relevant country. Given the growing concentration of populations in urban areas, it is also necessary to examine the possibility of using technical assistance to allow a systematic expansion of water supply and water quality management as a single package.	SDG 6.1: Universal and equitable access to safe and affordable drinking water for all SDG 6.3: Safe water use and water quality improvement through discharge management Measures for reducing water leakage and water stealing also lead to water quality measures.
A3 Measures (What?)	Measures for rural water supplies	It is necessary to promote improvements to both urban water supplies and rural water supplies. It is also necessary to promote resident participation, cooperation with NGOs, etc., in addition to the development of a water quality monitoring system.	Activities such as the following are mainly conducted through JICA projects: the construction of wells, the development of small-scale water supplies, and the establishment of a water management system.	Improving the supply of water in rural areas contributes more to the solving of social issues than improving the supply of water in urban areas does. A resident participation-type approach is required for overcoming water quality issues in village regions. The community-driven development (CDD) approach and the demand-driven management model are recognized as being effective. (FY2011 General Overview) Knowledge accumulated by JICA has been organized into a handbook on cases studies of supplying water in rural Africa.	Measures must be examined based on the individual country's circumstances by, for example, ascertaining people’s needs in villages, coordinating between rural and urban water supplies, and making judgments on role-sharing. As the next step for water supply development in Asia, it is necessary to examine strategies for improving hygiene in villages. Various cooperation activities are being implemented in Africa to extend the supply of water in rural areas. The activities include the construction of facilities and the strengthening of maintenance systems and administration systems. Future initiatives should be investigated based on the lessons learned from these experiences.	SDG 6.1: Universal and equitable access to safe and affordable drinking water for all SDG 6.b: Participation of local communities in improving water and sanitation management
A4 Measures (What?)	Measures for preventin	It is necessary to monitor the levels of arsenic and other substances by implementing measures such as	Measures such as the following are being conducted:	Efforts have been proactively made to address issues related to arsenic contamination. Effective processing technologies have been established even	First and foremost, it is necessary to ascertain the scale and distribution of the current problems. Technical measures such as contamination processing have been	SDG 6.1: Universal and equitable access to safe and affordable drinking water for all

Classifi-cation	Item	Proposals made in studies conducted since FY2006, in field studies, etc.	Current situation, specific systems, etc.	Issues clarified through initiatives implemented since FY2006, findings of Laos study, etc.	Future direction	Remarks and comments
	g inorganic groundwater contamination	conducting water quality research, providing residents with hygiene training, and developing equipment to remove such substances.	monitoring of information on contamination distribution, installation of contamination prevention equipment, and implementation of continuous measures aimed at gaining the support of residents.	in developing countries. However, given increases in population and demand, it is difficult to maintain countermeasures by relying just on the awareness of residents.	established, but it is difficult to implement and maintain such measures thoroughly. Given this, it is considered necessary to conduct research on how to implement these measures and make the public aware of them.	
A5 Measures (What?)	Measures for developing technical human resources	It is necessary to develop technical human resources who understand water supply technologies. To ensure a safe water supply, it is important to develop personnel who understand water purification technology and, in particular, managerial-level personnel who can be responsible for managing all of processes organically. It is also necessary to improve the technical skills of contractors by strengthening construction supervision, introducing construction evaluation systems, and providing training programs.	Based on the educational level and the water supply capabilities of the partner country, comprehensive training to develop technical human resources has been offered in Japan and training center support activities have been implemented.	The steady efforts that have been made to date have delivered positive results. In particular, the training center in Thailand plays a central role in developing human resources for water supply services in Southeast Asian countries. This human resource development can also produce secondary effects. (FY2014 study) Efforts to develop human resources have been actively promoted mainly through technical cooperation projects. Human resource development can be supported through grant aid combined with soft components.[40)]	For further horizontal development, it is necessary to take into account that national institutions and characteristics vary from one country to the next. An accurate record of the actual situation is helpful in the development of human resources. If the situation that existed before improvements were made is clearly recorded, it is possible to see how much progress has been made, which encourages human resource development and serves as an effective driving force in promoting the activities.	SDG 6.1: Universal and equitable access to safe and affordable drinking water for all SDG 6.4: Substantially increase water-use efficiency
A6 Measures (What?)	Measures for promoting management improvements	It is advisable for an independent accounting system to be adopted in order to maintain water supply systems. To that end, the following are required: thorough record keeping and accounting to clarify costs, fair and equitable water rate systems, and appropriate water rate collection. (FY2014 study)	A JICA handbook on the development of managerial human resources has been utilized.	A handbook on conducting capacity assessments for the urban water supply sector and water supply utilities in developing countries (JICA, 2010) has been provided. JICA analyzed perspectives concerning the organization and analysis of the water supply service environment based on the following three aspects: governance, personnel system, and financial base. (FY2014 report)	It is recognized the world over that recovering a project's full costs (including construction costs) can be difficult in a true sense. However, people still hold to the idea that water rates should be kept low without considering the importance of having the beneficiaries pay the necessary costs incurred in building and maintaining water facilities. In such cases, further study is necessary to make the water supply system sustainable. The starting point for management improvements is the culture of keeping records. Another effective approach is to deploy the NRW reduction measures and management improvement measures that have already taken root as a package.	SDG 6.1: Universal and equitable access to safe and affordable drinking water for all It is often difficult to carry out an objective evaluation due to a lack of clear regulations.
A7 Measures (What?)	Measures for improving operations & maintenance (O&M)	The importance of operations and management is sometimes overlooked. Given that there are limits to the self-help efforts that development countries can undertake, more in-depth support needs to be provided.	Efforts are underway to strengthen operations and maintenance through JICA technical cooperation projects.	Although there have been positive outcomes as a result of steady efforts, systematic operations and maintenance practices (including technical management and records management) have not yet been established. However, the Laos case has demonstrated that thorough records management leads to autonomous improvements.	It is obviously necessary to establish systematic operation and maintenance practices, including in terms of technical management and records management. Horizontal development should be carried out based on past experience and taking into account differences in national characteristics. Managerial-level human resources who can make	SDG 6.1: Universal and equitable access to safe and affordable drinking water for all

40) Technical assistance provided to improve the operational and maintenance capacities of partner countries so that they can properly operate and use facilities and equipment provided through grant aid using only local resources. This assistance needs to be completed by the end of the facility construction period or equipment procurement.

Classifi-cation	Item	Proposals made in studies conducted since FY2006, in field studies, etc.	Current situation, specific systems, etc.	Issues clarified through initiatives implemented since FY2006, findings of Laos study, etc.	Future direction	Remarks and comments
				For the supply of water in rural Africa, attempts have been made to enhance operations and management through soft component activities associated with facility construction. However, due to restrictions on investment and the implementation period, the creation of implementation systems, which take time to establish, and the development of human resources met with limited success.	decisions on facility operations need to be developed from the viewpoint of operations and maintenance. It is necessary to consider providing support by combining facility construction and technical cooperation projects.	
A8 Measures (What?)	Measures for improving public relations	It is necessary to ascertain how well Japan's cooperation activities are known and recognized, particularly in partner countries. (FY2015 study)	JICA as a whole is proactively carrying out comprehensive public relations activities, and these feature in the water supply sector as well.	After reviewing how public relations should be handled in terms of international cooperation based on the following three perspectives, suggestions have been made regarding the basic structure and measures: recognition in international society, recognition in partner countries, and recognition of ODA projects in Japan. (Report in FY2015)	It is necessary to consider new support for measuring the effectiveness of public relations and conducting quantitative evaluations. It is also necessary to promote understanding of the ripple effects of water supply development in terms of health and public sanitation, such as lower infant mortality rates, not just the direct effects. Awareness should be raised through international conferences, seminars, and forums, so that such activities can lead to more effective public relations measures, such as having international conferences hosted by institutions in Laos.	

2) Evaluation of international cooperation and goal setting (How?)

The method of evaluating international cooperation activities is an important consideration in setting goals for them. SDGs incorporate ideas for enhancing the effectiveness of activities through quantitative goal setting and monitoring. To set appropriate goals, it is necessary to correctly ascertain the current situation, and in order to do that, an institutional framework and continuous operations are essential. In this study, goal setting and management are considered after the current situation has been ascertained based on three items.

3) Priority regions in international cooperation (Where?)

The policy at the time of the FY2006 study was to set Asia as the main target for the time being and to secure bases in other regions. This is because, at that time, Asia was still experiencing economic growth and there was a significant demand for the development of water supply systems, mainly in urban areas.

With cooperation in the Asia region having been deepened through the provision of high-quality infrastructure over the 10 years since the FY2006 study, it is time to build a foundation for providing support in the Africa region. Also, for other regions such as Oceania and Latin America, it is necessary to ascertain the needs and consider appropriate support policies for each region, while taking into account the technologies possessed by water supply utilities in Japan.

The priority regions are as indicated in Table 4.3.

Table 4.2: Current situation and future direction for international cooperation evaluations and goal setting (How?)

Classifi-cation	Item	Proposals made in studies conducted since FY2006, in field studies, etc.	Current situation, specific systems, etc.	Issues clarified through initiatives implemented since FY2006, findings of Laos study, etc.	Future direction	Remarks and comments
B1 Goal and evaluation manage-ment (How?)	Evaluation perspective 1	It is necessary to quantitatively ascertain the effects that direct improvements to water supply services have in order to introduce the concept of goal achievement levels. (FY2006 study)	The following comparison data items, which allow the effects of water supply improvements to be directly identified, are prepared and used in reports comparing the starting points and outcomes for various activities: water supply time, water supply coverage, and standard charges.	Before carrying out an evaluation, it is necessary to appropriately collect various types of data, which serve as PIs, on the status of the water supply services. It should be noted that both reliable items based on actual measurements and estimated items are included in the statistical data. There are often cases where thorough investigations reveal that the data is not reliable. Initially, the need to collect accurate information is often not fully understood. Technical cooperation projects in Laos demonstrate the importance and effectiveness of collecting, accumulating, and analyzing accurate information.	Keeping in mind the targets for SDGs, it is necessary to develop an evaluation system that facilitates data collection. To evaluate direct effects, it is necessary to manage data on factors such as the following: water supply quantity, water quality, water supply time, water supply coverage, equipment and material management, and financial statements. To ascertain the actual situation, it is necessary to investigate how data is collected and to promote capacity building that allows for the accurate measuring of real data.	
B2 Goal and evaluation manage-ment (How?)	Evaluation perspective 2	It is necessary to identify the benefits (impacts) and beneficial effects (reduction in illness and housework burden) that residents ultimately enjoy as a result of water supply services and other efforts. (FY2006 study)	Items used to identify benefits had been organized, and these items were used to evaluate MDGs in each country.	Benefits must be calculated using data other than that related to water supply services (e.g., infant mortality rate) as well. Public sanitation-related data is often available only as national-level figures, and it is not easy to collect regional-level data with sufficient accuracy as indicators to evaluate the benefits of water supply services.	It should be possible to evaluate indirect effects such as reductions in water-borne diseases and increased leisure time and income and to monitor benefits, including the better public hygiene associated with improved medical standards, in society as a whole. There is room for discussion and research on the possibility of collecting appropriate regional-level data effectively. It is necessary to consider the quantification and systematic evaluation of benefits by combining baseline studies, periodic evaluations, and completion evaluations.	We need to proceed with these efforts for monitoring the final benefits. However, concerns remain about whether the impacts of multiple factors can be accurately analyzed.
B3 Goal and evaluation manage-ment (How?)	Evaluation perspective 3	It is necessary to identify beneficial activities from a series of activities by calculating their cost-effectiveness to ascertain their performance. After that, this knowledge should be shared horizontally. (FY2006 study)	If effects can be evaluated numerically, it is possible to analyze the cost-effectiveness of activities, but this is not standard practice at present.	If effects are properly evaluated, costs can be easily identified and cost-effectiveness can be calculated. However, there are limits to how accurately the context (i.e., the background of each business) can be understood. If effects are expressed using easy-to-understand numbers without fully taking into account the context, it could lead to misunderstandings. Further study is needed at present.	Evaluating projects based only on cost-effectiveness without carefully considering their individual backgrounds could lead to inappropriate judgments being made. It is important to judge the effectiveness of a project after ascertaining the circumstances of the relevant country. Cost-effectiveness analysis needs to be conducted only for limited projects carried out under similar circumstances.	
B4 Goal and evaluation manage-ment (How?)	Goal setting perspective	It was pointed out that improvements need to be systematically implemented by setting goals. (FY2006 study) Japan sets goals taking into account the fact that MDGs are intended for developing countries.	SDGs, which were set as a follow-up to MDGs, lay out more specific and comprehensive development goals. SDGs can be used as guidelines for goal setting in future cooperation activities.	Goal setting for water supply projects is entrusted to the country receiving international cooperation. National goals are set in many countries. Case studies on collaborations between MDG sectors, such as poverty alleviation and welfare measures, were examined. (FY2011 study)	Many countries prepare national goals and master plans, but these are not necessarily based on an accurate understanding of the current circumstances. To resolve this issue, it is necessary to improve the accuracy of the information collected and make suggestions for master plans based on an accurate understanding of the country's situation.	The ultimate goal of evaluations is to set policies and specific plans in conjunction with the country’s SDG targets.

Table 4.3: Current situation and future direction for priority regions in international cooperation (Where?)

Classifi-cation	Item	Proposals made in studies conducted since FY2006, in field studies, etc.	Current situation, specific systems, etc.	Issues clarified through initiatives implemented since FY2006, findings of Laos study, etc.	Future direction	Remarks and comments
C1 Priority region (Where?)	Asia region (traditionally the main activity region)	The aim of the policy was to set Asia as the main target for the time being and to secure bases in other regions (as of the FY2006 study).	Some of the international cooperation projects carried out in the Asia region have produced significant results.	In many countries and regions in Asia, improvements to the water supply and public health are still underway. In particular, there is a need to further improve support for rural areas.	Although remarkable progress has been made in the Asia region, it is necessary to refine the solutions to problems such as disparities between urban and rural areas.	
C2 Priority region (Where?)	Africa region (new activity region)	The aim of the policy was to set Asia as the main target for the time being and to secure bases in other regions (as of the FY2006 study).	In recognition of the support needs of the Africa region and the fact that policy-based support is being enhanced there, measures have been promoted with a focus on Africa. These measures include continuing to hold TICAD and the implementation of the ABE Initiatives.	Previous case studies indicate that activities conducted in the Africa region involve more difficulties than those conducted in Asia do. The reasons for this include insufficient water resources in proportion to the population, lower literacy rates, and poor computing and basic academic skills, as well as the fact that people there are not in the habit of producing accurate records and managing activities.	At present, the obstacles to international cooperation in Africa are recognized as being higher than those in Asia, which has built up its experience and improved its economic environment. Therefore, cooperation needs to be planned after accurately ascertaining the actual local conditions. It is also necessary to put together information related to cooperation for Africa, including whether Japan's experiences can be utilized and the status of implementation systems in recipient countries.	In determining which regions should be targeted for support, it is also important to consider the likely impact. The impact will be greatest if support is provided initially in a region where its provision is most challenging. If this point is recognized, it will provide a boost in support for Africa.

4) Recruiting human resources for international cooperation (Who?)

A key challenge is to continuously recruit and train human resources with expertise in international cooperation. The need for initiatives aimed at recruiting human resources is stated in the FY2006 study. Also, in proposals related to improving the management of water supply services in the FY2013 study commissioned by the Ministry of Health, Labour and Welfare, it was pointed out that there is a shortage of the types of human resources necessary for international cooperation.

In particular, there is a greater need for human resources from overseas in the water supply sector than there is in other sectors, and the bottleneck could be whether people who meet this needs can be recruited or not. Rather than there being signs that we are moving toward a solution, these trends have become even more pronounced in recent years.

At the time of the FY2006 study, some structures had been systematically developed for the dispatching of experts from water supply utilities and the acceptance of trainees, and analysis suggests that this project should be highly regarded for its contribution to continuous international cooperation. However, the FY2006 study also identified the following challenges: (1) the recipient countries sought cooperation in terms of not only technology transfers but also policy advisory services and (2) the necessity to use languages other than English had been increasing in line with the growing number of non-English speaking countries that were receiving cooperation.

The Development Cooperation Charter describes the importance of developing human resources and solidifying the intellectual foundations so that they can play a leading role in shaping the philosophy and trends in international development cooperation. In the water supply sector as well, further development of human resources is required. As the number of water supply projects has been increasing not only in the urban areas of recipient countries and regions but also in rural ones, a variety of different types of human resources are required.

In light of the above, this study organizes measures for recruiting human resources based on the following perspectives: solicitation and training of individuals with expertise; continuous training of local human resources; utilization of enterprises; support for experts; and building of a foundation for international cooperation. All of these measures are important and while various efforts have already been and are still being undertaken, further discussion is needed to promote them.

5) Cooperation with other bodies (With whom?)

The FY2006 study indicates that we should aim for a comprehensive support approach, in which cooperation should be sought through various international cooperation activities involving parties other than water supply administration bodies and water supply utilities. This is still true today, but such cooperative activities are not being undertaken at present.

Table 4.4: Current situation and future direction for recruitment of human resources for international cooperation (Who?)

Classification	Item	Proposals made in studies conducted since FY2006, in field studies, etc.	Current situation, specific systems, etc.	Issues clarified through initiatives implemented since FY2006, findings of Laos study, etc.	Future direction	Remarks and comments
D1 Recruitment of human resources (Who?)	Recruitment and training of experts 1	It is necessary to find and recruit experienced former water utility employees who are interested in participating in international cooperation. (FY2006 study)	The Japan Water Works Association (JWWA) has a senior expert registration system for registering personnel with experience in the water supply sector.	The senior expert registration system operated by the JWWA plays a certain role. However, the system currently works more like a registration system for personnel whose participation in international cooperation would be desirable, and the system has not yet succeeded in discovering human resources with expertise.	In addition to making sure that people are familiar with the senior expert system, it is also necessary to consider other methods of discovering experts more effectively.	The recruitment of experienced personnel is expected to be even more challenging in future.
D2 Recruitment of human resources (Who?)	Recruitment and training of experts 2	Experienced personnel who are currently employed by a water utility are dispatched with the organization's approval. An effective way of ensuring that the necessary procedures are taken into consideration is to have the Ministry of Health, Labour and Welfare act as an intermediary for referrals. (FY2006 study)	The International Cooperation Expert Registration System is a system for providing referrals for personnel from the water supply sector.	With the Ministry of Health, Labour and Welfare continuing to act as an intermediary, the system is mostly used to provide referrals and it has not yet led to the active discovery of suitable human resources. It has become difficult for water utilities to dispatch experts overseas due organizational streamlining. There have also been cases where a mismatch has occurred between the individual's preference and the organization's intention.	As international cooperation provides an opportunity for engagement with the rest of the world and the acquisition of experience in problem-solving in an environment that is completely different to that of Japan, it can provide clues for dealing with the issues faced by the water industry. Sharing information regarding this point helps to shape the grounds on which core personnel who are currently employed should be involved in international cooperation. It is necessary to develop human resources by having senior personnel with professional experience work together with younger experts. Under normal circumstances, it is necessary to build a network of human resources involved in matters related to the water supply sector who have the awareness and capability to participate in international cooperation.	Based on a keen awareness of the shared values that the water supply industry holds in terms of the supply of water, this industry is sometimes referred to as the "water family." Recruitment of human resources should be based on a broad assessment of the horizontal ties among water professionals who share these values.
D3 Recruitment of human resources (Who?)	Recruitment and training of experts 3	It is necessary to find young water utility employees who are interested in participating in international cooperation, and to make arrangements so that it is easier for them to get involved.	Few businesses are equipped with a structure that allows suitable personnel who are interested in participating in international cooperation to actually get involved.	Examples of initiatives undertaken in some municipalities include Y-TAP, an autonomous initiative carried out in Yokohama City. In addition, external training programs (run by JICA) may be utilized. Through coordination with community centers, JICA organizes seminars at which businesses can share information on initiatives that they have undertaken and study together, which encourages upskilling and interaction among businesses.	It is advisable that a structure be developed for identifying and training young or experienced personnel from outside the water supply sector who are interested in participating in international cooperation. To allow the water industry to gain more extensive knowledge about the activities of businesses and JICA, attempts should be made to identify human resources who are interested in international cooperation. Structures for promoting the sharing of experiences and other forms of interaction should be strengthened. Encouraging the development of virtual communities, such as social media platforms, is another effective option.	By strengthening structures for sharing experiences in the water supply sector, related parties who are not that actively involved in international cooperation will tend to be influenced in a favorable manner.
D4 Recruitment of	Recruitment and training of experts 4	It is also important to allow general personnel who are interested in participating in	Simply providing inexperienced personnel with training prior to their being dispatched will not give them	JICA and other organizations carry out programs to explain to the general public, who are obviously not experts, the need for action to be	While various activities for recruiting water supply personnel from outside the water supply sector are being undertaken, they are	Currently, JICA is actively promoting the sharing of information with the general public with the aim of

Classifica-tion	Item	Proposals made in studies conducted since FY2006, in field studies, etc.	Current situation, specific systems, etc.	Issues clarified through initiatives implemented since FY2006, findings of Laos study, etc.	Future direction	Remarks and comments
human resources (Who?)		international cooperation but have no experience in the water industry to increase their experience in this field so that they can get involved.	the expertise and skills that they need in relation to water supply services. JICA carries out internship programs.	taken in the water supply sector and the sanitation field. With academics playing a central role, the JAPAN-YWP runs activities that allow young water professionals to study and interact with each other. Other organizations in the water supply sector, such as the Japan Water Forum, also promote international cooperation. In FY2008, the dispatching of the Water Security Action Team (W-SAT) to African countries was launched by JICA as a cooperation volunteer program, and this has been a stepping stone for people with no experience in the water supply sector to get involved.	not understood in a structured way. There is room for better organization in terms of determining what activities are being carried out and how they are related to each other. One measure that has proved effective is to define what expertise is required to meet the needs of the relevant developing country, and to then register and train experts based on this definition. Social awareness would be improved if there were a system for proving a person's status, such as a license, or a system for recognizing experts. The internship programs should be maintained so that they provide students with opportunities and allow them to experience for themselves the expertise necessary to actually engage in international cooperation both in Japan and overseas.	identifying human resources who are interested in participating in international cooperation as individuals. The sharing of information with the water industry could be improved.
D5 Recruitment of human resources (Who?)	Training and retaining local human resources 1	Since experts who play a key role in local activities are vital to the success of international cooperation efforts, it is advisable to hold retain their services even after the completion of the project.	No structure is in place for continuing the employment of experts who have been trained locally.	No system has been established for following up on this point in particular. In cases where international cooperation activities need to be carried out on an ongoing basis, personnel who have been trained locally to acquire expertise and Japanese language skills sometimes leave during breaks between projects.	It is necessary to consider implementing measures for continuing the employment of experts who have been trained locally. In practical terms, possible means of doing this include shortening the interval between the completion of a project and its evaluation or assigning them a mission during the interval.	Private companies and other organizations may find it easier to expand if they have personnel with Japanese language skills.
D6 Recruitment of human resources (Who?)	Training and retaining local human resources 2	An effective option is to implement measures for hiring and training skilled foreign staff members at water utilities in Japan so that they can make use of their strengths in international cooperation as well. (FY2006 study)	While it is possible to employ foreign nationals in Japan, it is not actively promoted and it still relatively uncommon.	Although this was proposed at the time of the FY2006 study, there seems to be no sign of such a measure being employed in the water industry as a whole. However, some private companies seem to be adopting this measure. For example, Mizu Mirai Hiroshima Corporation hires Vietnamese nationals to carry out administrative work, with the aim of developing the core personnel required to assist the company with its overseas expansion in future.	From the perspective of revitalizing water supply sites in Japan, employing foreign nationals who will go on to become water supply experts and promoting training and interactions in Japan are considered effective measures. However, this is expected to prove to be difficult in practice. First of all, the significance of this course of action should be verified, and if it is found to be effective, strategies for promoting it will be required.	JICWELS dispatches nurses and caregivers. Consideration should be given to the implementation of a similar system in the water supply sector. Private companies that are looking to expand overseas tend to be more proactive in this regard. As such, progress is more likely to be made through public-private partnerships.
D7 Recruitment of human resources (Who?)	Utilizing human resources from private companies and subsidiaries of water supply businesses	Private companies needed to be actively utilized in this. Specific examples include utilizing consulting firms or the specialized subsidiaries of water utilities. (FY2006 study)	A registration system for consultants has been established. Also, the subsidiaries of water utilities employ their own initiatives for recruiting human resources to be involved in international cooperation.	It is becoming increasingly common for the subsidiaries of water utilities, such as Yokohama Water and TSS Tokyo Water, to partner private-sector consultants in bidding for technical cooperation projects. Although dispatching water utility personnel As has become difficult, the number of cases in which consultants do this in practice is on the increase. Generally speaking, however, experienced business personnel tend to perform better than consultants in providing support for the actual operations.	Just like water utilities, private companies all face different circumstances, so it is important to identify the best approach to mix different approaches according to the individual company's circumstances. Since business affiliates tend to be influenced by matter such as changes of policy by local municipalities, it is important to take the relevant circumstances into consideration.	While the subsidiaries of water utilities can play a lead role in activities, there are concerns about the fact that such subsidiaries tend to be influenced by changes in the policies of local municipalities or water utilities concerning international cooperation. Since purely private companies cannot invest management resources unless revenue will be generated, how seriously they take international

Classifica-tion	Item	Proposals made in studies conducted since FY2006, in field studies, etc.	Current situation, specific systems, etc.	Issues clarified through initiatives implemented since FY2006, findings of Laos study, etc.	Future direction	Remarks and comments
						cooperation will be affected by management policies and the business environment.
D8 Recruitment of human resources (Who?)	Training, and support for experts 1	It has been requested that improvements be made in terms of the provision of information prior to the dispatching of personnel, and that logistical back-up measures be put in place (arrangements and negotiations).	Although the training program conducted prior to the dispatching of experts fulfills its purpose, some feel that this program is insufficient.	JICA provides full support with regard to the procedures for dispatching personnel. In terms of logistics, however, the basic policy is that the expert is responsible for making the necessary arrangements. In the case of private companies such as a development consultancy, the necessary skills are ensured by having the personnel build up their experience in logistics from the beginning. In JICA Management Training (B), where Japanese and overseas trainees take part in the training together, actions are taken to have Japanese trainees get a feel for what it is like to work as experts in developing countries.	In the FY2014 study, the viewpoints necessary to develop an understanding of the national affairs of the target country were summarized prior to the dispatching of personnel. By using this format, information on the circumstances of the assigned country can be gathered and summarized so that it can be shared among the various projects, thereby facilitating the start-up of projects and reducing the risks involved. When the personnel involved have insufficient work experience and capabilities, it is impossible for them to build a relationship of trust with their counterparts in the developing country. In addition to the provision of training on practical skills, another possible course of action is to improve conversational skills and problem-solving skills through role-playing.	While the importance of making proposals based on the developing country's actual circumstances, which differ from those of Japan, has always been pointed out, it is difficult to do this without having respect for the other party and a reasonable understanding of water supply services. If there is a preceding project, support for that project is available in terms of its logistics, which helps to reduce the obstacles significantly. It is also important to implement practical initiatives such as arranging for the dispatching of personnel according to whether a preceding project is underway.
D9 Recruitment of human resources (Who?)	Training, and support for experts 2	English-language technical documents and other materials for explaining the technologies and experiences of Japan are insufficient. In particular, educational materials on actual practices must be prepared and provided.	Improvements could be made to foreign-language documents and other materials that provide an introduction to Japan's water supply sector and its structure.	With the exception of the following, the academics responsible for conducing lectures relied on materials that they prepared themselves: the Water Supply Act, the design criteria for water supply facilities, and materials describing the current conditions in Japan. It has been pointed out that a support system for overcoming the difficulty of creating lecture materials in English is needed. (FY2011 study) Given this, JICA is preparing materials for use in the provision of training on water supply services based on Japan's experiences (to be completed in March 2017).	JICA is currently preparing educational materials in English, but the preparation and improvement of educational materials in other languages should also be considered. Also, through regular follow-ups and the sharing of information on matters such as new trends and new technologies, the quality of future training programs should be improved and a network for providing trainees with constant support should be developed. (FY2011 study)	
D10 Recruitment of human resources (Who?)	Establishment of a culture of international cooperation 1	A water utility is positioned as part of the local municipality, and some local municipalities are strongly aware of this perception. However, in municipalities that do not provide any support and never take part in international cooperation, the atmosphere is such that it is difficult to carry out cooperation activities.	International cooperation is not necessarily the responsibility of water utilities. In the New Vision for Water Supply 2013, the role of international cooperation is regarded as being to provide staff members with an opportunity to improve their qualities.	JICA plays a central role in carrying out public relations activities aimed at increasing the general public's interest in international cooperation. However, it is clear that, in spite of these proactive public relations efforts, the general public does not know as much about international cooperation as they should do. (FY2015 study)	Based on the results of the extensive public relations activities being conducted by JICA, it is necessary to target public relations at a wider range of people, so that water professionals can be secured more effectively. Measures must be implemented to show the significance of international cooperation by, for example, demonstrating that participation in international cooperation can also contribute to resolving some of the problems faced by Japan's water supply sector. A particularly effective measure is to help develop human resources who will support water utilities in Japan.	Efforts should be made to publicize information such as the following more proactively: the fact that there is a pressing need for international cooperation in the water supply sector throughout the world and the fact that Japan has developed a strong presence in international cooperation, having been the top donor in the water supply sector since 2005.

Classifica-tion	Item	Proposals made in studies conducted since FY2006, in field studies, etc.	Current situation, specific systems, etc.	Issues clarified through initiatives implemented since FY2006, findings of Laos study, etc.	Future direction	Remarks and comments
D11 Recruitment of human resources (Who?)	Establishment of a culture of international cooperation 2	Some of the studies that have been carried out indicate a lack of stability in the treatment of human resources for international cooperation, and it has been pointed out that this may act as an impediment when actions need to be taken proactively. (FY2011 study)	There has been a failure to understand that participating in international cooperation is of great significance for business operations in Japan.	Personnel involved in international cooperation activities get to experience things like implementing challenging initiatives in an unfamiliar environment where there is insufficient support and being required to respond flexibly due to their being exposed to new cultures outside their organization. However, there is no sign that such experiences are highly valued or that the personnel assume important posts after their return to Japan. Even in the case of private companies, the situation varies significantly depending on the corporate culture of the respective company.	While it is difficult to get involved in the personnel policies of individual water utilities and companies, it is possible to help with the career progression of leading personnel by enhancing the horizontal network for experienced personnel involved in international cooperation. Potential measures include introducing career paths for personnel involved in international cooperation through industry journals, newsletters and the like or promoting networking through training courses.	
D12 Human resource development (Who?)	Joint cooperation among multiple businesses	It is becoming increasingly common to support overseas expansion by forming partnerships among multiple business entities and a particular municipality's local companies. It is necessary to consider what measures would contribute to the recruitment of human resources in the water supply industry.	Partnerships between the water utilities of a particular municipality and local companies could be strengthened.	In recent years, some water utilities have developed partnerships with development consultants, local companies and other organizations to work on projects.	In response to the diversification of cooperation formats and the support options provided by JICA, it is necessary to further encourage the current situation where, through partnerships between local municipalities and entities such as private companies, grant aid and loan aid cooperation programs and technical cooperation are provided.	Going forward, it is advisable to aim for a "Japan Brand" by expanding these actions further. * This is also mentioned under the "With whom?" section as part of the development of partnerships with other sectors.
D13 Human resource development (Who?)	Development of human resources from other countries at universities and research institutions	It is necessary to approach this matter by developing foreign nationals through educational systems in Japan, so that they can work within the ODA framework by incorporating their respective languages and cultures into their work. (FY2006 study)	The systems that are currently available for the development of human resources from developing countries are SATREPS, which is jointly promoted by JICA and the JST, and the ABE Initiative, which accepts postgraduate students and offers internship programs.	An operating system has been established for promoting interaction between, and the networking of, Japanese universities and institutions. However, the case studies on water utilities are limited and further action will be required in future.	Universities and research institutions should continue to accept exchange students, researchers, and practitioners in order to contribute to the development of human resources from other countries and build up the pool of human resources. Actions should be taken with a focus on matters such as implementing projects within the existing framework and improving student exchange programs (JICA).	This is also mentioned under the "With whom?" section.

Table 4.5: Current situation and future direction for collaborations with other entities in international cooperation (With whom?)

Classifica-tion	Item	Proposals made in studies conducted since FY2006, in field studies, etc.	Current situation, specific systems, etc.	Issues clarified through initiatives implemented since FY2006, findings of Laos study, etc.	Future direction	Remarks and comments
E1 Multi-lateral approach (With whom?)	Comprehensive assistance approach	Cooperation with other sectors (e.g., health and sanitation or regional development) should be considered as a specific method under the comprehensive assistance approach. (FY2006 study)	In some projects, the actions taken have included positioning staff members to be in charge of sanitation and promoting cooperation with health administration and local health centers.	While international organizations and other concerned parties have considered the merits of various methods in the health and sanitation field, no universal method has yet been established. This is demonstrated by the fact that regions with different customs and cultures have had different results. Also, since it takes	For the supply of water in both urban and rural areas, there is a recognized need for coordination between the health and sanitation field and the regional development sector. For positive results to be achieved, research on an effective method should be conducted and put into practice.	SDG 6.b: Participation of local communities in improving water and sanitation management

Classification	Item	Proposals made in studies conducted since FY2006, in field studies, etc.	Current situation, specific systems, etc.	Issues clarified through initiatives implemented since FY2006, findings of Laos study, etc.	Future direction	Remarks and comments
				time for behavioral changes to become permanent, the situation often reverts to what it used to be before the improvement.		
E2 Coordination with other fields (With whom?)	Coordination related to integrated water resources management	Issues such as the need to improve governance in relation to water management* and asset management are important for both developed countries and developing countries. As such, the demand for more effective management of water resources and water environments is stronger than ever. (FY2011 study) * Under this item, the term "water management" is used to refer to integrated water resources management, including disaster prevention.	Support is provided through the formulation of master plans by JICA, and financial cooperation is provided based on prior studies carried out through preparatory surveys. In Japan, the Water Cycle Act was established in 2014, followed by the Basic Plan on Water Cycle Policy and then the Plan on Water Cycle Policy for River Basins.	The initiatives advanced by the Japanese government have consistently been based on an awareness of the importance of integrated water resources management and disaster prevention. Examples of coordination in the water supply sector include the Japan Water Forum and the IWA Conference, where the actions taken are not restricted to water supply matters alone. Greater coordination in the energy field and the integrated development of urban areas has been requested by developing countries.	Information about measures for promoting interaction, including the Executive Forum for Enhancing Sustainability of Urban Water Service in the Asian Region organized by JICA, should be communicated more proactively. It is necessary to provide public water utilities with a summary of the kinds of actions each entity is undertaking. Going forward, connections and interactions with the relevant ministries and agencies should be expanded so that initiatives for pursuing a deeper involvement in the national politics can be implemented. It is also considered necessary to implement initiatives for expanding the activities of the association for personnel engaged in international cooperation in the water supply sector.	SDG 6.5: Integrated water resources management SDG 6.b: Participation of local communities in improving water and sanitation management Keeping in mind the importance of monitoring, work will be carried out with regard to the evaluation of projects, the establishment of criteria for water quality, the accumulation of hydrological data, and the avoidance of exploitative development.
E3 Coordination with other fields (With whom?)	Development using sanitation processing and other fields as a packaged solution	When activities are coordinated for the first time, consideration could also be given to a packaged solution through coordination between waterworks and sanitation processing, which are becoming increasingly integrated in Japan.	Water utilities and private corporations do not make much distinction between water supply and sewerage systems. The same can be said about the program for the private-sector dissemination of Japanese technologies.	Technical cooperation projects, financial cooperation projects, and programs for the private-sector dissemination of Japanese technologies are carried out as independent projects for sanitation processing (including the sewerage system).	When maintenance is carried out for water supply services, contamination from urban areas can shift towards waterbodies. As such, unless such maintenance is carried out in tandem with maintenance of the sewerage system, the urban area's water environment may deteriorate. For this reason, the treatment of effluents in the waterworks coverage area is of great importance. It is necessary to implement measures for strategically exporting Japanese specialist know-how about fields such as water and sanitation (water and sewerage systems) as a package to share technologies for the maintenance of infrastructure in urban areas.	
E4 Coordination with other entities (With whom?)	Public-private partnerships	Public-private partnerships (PPP) and the like should be considered as specific methods under the comprehensive assistance approach. (FY2006 study)	JICA measures such as the following have been introduced: the PPP infrastructure project, the BOP business coordination promotion project, and the overseas business expansion program for small and medium-sized enterprises.	The status of water supply development using private-sector funds, the governance of private water supplies and other such matters seem to be completely different in each country. Just recently, JICA began conducting research on this point.	In overseas countries, private corporations are expected to provide the construction funds. In contrast, public-private partnerships in Japan focus on the management side of things, which indicates a serious discrepancy. In light of the fact that public-private partnerships in Japan are still in the trial-and-error stage, it is necessary to begin by exchanging opinions with an awareness of the benefits of learning from overseas case studies.	
E5 Coordinati	Coordination with NGOs	Participation by local residents, cooperation with NGOs and the	Systems such as the following have been introduced: Grant Aid for	It has been pointed out that there is a strong possibility that the know-how accumulated by	This system supports the autonomous activities of NGOs and other such entities, and	

Classification	Item	Proposals made in studies conducted since FY2006, in field studies, etc.	Current situation, specific systems, etc.	Issues clarified through initiatives implemented since FY2006, findings of Laos study, etc.	Future direction	Remarks and comments
on with other entities (With whom?)		like should be considered as specific methods under the comprehensive assistance approach. (FY2006 study)	Grassroots Human Security by the Ministry of Foreign Affairs, Grant Aid for Japanese NGO Projects, and JICA's Technical Cooperation at the Grass-Roots Level.	NGOs could be utilized in connection with the rural water supply, the informal sector for urban water supply, and actions being undertaken with the participation of local residents.	it is regarded as having achieved the desired results. However, coordination with water utilities and the like has not extended beyond the scope of municipalities, and it is difficult to say that the system provided sufficient coordination, including in terms of how many NGOs there are. It is necessary to find a partnership that will cover budgetary measures as well.	
E6 Coordination with other entities (With whom?)	Coordination with universities and other research institutions	Universities and other such educational institutions serve as the source for supplying personnel, such as managers and engineers, to developing countries.	The systems that are currently available for the development of human resources from developing countries are SATREPS, which is jointly promoted by JICA and JST, and the ABE Initiative, which accepts postgraduate students and offers internship programs.	The ongoing implementation of SATREPS and other such systems has resulted in the creation of a certain level of interaction among schools. There have been cases where practitioners from developing countries would join Japanese research institutions to conduct research and acquire a degree (master's or doctorate) by researching issues faced by their own countries. It has been possible to obtain effective data from such cases.	In developing countries, academics often engage directly in drafting master plans and carrying out studies. In such cases, the degree of involvement can have a significant effect, but it is difficult to say for certain whether Japan's water supply sector has made sufficient use of inter-school relationships. While the current system should be utilized as well, it is necessary to find a new structure for maintaining already developed networks and promoting further development.	This is also mentioned under the "Who?" (Human resource development) section.

4–3 Future Initiatives

The last section of this document summarizes our discussions, the relationships among the various issues and future initiatives that should be undertaken.

1) Comparison of measures

First, let's review the issues that were identified and discuss the high-priority measures.

As was mentioned in the category for priority measures (What?), in addition to continuing to pursue technical approaches, it is important to establish the human resource and financial foundations necessary to form a basis for the management of water supply services while overcoming the significant differences that exist in terms of the cultures and systems in the recipient countries. It is particularly necessary to carry out sufficient research into a strategy for maintaining water supply services over the long term in cases where water rates do not cover the costs of constructing and maintaining waterworks. It is also necessary to understand the recipient countries' expectations with regard to Japan's public-private cooperation activities, given that Japan finds it difficult to ascertain the circumstances of developing countries that are desperate for funds to develop their waterworks.

In the category for evaluations (How?), we should endeavor to accurately understand the actual situations in a quantitative manner, as in the case of the SDGs. Since even data on water supply coverage based on the population served is rarely accurate and many non-revenue water rates are only estimates, accumulating accurate data and conducting self-analysis in the promoting of measures are the first steps toward establishing self-sustaining water supply services.

In the category for priority regions (Where?), it is necessary to research the situation in Africa and provide information to the domestic parties concerned in order to improve Japan's understanding of Africa. The reason why this is necessary is that providing cooperation to this region is challenging due to the fact that it can be difficult to identify what Japan's cooperation in the provision of water supply services in Africa has achieved and the presence of differences in terms of culture and basic education.

In the category for the recruitment of human resources (Who?), it is important to make it easier for personnel currently employed by water utilities to participate in international cooperation as well as to find retired water supply experts who can make an immediate contribution. We should also increase the number of young water supply experts who can play a central role in future cooperation activities. For these purposes, we need to raise public awareness of international cooperation in the water supply sector by clarifying that such efforts not only have an international benefit, but also help to foster water supply experts for Japan and create new business opportunities. Given the serious labor shortage, using overseas labor in domestic water supply services is expected to positively stimulate the domestic water supply service industry in a variety of ways. Recruiting the necessary human resources is an essential part of all of our measures and should be given top priority.

In the category for cooperation with other parties (With whom?), although it remains unclear whether we should begin this, it seems necessary to first discuss who we would be able to work with in providing international cooperation in the water supply sector.

Table 4.6: Necessary activities broken down by category and subcategory

Category	Number	Subcategory	Notes
Priority measures (What?)	A1	Measures for reducing non-revenue water countermeasures	All of these are important measures extracted based on Japan's experience of providing water supply services. However, we still need to study areas of public-private cooperation in which Japan does not have sufficient experience.
	A2	Measures for promoting water quality management (urban water supply)	
	A3	Measures for rural water supplies	
	A4	Measures for preventing inorganic groundwater contamination	
	A5	Measures for developing human resources	
	A6	Measures for improving water supply service management	
	A7	Measures for improving operations and maintenance (O&M)	
	A8	Measures for improving public relations	
Evaluation (How?)	B1	Identification of the direct effects of improvement	We need to discuss the collection of accurate information from the viewpoint of the SDGs.
	B2	Identification of benefits	
	B3	Identification of cost-effectiveness	
	B4	Setting and planned pursuit of goals	
Priority regions (Where?)	C1	Continuation of activities in Asia	We should begin with ascertaining the actual situation.
	C2	Start of activities in Africa	
Recruitment of human resources (Who?)	D1	Recruitment and development of human resources 1	As there is an urgent need to recruit human resources, we should implement measures with immediate benefits right away. However, it is also important to foster a culture of international cooperation from a long-term viewpoint.
	D2	Recruitment and development of human resources 2	
	D3	Recruitment and development of human resources 3	
	D4	Recruitment and development of human resources (inexperienced persons)	
	D5	Retaining of local human resources	
	D6	Hiring of local human resources in Japan	
	D7	Use of human resources from private companies	
	D8	Support for experts (logistics)	
	D9	Support for experts (teaching materials)	
	D10	Creation of culture (public awareness)	
	D11	Creation of culture (responsibilities of water supply utilities)	
	D12	Cooperation among utilities and	

Category	Number	Subcategory	Notes
		businesses	
	D13	Use of universities and research institutions	
Coordination with other entities (With whom?)	E1	Comprehensive assistance approach	We should keep these activities in mind as future initiatives.
	E2	Total water resources management	
	E3	Cooperation with sanitary treatment services	
	E4	Public-private cooperation	
	E5	Cooperation with NGOs	
	E6	Cooperation with universities	

3) Priority initiatives

The following are initiatives that should be prioritized.

- There is still some room to discuss what water supply know-how Japan can provide to meet the needs of developing countries. While Japan has built up experience in the provision of water supply services in terms of subcategories A1 to A8, it may not yet be able to meet these needs in other fields, such as the use of private funds and the maintenance of water supply services in countries where water rates are too low. An effective course of action would be to study measures taking into account the basic approaches that each recipient country employs in the provision of water supply services, objectively analyze Japan's water supply services, and compare their strengths and weaknesses with water supply services in other countries.
- Japan's international cooperation in the water supply sector has delivered satisfactory achievements in countries and regions where Japan has been engaged in cooperation efforts for a long time. On the other hand, Japan does not have sufficient information on other countries and regions. It is therefore important to research the actual conditions in these countries and regions and to share this information. We believe that Japan should obtain and share more information, particularly on Africa, including in terms of the water supply situation and data accuracy. To effectively promote international cooperation, we need to deepen cooperation in fields other than just water supply services, gather information on developing countries, and identify their needs more accurately and quantitatively. For these activities, it is important to identify the needs of Africa (related to C2) and identify the direct effects of improvements (B1).
- There is an urgent need to recruit human resources. We should not only take short-term measures to assist in the recruitment of human resources, but also make it easier to recruit international cooperation experts by promoting public awareness that international cooperation helps increase the number of water supply experts.

Although not new, these activities have been reaffirmed to be important as they can serve as a starting point for other activities. We hope that the results of our research will serve as the starting point for our future initiatives.