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FY2021

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

March 2022

Japan International Corporation of Welfare Services
JICWELS

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Chapter 1 Policy for the FY2021 Study of International Cooperation in the Water Supply Sector

1-1 Description of the Study

(1) Background and history

In September 2015, the Sustainable Development Goals (SDGs) were unanimously adopted by the member nations of the United Nations General Assembly. The goal of the water and sanitation sectors was to secure availability and sustainable management of water and sanitation for all people. Under this goal, the 2030 target was set to achieve universal and equal access to safe and inexpensive drinking water for all people. Currently, various projects are in progress around the world to achieve this target. While these projects have so far successfully decreased the size of the population with no access to improved drinking water services, which was estimated to be about 660 million globally in 2015, to approximately 580 million in two years (2017), more efficient and effective efforts are still required.

In February 2015, the Japanese government reviewed the Official Development Assistance (ODA) Charter and formulated the Development Cooperation Charter, which summarizes the philosophy and the basic principles of ODA. This new charter notes that self-sustaining development of developing nations is one of the key issues and proposes provision of comprehensive assistance, including not only physical assistance but also intangible assistance such as operational management, human resources, and institutions. In December 2020, Infrastructure System Overseas Promotion Strategy 2025 was created by fundamentally reviewing the traditional infrastructure export strategy in light of social transformation and changes in society as well as changes in people's value perspectives resulting from the global spread of the novel coronavirus. Infrastructure System Overseas Promotion Strategy 2025 states that "While the approach to the SDGs has spread globally and efforts to improve the quality of life (QoL) are being made, an understanding that the value of infrastructure is not only to simply improve the capabilities of articles but also to improve the QoL of local people. The same understanding has been solidified through the current battle against the novel coronavirus." Based on this notion, Infrastructure System Overseas Promotion Strategy 2025 points out the importance of continuously providing high quality infrastructure that matches the needs of its recipients.

As described above, the basic direction of international cooperation and contribution activities inside and outside Japan has been changing. Under these circumstances, promoting these activities more effectively and efficiently in the water supply sector requires reviewing of past efforts and consideration of activities for the future.

(2) Purpose of the project

The purpose of this project is to promote implementation of effective and efficient international cooperation and contribution to help nations that receive the assistance achieve self-sustaining development of their water supply. For this purpose, experts from industry, university, and government will collect, organize, and analyze information relating to the issues in international cooperation and contribution in the water supply sector that should be prioritized or actively addressed, will study problem-solving approaches and support policies based on the needs of the assisted nations, and share the results with the parties

concerned.

(3) Previous studies

The Ministry of Health, Labor and Welfare (MHLW) has been carrying out studies and providing recommendations with the primary focus on intangible aspects of the study theme through the Study Committee on International Cooperation in the Water Supply Sector, which was formed in this project. In FY2018, it conducted a field study in the Democratic Republic of East Timor to examine the liaison between the water and sanitation sectors from the Universal Health Coverage (UHC) point of view. Based on the study result, it noted that both the urban and rural water supply needed improvement and recommended encouragement of local government-funded quasi-public sector entities and private sector companies, such as the members of the Japan Water Works Operation and Management Association, that are in the water service management and maintenance business to participate in water suppliers' future international cooperation or preparation of the environment for Japanese companies to enter the overseas market. In FY2019, based on the notion that the international cooperation in the water supply sector, which had been focused more on Asian regions, was now at the stage to cultivate the foundation also in African regions as the key regions, MHLW explored detailed measures to address their key issues and how the outcome was monitored.

In the FY2020 study, MHLW reflected on the background of the past project activities as well as the past 10 years of recommendations to review the positioning, direction, and outcome of this project. Furthermore, since the Pacific Island Leaders Meeting (PALM), which has been hosted by the Japanese government since 1997 to strengthen the relationship with Pacific island countries, was planned for its 9th session in 2021, MHLW studied and organized information on the water supply sector issues arising from the uniqueness of the Pacific island country region as well as the issues to be addressed by the region as a whole. It then put together information on the water situation in these countries and proposed international cooperation that took into consideration the situation of each country.

(4) Policy for the present study

Japanese local governments' know-how, human resources, and the method of rural autonomy can become a type of know-how useful for developing nations. Participation of water suppliers in international cooperation has been a significant help. At the same time, international cooperation activities are meaningful for local governments in terms of globalization and stimulation of the region as well as international contribution.

International cooperation by water suppliers is implemented by local governments each using different schemes. The progress and method of cooperation vary with the local government. The implementation ratio differs between government-designated cities and other local governments. Within the government-designated cities, how they form an organizational structure for international cooperation varies. A wide variety of case examples on the implementation method have been reported. By providing assistance that matches the needs, it becomes possible to solve problems of assisted nations and contribute to self-sustaining development of a water system. At the same time, a wide range of information, knowledge, and experience gained through international cooperation can help more local governments solve their problems.

For this purpose, it is desirable to consider the method of carrying out activities even more efficiently and effectively and promote international cooperation activities by water suppliers.

Based on the above, the present study focused on one of the methods of international cooperation, which was joint international cooperation activities by multiple local governments. The study examined and summarized the effect and issues of international cooperation activities in which multiple water suppliers worked together.

1) Studying and summarizing the effect of collaboration of water suppliers in international cooperation in the water supply sector to promote effective efforts in the future

- Checking of past international cooperation activities of Japanese water suppliers in documents such as information materials and reports produced by relevant organizations.
- Studying of references and holding of interviews while referring to past records of collaboration of multiple water suppliers, summarizing of the information, and provision thereof.
- No local studies were conducted in consideration of the international travel situation caused by the novel coronavirus. There was instead examination of reports on the relevant project produced by the Japan International Cooperation Agency (JICA), interviewing of individuals in Japan who had experience of going to a target nation and had local information, and interviewing of water suppliers with a past record of implementing a Technical Cooperation Project in the target region. There were also online interviews with parties concerned in the target nations. While incorporating the result of the study of relevant references, the effect and issues of international cooperation through collaboration of water suppliers were summarized from the standpoint of the assisted nations.

Based on the result of consideration up to this point and the result of committee discussions, we summarized the direction and detailed strategy for future international cooperation and contribution while considering how to make this information widely used by parties involved in international cooperation in the water supply sector.

For the two points listed below, the study result and its summary are provided as information material.

2) Studying and summarizing of records, case examples, effectiveness, and issues of online training on water supply sector international cooperation, which became widely implemented in FY2020 and onward due to the novel coronavirus.

As a result of the novel coronavirus making cross-border travel difficult, some case examples have emerged in which face-to-face water supply sector training was switched to online training. We provide information on the effectiveness and issues of online training compared to face-to-face training based on the result of case examples that we collected. (Information Material 1)

3) Studying and summarizing of case examples of international cooperation in the water supply sector by overseas governments.

Using information submitted from the committee members, we summarized the details and characteristics of other governments' international cooperation activities in the water supply sector by comparing them with those of Japan. We compared data such as the amount of money spent on assistance in the water supply sector and also collected anecdotes from those who were at the site of international cooperation overseas. Using this obtained data and information, we organized activity support policies of other governments and different activity menu items as characteristics of each country. We have extracted and will present a brief summary of important perspectives on promoting international cooperation and information to be referred to in future activities. (Information Material 2)

1-2 Study Task Force

(1) Committee structure

The period of the present study was one year. The Study Evaluation Committee was formed and the study result was reported at the committee meeting, which was held three times. The committee members for the FY2021 study are listed below.

(Honorifics omitted; committee member names in Japanese alphabetical order)
[Committee members]

○	Hidetoshi Kitawaki	Professor, Faculty of Global and Regional Studies, Toyo University
	Masao Shibuya	International Director, Training and International Department, Japan Water Works Association (JWWA)
	Dai Shimazaki	Chief Senior Researcher, Water Supply and Management Section, Department of Environmental Health, National Institute of Public Health
	Keisuke Sonoda	Management and Planning Section, Management and Planning Division, Operation Department, Saitama City Waterworks Bureau
	Takeo Tanaka	Deputy Director, International Operations Division, Business Promotion Department, Yokohama Waterworks Bureau
	Yoko Nakamura	Deputy Director for the International Affairs Team, Planning and Coordination Section, General Affairs Division, Bureau of Waterworks, Tokyo Metropolitan Government
	Yusuke Hayashi	Manager, International Project Division, International Project Department, Water and Sewer Bureau, City of Kitakyushu
	Shigeyuki Matsumoto	Deputy Director General, and Group Director for Water Resources, Global Environment Department, JICA
	Takahiro Mukai	Manager of the Murano Water Treatment Plant, Osaka Water Supply Authority
	Tatsuo Morimoto	Senior Advisor, Federation of Japan Water Industries, Inc.

(○: Chairperson)

[Administrative office]

Yoshitaka Kitamura	Director, Office of Global Health Cooperation, International Affairs Division, Minister's Secretariat, MHLW
Moeko Yoshitomi	Section Chief, Office of Global Health Cooperation, International Affairs Division, Minister's Secretariat, MHLW
Hisashi Kudo	Deputy Director, Water Supply Division, Pharmaceutical Safety and Environmental Health Bureau, MHLW
Hiroyuki Yakushiji	Deputy Director, Water Supply Division, Pharmaceutical Safety and Environmental Health Bureau, MHLW
Masayuki Fujiwara	Deputy Director, Water Supply Division, Pharmaceutical Safety and Environmental Health Bureau, MHLW
Kenji Ito	Water Supply Planning Guidance Office, Water Supply Division, Pharmaceutical Safety and Environmental Health Bureau, MHLW
Takeo Yamaguchi	Technical Advisor, JICWELS
Toru Tomioka	Technical Advisor, JICWELS
Hiroya Yaguchi	Director, International Cooperation and Training Department, JICWELS
Mai Isohata	International Cooperation Section, International Cooperation and Training Department, JICWELS
Sachiko Ochiai	International Cooperation Section, International Cooperation and Training Department, JICWELS

[Observers]

Tomoyoshi Endo	Deputy Director, Water Supply Division, Pharmaceutical Safety and Environmental Health Bureau, MHLW
Takeshi Kamiya	Deputy Office Manager, Water Supply Planning Guidance Office, Water Supply Division, Pharmaceutical Safety and Environmental Health Bureau, MHLW
Haruka Kubota	Water Supply Planning Guidance Office, Water Supply Division, Pharmaceutical Safety and Environmental Health Bureau, MHLW

(2) Committee meeting schedule

The Study Evaluation Committee was held three times in FY2021. The meeting dates are listed below. The meetings took place in a meeting room at the JICWELS office unless otherwise specified. Due to the situation related to the novel coronavirus, holding of a remote meeting was considered as necessary, and the members could participate remotely.

- 1st meeting: September 28, 2021
- 2nd meeting: January 6, 2022
- 3rd meeting: March 3, 2022

[Domestic research]

- From September 2021 to March 2022

Chapter 2　State of International Cooperation with Participation of Local Governments

In this chapter, Section 2-1 describes the scheme for local governments to participate in international cooperation, and Section 2-2 lays out information collected on international cooperation in the water supply sector by water suppliers that have been implemented so far to explain (1) case examples of Grant Aid and Grassroots Technical Cooperation Projects, (2) state of expert dispatches in technical cooperation, (3) state of trainee acceptance in technical cooperation, and (4) international cooperation activities implemented independently by local governments.

2-1　Scheme of International Cooperation with Local Government Participation

Japanese local governments have a wide variety of know-how and human resources for community services in the areas of water and sewers, waste treatment, health and hygiene, maternal and child health, social welfare, agricultural extension, elementary and secondary education, occupational training, environmental preservation, and public transportation. Methods of local autonomy themselves can also become a type of useful know-how for developing nations. International cooperation activities by local governments include: the Grant Aid in Cooperation with Local Governments, Grassroots Technical Cooperation Project for Local Revitalization (Special Project for Regional Revitalization), Grassroots Technical Cooperation (Grassroots Assistance Project), Grassroots Human Security Grant Aid, Technical Cooperation Project, trainee acceptance for the Knowledge Co-Creation Program, and international cooperation activities implemented independently by local governments.

In the case of the Grant Aid in Cooperation with Local Governments, the subject local government works with JICA to explore and create a grant aid project, participates in a cooperation preparatory study, and takes part in a grant aid project implemented by the government of the target country. The local government can take part in the project as an adviser to JICA or as a contractor[1]. The Grant Aid with Business Support is designed with the goal to facilitate acquisition of business and operation rights by a Japanese private sector company. A grant is provided to a public project in which a private sector company implements everything from facility construction to its management and maintenance. This grant also aims to make our country's excellent techniques and know-how useful for development in developing nations. In an infrastructure project carried out by a developing nation, funds necessary for important facilities, equipment, and other services will be provided if commercial funds alone cannot finance the project. Funds are paid through the government of the developing nation to the entity such as a special purpose corporation that implements the project.

The Grassroots Technical Cooperation Project for Local Revitalization (Special Project for Regional Revitalization) is proposed and implemented by a local government as a leader. There is an expectation that the local government or an entity working with the local government will achieve overseas business expansion while effectively utilizing its knowledge, experience, and techniques and at the same time will aim to solve problems in a developing country. The implementing entity is expected to not only contribute to development or restoration of the economy and society for local residents of the developing nation but

[1] JICA Grant Aid in Cooperation with Local Governments
https://www.jica.go.jp/partner/jichitai/grant_aid/index.html

also use the experience gained from the project implementation to engage in activities that can effectively revitalize the local society. The Grassroots Technical Cooperation Project (Grassroots Assistance Project) is designed for organizations such as non-governmental organizations (NGOs), universities, and public interest corporations having a track record of activities inside Japan but with little experience assisting developing nations. Through a Grassroots Technical Cooperation Project, the organization making a project proposal is expected to build up experience in international cooperation targeting developing nations and play an active role as an international cooperation provider even after the project ends.

The Grassroots Human Security Grant Aid (Grassroots Grant Aid) is based on the philosophy of human security. Its objective is economic and social development in developing nations and provides necessary funds for relatively small projects that directly benefit local residents. This grant aid is characterized by quick assistance with an ability to provide fine-tuned and flexible responses[2]. The Ministry of Foreign Affairs encourages Japanese local governments to participate in the Grassroots Grant Aid, cooperate with NGOs working in developing nations as well as local public entities, and utilize their techniques and know-how for economic and social development of developing nations[3]. There have been case examples in which outcomes of Grassroots Grant Aid projects have triggered implementation of different types of cooperation including other grant aid categories[4,5].

The Technical Cooperation Project consists of the combination of three means of cooperation, which are a JICA expert dispatch, trainee acceptance, and provision of equipment, and are implemented in a specified period of time. Local governments participate in this cooperation initiative by dispatching their officers as experts to the site of cooperation or by accepting trainees. The Knowledge Co-Creation Program is a training program developed and planned in Japan and proposed to a developing nation. JICA is providing training covering many topics to help developing nations solve their problems by using Japanese knowledge and experience. Local governments work with JICA and accept trainees who participate in the program.

Aside from these JICA projects, there are international cooperation activities implemented independently by local governments. These activities include establishing sister city partnership and information exchanges and technical cooperation under a memorandum signed with the city or agency of the partner country.

2-2 Case Examples of Local Governments' Activities under Each Scheme

(1) Grant aids and Grassroots Technical Cooperation Projects

From international cooperation in the water supply sector implemented so far in which water suppliers participated, Table 1 shows grant aid case examples and Table 2 shows case examples of the Grant Aid with

[2] ODA "Grassroots human security grant aid"
https://www.mofa.go.jp/mofaj/gaiko/oda/shimin/oda_ngo/kaigai/human_ah/index.html
[3] ODA "Support for overseas expansion of local business by local governments through ODA"
https://www.mofa.go.jp/mofaj/gaiko/oda/about/page23_000707.html
[4] ODA "Case examples of the Grant Aid with Business Support"
https://www.mofa.go.jp/mofaj/gaiko/oda/about/kanmin/page23_000778.html
[5] Bureau of Waterworks, Tokyo Metropolitan Government press release
https://www.waterworks.metro.tokyo.lg.jp/press/h29/press170711-01.html

Business Support, which is implemented as an outcome or is related to the outcome of technical cooperation participated in by water suppliers.

Also, for Grassroots Technical Cooperation Projects in the water supply sector in which water suppliers participated, Table 3 lists projects adopted as the Grassroots Technical Cooperation Project for Local Revitalization and Table 4 shows projects adopted as the Grassroots Assistance Project.

Table 1 Grant Aid in Cooperation with Local Governments (FY2008 and onward)

Month of grant agreement	Country	Project name	Parties engaged in the project
December 2019	Cambodia	Project for the Expansion of the Water Supply System in Pursat[6]	Consortium (City of Kitakyushu Water and Sewer Bureau, CTI Engineering International, and TEC International)[7]
February 2016	Vietnam	Project for Improving the Duong Water Treatment Plant in Hai Phong City[8]	Kitakyushu Water Service*1, NJS Consultants, Kobelco Eco-Solutions, Sankyu
June 2015	Cambodia	Project for Expansion of the Water Supply System in Kampot[9]	City of Kitakyushu Water and Sewer Bureau, Nihon Suido Consultants, Sumitomo Mitsui Construction, Swing
October 2014	Myanmar	Non-Revenue Water Control Project	Japan Consortium LLC (Tokyo Suido Services*2 and Toyo Engineering)
April 2014	The Philippines	Project for the Improvement of the Water Supply System in Metropolitan Cebu Water District[10]	Yokohama Water*3, NJS Consultants, Hitachi, Yokogawa Solution Service
June 2013	Cambodia	Project for Expansion of Water Supply Systems in Kampong Cham and Battambang[11]	City of Kitakyushu Water and Sewer Bureau, Nihon Suido Consultants, CTI Engineering International, Kubota Construction

*1: A public-private joint venture established through joint funding by the City of Kitakyushu Water and Sewer Bureau and private sector companies

*2: As a government-liaison organization funded by the Bureau of Waterworks, Tokyo Metropolitan Government, Tokyo Suido Services was a company that engaged in water supply operation together with the Bureau of Waterworks, Tokyo Metropolitan Government. The company is currently Tokyo Water Co., Ltd.

*3: A company 100% funded by the Yokohama City Government that provides water and sewer services

Sources: JICA Grant Aid Procurement Progress[12], ODA Visual Presentation Website, Bureau of Waterworks, Tokyo Metropolitan Government

[6] ODA Visual Presentation Website "The Project for the Expansion of the Water Supply System in Pursat" https://www.jica.go.jp/oda/project/1960450/index.html

[7] City of Kitakyushu Water and Sewer Bureau press release https://www.city.kitakyushu.lg.jp/files/000769664.pdf

[8] ODA Visual Presentation Website "The Project for Improving the Duong Water Treatment Plant in Hai Phong City" https://www.jica.go.jp/oda/project/1460880/index.html

[9] ODA Visual Presentation Website "The Project for Expansion of the Water Supply System in Kampot" https://www.jica.go.jp/oda/project/1560010/index.html

[10] ODA Visual Presentation Website "The Project for the Improvement of the Water Supply System in the Metropolitan Cebu Water District" https://www.jica.go.jp/oda/project/1360680/index.html

[11] FY2019 Third-Party Ex-Post Evaluation Report (Grant Aid) "The Project for Expansion of the Water Supply Systems in Kampong Cham and Battambang" https://www2.jica.go.jp/ja/evaluation/pdf/2019_1360280_4_f.pdf

[12] JICA Grant Aid Procurement Progress https://www.jica.go.jp/activities/schemes/grant_aid/situation.html

Table 2 Grant Aid with Business Support

Month of grant agreement	Country	Project name	Parties engaged in the project
May 2020	Cambodia	Project for the Expansion of the Water Supply System in Ta Khmau[13]	Nihon Suido Consultants, Crown Agents Japan (Consultant) This project is currently in the bidding process.
Date of official note exchange: March 30, 2017	Cambodia	Project for Expansion of the Water Supply System in Kampong Thom[14, 15]	Consortium (Kubota Koken, CTI Engineering International, Geocraft, and Metawater)
October 2016	Myanmar	Project for Reduction of Non-Revenue Water in Mayangone Township in Yangon City[4]	Japan Consortium LLC (Tokyo Suido Services and Toyo Engineering)

Sources: ODA Grant Aid with Business Support case examples, Japan International Cooperation System[16,17]

Table 3 Projects adopted as a Grassroots Technical Cooperation Project (for local revitalization) in the water supply sector (FY2004 and onward)[18]

Adoption year	Country	Project name	Proposing local government / agency
FY2020 (1st bidding)	Malaysia	Water Resource Management Support Project to Create a Sustainable Resource Recycling-Based Society in Penang	City of Kawasaki Waterworks Bureau
FY2020 (1st bidding)	Myanmar	Yangon Water Facility Management Ability Improvement Project	Fukuoka City Waterworks Bureau
FY2019	Indonesia	Technical Assistance for Developing Inspection Techniques to Maintain and Manage Water Pipelines in Bandoeng	Hamamatsu City Water Department
FY2019	Nepal	Technical Cooperation Project for Systematizing Water Supply and Distribution Management in Pokhara, Nepal	Sapporo Waterworks Department
FY2017 supplementary budget / FY2018	Thailand and Laos	Water Service Human Resource Development Project in Thailand and Laos	Saitama Prefectural Enterprise Bureau

[13] JICA news release https://www.jica.go.jp/press/2020/20200602_10.html
[14] ODA "Preliminary Evaluation based on the Policy Evaluation" by MOFA https://www.mofa.go.jp/mofaj/gaiko/oda/press/shiryo/page22_000342.html
[15] Kubota Construction news release https://www.kubota.co.jp/news/2019/19-10j.html
[16] Japan International Cooperation System https://www.jics.or.jp/jigyou/20161102.html
[17] Japan International Cooperation System https://www.jics.or.jp/pdf/201901.pdf
[18] List of projects adopted as a JICA Grassroots Technical Cooperation Project for Local Revitalization https://www.jica.go.jp/partner/kusanone/chiiki/index.html

Adoption year	Country	Project name	Proposing local government / agency
FY2017 supplementary budget / FY2018	Indonesia	Skill Enhancement Project for North Sumatra Water Corporation to Achieve Safe Water Supply 24/7	Yokohama Waterworks Bureau
FY2017 supplementary budget / FY2018	Indonesia	Human Resource Development Project for Improving the Water Environment in Bandung	City of Kawasaki Waterworks Bureau
FY2017 supplementary budget / FY2018	Indonesia	Solok Water Supply Service Enhancement Project	Toyohashi City Waterworks & Sewerage Bureau
FY2017 supplementary budget / FY2018	Mexico	Anti-Earthquake Measure Strengthening Project for the Water and Sewerage System in Mexico City	Nagoya City Waterworks & Sewerage Bureau
FY2017 supplementary budget / FY2018	Myanmar	Project for Supporting Enhancement of Safe and Stable Water Supply Capabilities in Mandalay	City of Kitakyushu Water and Sewer Bureau
FY2017	Laos	Project for Supporting Enhancement of Water Pipeline Maintenance and Management Capabilities at the Water Authority	Saitama City Waterworks Bureau
FY2017	Indonesia	Project for Enhancing the Ability to Implement Anti-Subsurface Leakage Measures in Makassar — For Effective Use of Water Resources —	City of Kawasaki Waterworks Bureau
FY2016 supplementary budget	Malaysia	Project for Enhancing the Ability to Manage the Water Supply and Non-Revenue Water (NRW) Using SCADA	Bureau of Waterworks, Tokyo Metropolitan Government
FY2016 supplementary budget	Fiji	Water Supply Service Improvement Project in Nandi and Lautoka	Fukuoka City Waterworks Bureau
FY2015 supplementary budget / FY2016	Indonesia	Skills Support Regarding Leak Prevention Initiatives in Bandung City	Hamamatsu City Water Department
FY2014 supplementary budget	Vietnam	Non-Revenue Water Reduction Technique Training and Ability Enhancement Project in Hanoi	Bureau of Waterworks, Tokyo Metropolitan Government
FY2014 supplementary budget	Laos	Water Treatment Plant Operation, Maintenance, and Management Skill Enhancement Support Project at the Water Authority	Saitama Prefectural Enterprise Bureau
FY2014 supplementary budget	Indonesia	Project for Improvement of Water Purification Technology in Solok	Toyohashi City Waterworks & Sewerage Bureau

Adoption year	Country	Project name	Proposing local government / agency
FY2014 supplementary budget	Indonesia	Improvement of Tap Water Quality in Bengkalis, a Typical Tropical Peatland — Based on the Basic Environmental Plan Backed by the Ube Method —	Ube City Waterworks & Sewerage Bureau
FY2013	Malaysia	Non-Revenue Water Reduction Technique Training and Ability Enhancement Project in Malaysia	Bureau of Waterworks, Tokyo Metropolitan Government
FY2013	Thailand	Technical Assistance for Capacity Development of PWA in Operation and Maintenance of Water Purification Plants	Saitama Prefectural Enterprise Bureau
FY2013	Laos	Improvement Project of Water Environment in Vientiane Capital of the Lao P.D.R	Chiba Prefectural Enterprise Bureau
FY2013	Vietnam	Vietnam National Safe Water Supply Project Using Techniques of Private-Sector Companies in Yokohama	Yokohama Waterworks Bureau
FY2013	Sri Lanka	Capacity Development Project for Management of Water Supply Pipe Laying	Nagoya City Waterworks & Sewerage Bureau
FY2013	Indonesia	Research on Safe Drinking Water Supply and Quality Improvement for Citizens of Surabaya, Indonesia	City of Kitakyushu Water and Sewer Bureau
FY2013	Cambodia	Improvement of Siem Reap's Capacity for Water Supply Facilities Management	City of Kitakyushu Water and Sewer Bureau
FY2013	Myanmar	Improvement of Mandalay's Capacity for Water Treatment Plant Operation	City of Kitakyushu Water and Sewer Bureau
FY2013	Fiji	Project to Support Reducing Non-Revenue Water Control on NADI/LAUTOKA Regional Water Supply in Fiji	Fukuoka City Waterworks Bureau
FY2012	Sri Lanka	Water Facility Design and Construction Management Capability Enhancement Project	Nagoya City Waterworks & Sewerage Bureau
FY2012	Vietnam	Improvement of HPWSCo's Capacity for Distribution Network Management	City of Kitakyushu Water and Sewer Bureau
FY2010	Malaysia and Vietnam	Transferring of Tokyo Water Service Operation Know-How (e.g., pipeline	Bureau of Waterworks, Tokyo Metropolitan Government

Adoption year	Country	Project name	Proposing local government / agency
		maintenance and water distribution techniques)	
FY2010	Thailand	Water Treatment Technique Enhancement Support Project in Chonburi, Thailand	Saitama Prefectural Enterprise Bureau
FY2009	Vietnam	Water Purification Enhancement Program to Reduce Organic Substances	City of Kitakyushu Water and Sewer Bureau
FY2009	Samoa	Water Business Support in Samoa Using the Miyakojima Water Supply Model	Miyakojima City Water and Sewerage Department
FY2007	Mexico	Potable Water Quality Control Project II in Mexico City	Nagoya City Waterworks & Sewerage Bureau
FY2007	China	Development of Water Service Human Resources in Dalian to Provide Technical Cooperation inside China	City of Kitakyushu Water and Sewer Bureau
FY2005	Laos	Enhancement of Water Distribution and Supply Pipe Maintenance and Management Techniques	Saitama City Waterworks Bureau
FY2005	Solomon Islands, Fiji, Samoa, East Timor, Laos, and Nepal	Technical Training on a Slow Sand Filtration System and Water Supply Management	Miyakojima City Water and Sewerage Department
FY2004	Thailand, China, India, Vietnam, Indonesia, Malaysia, The Philippines, and Myanmar	Water Business Management and Pipeline Maintenance Techniques	Bureau of Waterworks, Tokyo Metropolitan Government
FY2004	Vietnam	Water Business Management Improvement Plan	Yokohama Waterworks Bureau
FY2004	Mexico	Water Quality Control in the Water Supply System	Nagoya City Waterworks & Sewerage Bureau
FY2004	China	Water System Techniques “Enhancement of Safe and Stable Water Supply”	City of Kitakyushu Water and Sewer Bureau

Note: Projects between FY2004 and FY2012 were advertised for and adopted as a Local Government-Led Project
Note: Projects between FY2013 and FY2020 were advertised for and adopted as a Special Project for Regional Revitalization (a Special Project for Regional Economy Revitalization in FY2013)
Sources: List of projects adopted as a JICA Grassroots Technical Cooperation Project for Local Revitalization, in which names of the proposing local government were partially corrected to establish consistency

Table 4 A project adopted as a Grassroots Technical Cooperation Project (a Grassroots Assistance Project) in the water supply sector (FY2002 and onward)

Adoption year	Country	Project name	Organization name
FY2009	China	Water Supply Engineer Development Project in Areas Around Dalian	Kitakyushu Water and Sewer Association*

Source: List of projects adopted as a JICA Grassroots Technical Cooperation Projects (Grassroots Assistance Project)
* Kitakyushu Water and Sewer Association was an extra-governmental organization funded by the Kitakyushu City Government and is currently a public-private joint venture firm called Kitakyushu Water Service Co., Ltd.

(2) Technical cooperation (expert dispatches)

Among various types of ODA implemented between two countries, technical cooperation may take the shape of an expert dispatch, trainee acceptance, Technical Cooperation Project, or Technical Cooperation for Development Planning. With the goal of making it possible for the water system of each target country to continue supplying safe and good quality water and based on the perspective that it is necessary to 1) build a water facility that matches each country's natural and social condition, 2) develop human resources who can manage such a facility, and 3) have them manage such a facility in accordance with the water quality at the source or the facility characteristics, water suppliers and related organizations dispatch experts on water systems following MHLW recommendations to JICA. On top of that, Yokohama Water Co., Ltd., Tokyo Water Co., Ltd., and Kitakyushu Water Service Co., Ltd., which are funded by the Yokohama City Government, Bureau of Waterworks, Tokyo Metropolitan Government and City of Kitakyushu Water and Sewer Bureau, respectively, are receiving many assignments as consultants after surviving competition.

Table 5 shows the number of experts in the water supply sector dispatched and Table 6 shows details of long-term expert dispatches in FY2020. Note that, in FY2020, there were no short-term expert dispatches (such as water suppliers) or survey team dispatches (e.g., experts from water suppliers).

Table 5 Number of water supply sector experts dispatched (recommended by MHLW)

FY	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Long-term	5	4	9	7	6	8	6	5	10	9	8
Short-term	27	30	45	49	29	29	33	35	16	16	0
Total	32	34	54	56	35	37	39	40	26	25	8

Note: JICA study
For each fiscal year, the number of experts who were dispatched during the subject fiscal year was tabulated (including the date of departure from and return to Japan).
Short-term dispatches include dispatches of survey team members.
Source: MHLW "International Contributions"[19]

[19] MHLW "International Contributions"
https://www.mhlw.go.jp/stf/seisakunitsuite/bunya/0000112577.html

Table 6 Details of FY2020 long-term expert dispatches (e.g., experts from water suppliers)

Country	Project name	Experts' organization	Responsibility
Cambodia	Project for Strengthening Administrative Capacity of Urban Water Supply in Cambodia	MHLW	Chief adviser
		City of Kitakyushu Water and Sewer Bureau	Water system techniques
Malawi	Project for Strengthening the Capacity of Non-Revenue Water Reduction for the Lilongwe Water Board	Yokohama Waterworks Bureau	Chief adviser / non-revenue water management
Myanmar	The Advisor for Water Service Administration and Water Supply in Yangon City	Fukuoka City Waterworks Bureau	Water service administration and water supply
Laos	Project for Improvement of Management Capacity of the Water Supply Sector (MaWaSU 2)*	Saitama City Waterworks Bureau	Chief adviser
		City of Kawasaki Waterworks Bureau	Sub-chief adviser / Water system techniques
			Sub-chief adviser / Water system techniques
East Timor	Water Supply Improvement Adviser	Chiba Prefectural Enterprise Bureau	Water supply improvement adviser
Total		7 organization	8 experts

Note: JICA study
* It is called MaWaSU 2, short for the project name "the Project for Improvement of Management Capacity of the Water Supply Sector"
Source: MHLW "International Contributions"

Table 7 shows the Technical Cooperation Project, which started in FY2020. Yokohama Water Co., Ltd. is taking part in this project, and the Yokohama City Government has announced that it would support the project activities by dispatching its officers or holding training programs[20]. Many experts have been dispatched and a lot of training programs have been held in Japan through Technical Cooperation Projects implemented by local governments. Table 8 shows case examples of these projects in which multiple water suppliers were involved[21].

[20] Information material from the Yokohama City Government press conference (February 16, 2021)
https://www.city.yokohama.lg.jp/kurashi/machizukuri-kankyo/kasen-gesuido/gesuido/torikumi/water_business/press_release.files/0015_20210216.pdf
[21] International Activities by Water Utilities (FY2008-FY2020)
http://www.jwwa.or.jp/jigyou/kaigai_file/wops_jp_2020.pdf

Table 7 FY2020 Technical Cooperation Project (cooperation activities began in FY2020)

Country	Project name	Cooperation start date	Cooperation end date
Pakistan	Project for Improving the Capacity of WASAs in Punjab Province Phase 2	February 2021	February 2024

Note: JICA study
Source: MHLW “International Contributions”

Table 8 Case examples of Technical Cooperation Projects implemented through collaboration of multiple local governments (projects ended by FY2019)

Scheme	Period of cooperation	Country	Project name	Local governments / agencies
Technical cooperation	August 2014 - August 2019	Samoa	Capacity Enhancement Project for the Samoa Water Authority in Cooperation with Okinawa[22] in Samoa	Okinawa Prefectural Enterprise Bureau Naha City Water Works Nago City Environment and Water Department, Okinawa City Waterworks Bureau Nanbu Water Supply Authority Ishigaki City Water Department Taketomi Town Water Department Miyakojima City Water and Sewerage Department
Technical cooperation	October 2012 - October 2015	Solomon Islands	Project for Improvement of Non-Revenue Water Reduction Capacity for the Solomon Islands Water Authority[23, 24] on the Solomon Islands	Yokohama Waterworks Bureau Okinawa Prefectural Enterprise Bureau Miyakojima City Water and Sewerage Department Naha City Water Works

[22] ODA Visual Presentation Website Capacity Enhancement Project for the Samoa Water Authority in Cooperation with Okinawa
https://www.jica.go.jp/oda/project/1300358/index.html
[23] Project for Improvement of Non-Revenue Water Reduction Capacity for the Solomon Islands Water Authority: Project Completion Report (Main Report)
https://libopac.jica.go.jp/images/report/12263976_01.pdf
[24] ODA Visual Presentation Website Project for Improvement of Non-Revenue Water Reduction Capacity for the Solomon Islands Water Authority
https://www.jica.go.jp/oda/project/1100314/index.html

Scheme	Period of cooperation	Country	Project name	Local governments / agencies
Technical cooperation	August 2012 - August 2017	Laos	"Project for Improvement of Management Capacity of the Water Supply Sector (MaWaSU*)"[25]	Saitama City Waterworks Bureau Saitama Prefectural Enterprise Bureau City of Kawasaki Waterworks Bureau Yokohama Waterworks Bureau Matsuyama City Public Enterprise Bureau (dispatch through public bidding)
Technical cooperation	2010-2012	Thailand	Yen-Loan-Financed Technical Cooperation Associated with the Eighth Bangkok Water Supply Improvement Project	Bureau of Waterworks, Tokyo Metropolitan Government Nagoya City Waterworks & Sewerage Bureau Osaka Water Supply Authority
Technical cooperation	October 2009 - April 2012	Indonesia	Project for Water Supply Service Improvement in the Mamminasata Metropolitan Area[26]	Nagoya City Waterworks & Sewerage Bureau Okayama City Waterworks Bureau

* It is called MaWaSU, short for the project name "Capacity Development Project for Improvement of the Management Ability of Water Supply Authorities"

Sources: International Activities by Water Utilities (FY2008-FY2020)
ODA Visual Presentation Website; the result of the present study has been incorporated into each program report.

(3) Technical cooperation (trainee acceptance)

Human resource development in developing nations is extremely important and quite effective in supporting their voluntary efforts and creating friendly relationships with them. From this point of view, the training program has been in place where trainees are accepted in group and individual water system technician training programs that JICA provides. Different training courses are available for different purposes and target countries range widely from Africa to Asia, Pacific island countries, Central America, South America, Middle Eastern nations, and so on[27]. Table 9 shows the number of trainees accepted for water supply sector training provided by water suppliers, and Table 10 lists the details of trainee acceptance in FY2020. Note that, due to the global spread of the novel coronavirus, FY2020 training was conducted remotely.

[25] Project for Improvement of Management Capacity of the Water Supply Sector in Laos: Project Evaluation Report at the Time of Project Completion
https://libopac.jica.go.jp/images/report/12290425.pdf

[26] ODA Visual Presentation Website Project for Water Supply Service Improvement in the Mamminasata Metropolitan Area
https://www.jica.go.jp/oda/project/0800063/index.html

[27] JICA Knowledge Co-Creation Program: Water Resources
https://www.jica.go.jp/activities/schemes/tr_japan/summary/lineup2019/sector/water.html

Table 9 Number of trainees accepted in the water supply sector (accepted by water suppliers)

FY	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
JICA Knowledge Co-Creation Program	76	69	65	81	100	136	132	144	83	113	31
JICA individual training	100	121	115	89	52	26	61	38	21	84	13

Note: JICA study
Source: MHLW "International Contributions"

Table 10 Details of FY2020 JICA trainee acceptance (accepted by water suppliers)

Training type	Project name	Target country	Number of trainees	Main cooperating agency
Knowledge Co-Creation Program	African Region Urban Waterworks Engineering	Kenya, Malawi, South Sudan, Rwanda	9	Yokohama Water
	Comprehensive Engineering on Water Supply Systems: Basic Water Supply System Planning and Designing (A)	Cambodia, Egypt, Laos, Myanmar, Sudan	5	Japan Water Works Association
	Water Supply Administration for Better Management of Water Supply Services (A)	Afghanistan, Cambodia, Egypt, Laos, Malawi, Micronesia, Nigeria, Palestine, the Philippines, Rwanda, South Africa, Sri Lanka, Tunisia, Tanzania, Myanmar, Lebanon	24	JICWELS
JICA Knowledge Co-Creation Program (Country Focus)	Project for Strengthening the Capacity of Non-Revenue Water Reduction for the Lilongwe Water Board (Malawi)	Malawi	10	Yokohama Waterworks Bureau
	Project for Strengthening Administrative Capacity of the Urban Water Supply (Cambodia)	Cambodia	1	Japan Water Works Association
	Project for Improvement of Management Capacity of the Water Supply Sector (MaWaSU 2) (Laos)	Laos	1	Japan Water Works Association
	Project for Strengthening Capacity in Non-Revenue Water Reduction (Kenya)	Kenya	1	Yokohama Water

Note: JICA study
Source: Introduction of international activities by water utilities on the Japan Water Works Association website has been incorporated into the MHLW page "International Contributions"

(4) International cooperation activities implemented independently by local governments

Some local governments sign a memorandum or exchange letters with overseas water suppliers or government agencies to carry out international cooperation such as their unique technical cooperation, information exchanges, and training. Table 11 lists case examples of FY2020 activities including ongoing activities, and Table 12 shows activity case examples that were reported between FY2008 and FY2019[28, 29].

Table 11 Local governments' independent international cooperation activities in FY2020 (including ongoing activities)

Scheme	Target country	Activity description	Local government / agency
Independent activity	Korea, Taiwan, Thailand	Asian Waterworks Utilities Network of Human Resource Development (A1-HRD) (e.g., information exchanges and study tours)	Bureau of Waterworks, Tokyo Metropolitan Government
Memorandum-based project	Vietnam	Project based on memorandums signed with 5 agencies such as Vietnamese water suppliers (trainee acceptance in Japan)	Yokohama Waterworks Bureau
Memorandum-based technical exchange project	Pakistan	Memorandum-based technical exchange project with Water and Sanitation Agency Faisalabad, Pakistan (training in Japan)	Yokohama Waterworks Bureau
Memorandum-based project	Vietnam	Technical exchanges with organizations including Vietnamese Saigon Water Corporation	Osaka Waterworks Bureau
Independent activity	Myanmar	Opinion exchanges with Myanmar Mandalay Regional Development Affairs on water system improvement for regional cities of Mandalay	Osaka Waterworks Bureau
Memorandum-based project	Vietnam	Project based on the two-party memorandum with Lang Son Province of Vietnam (expert dispatches and training in Japan)	Kanagawa Prefectural Enterprise Bureau
Memorandum-based project	Vietnam	Technical assistance for efforts to improve the water environment of Ba Ria-Vung Tau Province in Vietnam	Kawasaki City Government
Memorandum-based project and sister city agreement with Phnom Penh	Cambodia	Project for improving the water supply across Cambodia	Kitakyushu City Government
Memorandum-based project and sister city	Vietnam	Water supply business expansion to Hai-phong, Vietnam	Kitakyushu City Government

[28] International Activities by Water Utilities (FY2008-FY2020)
http://www.jwwa.or.jp/jigyou/kaigai_file/wops_jp_2020.pdf
[29] Ministry of Internal Affairs and Communications "Case Examples of Overseas Water Supply Business Expansion by Japanese Local Governments" (March 2021)
https://www.soumu.go.jp/main_content/000610019.pdf

Scheme	Target country	Activity description	Local government / agency
agreement with Hai-phong			
Memorandum-based project	Myanmar	Technical cooperation in Yangon, Myanmar	Fukuoka City Government
Memorandum-based project	Laos	Technical cooperation with three important water supply authorities of Laos (capital city of Vientiane, Luang Prabang Province, and Khammouane Province)	Saitama City Waterworks Bureau

Sources: Introduction of international activities by water utilities, Japan Water Works Association (JWWA)[30]. Note that some schemes have been decided in the present study.
Ministry of Internal Affairs and Communications "Case Examples of Overseas Water Supply Projects by Japanese Local Governments" (March 2021)

Table 12 International cooperation activities independently implemented by local governments between FY2008 and FY2019

FY	Scheme	Target country	Activity description	Local government / agency
2012, 2013, 2016, 2018,、2019	Independent activity	Thailand	Technical exchange and training with the Thai Metropolitan Waterworks Authority (MWA)	Osaka Water Supply Authority
2010-2019	Friendship city	China	Bilateral officer dispatch and training with Tsingtao Water Affairs Group Limited (sister city exchange)	Shimonoseki City Waterworks Bureau
2015 and 2016	Independent activity	India	Technical cooperation project targeting Varanasi, India	Kyoto City Waterworks Bureau
2014	Ministry of the Environment	Laos	Ministry of the Environment overseas technical assistance feasibility study project	Kyoto City Waterworks Bureau
2014	Independent activity	Singapore	Singaporean Public Utilities Board officer training and officer acceptance for a water purification plant tour (activities only in Japan)	Osaka Water Supply Authority
2014	CLAIR project for promoting international cooperation by local governments (model project)	Vietnam	Water supply situation improvement project in Long An Province, Vietnam	Kobe City Waterworks Bureau
2010, 2011, 2013	Friendship city exchange	China	Water engineering exchanges with Fuzhou City	Nagasaki City Waterworks Bureau
2010, 2011	Friendship city exchange	China	Technical exchanges between the Sapporo Waterworks Department and Shenyang Water Affairs Group Limited	Sapporo Waterworks Department
2010	Friendship city exchange	China	FY2010 Osaka-Shanghai water supply system technical exchanges	Osaka Waterworks Bureau
2008	Combined cooperation	China	FY2008 technical cooperation for Yinchuan	Matsue City Waterworks Bureau

[30] Introduction of international activities by water utilities by Japan Water Works Association (JWWA) http://www.jwwa.or.jp/index.html

FY	Scheme	Target country	Activity description	Local government / agency
	between CLAIR and water suppliers			

Sources: Introduction of international activities by water utilities, Japan Water Works Association (JWWA)
Ministry of Internal Affairs and Communications "Case Examples of Overseas Water Supply Projects by Japanese Local Governments" (March 2021)

Some local governments also support small and medium-sized businesses to expand their business overseas. Table 13 shows case examples of local governments participating in small and medium-sized business support projects held by JICA.

Table 13 Case examples of local governments participating in small and medium-sized business support projects

Country	Proposer (representative company)	Proposer (member company)	Project name	Strength	Local governments' participation
Sri Lanka	Abe Nikko Kogyo	Kaihatsu Management Consulting	• Project Viability Study for Promoting the Use of Prestressed Concrete (PC) Tanks that Financially Contribute to Water Supply System Improvement in Developing Nations • Project to Promote and Demonstrate PC Tanks that Financially Contribute to Water Supply System Improvement	Abe Nikko Kogyo is one of the top companies in Japan having the techniques to handle PC tanks whose construction management is difficult.	Nagoya City Waterworks & Sewerage Bureau provides support
India	Suidou Technical Service	MRI Research Associates	• Project Viability Study for a Water Leakage Detection Service • Project to Promote and Demonstrate a Leakage Detection System using an Automatic Leaking Sound Detector	Suidou Technical Service explores business expansion using the leakage detection technology that it has built up.	Yokohama Waterworks Bureau provides support through the Yokohama Water Business Association

Country	Proposer (representative company)	Proposer (member company)	Project name	Strength	Local governments' participation
Laos	Tohkemy	Pacific Consultants	• Project Viability Study for Small Town Water Supply Business • Project to Promote and Demonstrate a Water Purification System Capable of Handling High-Turbidity Raw Water for Small Town Water Supply Business	Tohkemy expands its techniques related to its prefiltering system and high-turbidity water processing system.	Saitama City Waterworks Bureau provides support
Thailand	Yokohama Water	Nippon Koei	• Study of Work Contracted to Examine Water Service Pipe Maintenance, Management, and Leakage in Collaboration with the Thailand Provincial Waterworks Authority (PWA) (Promotion of SME Collaboration)	Yokohama Water expands the city government's knowledge of water leakage examination.	Yokohama Water is the proposer
The Philippines	Nihon Genryo	None	• Project to Promote and Demonstrate a Mobile Sand-Filtration Water Purification System and a Filter Basin Rehabilitation System	The company promotes a sand-filtration system with an automatic cleansing capability.	Yokohama Water is participating as a team member
Indonesia	Goodman	None	• Project to Promote and Demonstrate Non-Revenue Water Countermeasures and Water Service Pipe Maintenance and Management Focused on Resin Pipes (e.g., polyvinyl chloride (PVC) pipes, polyethylene (PE) pipes)	The company explores where its foreign-produced water leakage systems can be used effectively.	Yokohama Waterworks Bureau and Yokohama Water are participating as team members
Sri Lanka	Tesco Asia	None	• Project to Promote and Demonstrate Offering of a Package of Non-Revenue Water Reduction Measures as a Business	A maintenance and management company aims at non-revenue water reduction mainly for water supply pipelines.	Nagoya City Waterworks & Sewerage Bureau is participating as a team member

Country	Proposer (representative company)	Proposer (member company)	Project name	Strength	Local governments' participation
Brazil	Geo Plan	Tokyo Waterworks International	•Study of Hyper Management System Business for Improvement of Water Supply Operation (Promotion of SME Collaboration)	The company's strength is information technology such as GIS in the water supply sector.	Tokyo Waterworks International is the proposer.
Malaysia	Naoji Yakuhin	Tokyo Engineering Consultants	• Study of Business to Locally Produce Coagulants to Purify Water for Water Supply Systems in Selangor and Malacca (Promotion of SME Collaboration) • F/S Study of Business to Locally Produce Coagulants to Purify Water for Water Supply Systems in Selangor and Malacca	The company expands sales of its electrolyzed hypochlorous acid generator overseas. It considers business potential outside Japan where it is difficult to procure chemicals.	The Saitama Prefectural Government provides support.

Source: JICA Developing Nation Issue Presentation Seminar: Water (Urban Water Service) (September 2, 2019)

Chapter 3　Collecting Information on the Effect of Collaboration of Water Suppliers

3-1　Study Subjects

To consider future activities for international cooperation in the water supply sector, this chapter focuses on collaboration of water suppliers and examines the effect of collaborative international cooperation activities.

In particular, this chapter summarizes the background of collaboration, the method of implementing cooperation activities including division of responsibility, the effect of collaboration on cooperation activities, issues in cooperation activities caused by the collaboration and their solutions, and the impact of collaboration and issues for water suppliers. We studied the case examples listed below.

[Case examples of international cooperation implemented through collaboration of water suppliers]

1) Project for Improvement of Management Capacity of the Water Supply Sector in Laos (MaWaSU 2)
   This is a case example of a Technical Cooperation Project implemented through collaboration of water suppliers from the Saitama Prefectural Government, Saitama City Government, Yokohama City Government and Kawasaki City Government.
2) Capacity Enhancement Project for the Samoa Water Authority in Cooperation with Okinawa in Samoa
   This is a case example of a Technical Cooperation Project in which the Okinawa Prefectural Government, Naha City Government, Nago City Government, Okinawa City Government, Nanbu Water Supply Authority, Ishigaki City Government, Taketomi Town Government, and Miyakojima City Government worked together.
3) Project for Expansion of Water Supply Systems in Kampong Cham and Battambang in Cambodia
   This is a case example of collaboration between a Japanese local government and a local government of the country where the project took place, instead of collaboration among water suppliers from Japanese local governments. More specifically, The City of Kitakyushu Water and Sewer Bureau and officers from the Phnom Penh Water Supply Authority worked together to provide training and transfer techniques to waterworks bureaus of regional cities.

[Case examples of training provided through collaboration of water suppliers]

1) JICA Knowledge Co-Creation Program: Operation and Maintenance of Urban Water Supply Systems (Water Quality and Purification) (A)
   This is a case example of a training program jointly hosted by the Osaka and Kyoto City Governments. The Nara City Government also took part by accepting trainees for a facility tour.
2) JICA Knowledge Co-Creation Program: Non-Revenue Water Management (Leakage Control)
   This is a case example in which the Nagoya, Hamamatsu, and Toyohashi City Governments together with the Mie Prefectural Enterprise Bureau split the program schedule to take charge of study tours and lectures.

3-2 Study Method

(1) Organization of project information

We obtained a project overview from open sources and organized it. For references we also indicated URLs of related JICA pages and websites of water suppliers that implemented the project.

(2) Interviews with water suppliers in Japan

We conducted interviews, made inquiries, and asked for information materials from local governments to collect information on the background of collaboration in cooperation activities, the method of implementing cooperation activities including division of responsibility, and issues in cooperation activities caused by the collaboration and their solutions. In the interviews we asked for their opinions on the effect of joint efforts in holding cooperation activities and the impact of such activities on them. We then organized the obtained information with the hope that it will become useful when promoting collaboration of local governments in the future. As for details of cooperation activities, we sought their comments on requests from target nations and needs for cooperation activities perceived as a result of implementation. In the case of a training program, we asked them to comment on an effective training menu.

Table 14 shows the list of organizations that we studied through interviews for example.

Note that the result described in each chapter has been partially corrected or supplemented after confirming facts with other parties involved in each project and in related reports based on the result of interviews with the subject organizations.

Table 14 Organizations studied by interviews for example

No	Project name	Target country	Studied organization
1	Project for Improvement of Management Capacity of the Water Supply Sector (MaWaSU 2)	Laos	Saitama City Waterworks Bureau Yokohama Waterworks Bureau
2	Capacity Enhancement Project for the Samoa Water Authority in Cooperation with Okinawa	Samoa	Okinawa Prefectural Enterprise Bureau
3	Project for Expansion of Water Supply Systems in Kampong Cham and Battambang	Cambodia	City of Kitakyushu Water and Sewer Bureau
4	Operation and Maintenance of Urban Water Supply Systems (Water Quality and Purification) (A)	—	Osaka Waterworks Bureau Nara City Enterprise Bureau
5	Non-Revenue Water Management (Leakage Control)	—	Nagoya City Waterworks & Sewerage Bureau

In addition to information obtained from interviews, we were also able to access information on the presentation made by the Nara City Enterprise Bureau at the fifth Local Government Water Supplier Study Group held by JICA in 2017[31] and in “Comparative Study of JICA Projects for Japanese Water Suppliers”

[31] FY2017 JICA topics: Holding of the fifth Local Government Water Supplier Study Group https://www.jica.go.jp/tokyo/topics/2017/ku57pq00000i3owr.html

(March 31, 2020) compiled by the International Cooperation Expert Committee ("Y-TAP") of the Yokohama Waterworks Bureau. We also used these pieces of information as references.

For the purpose of understanding the strengths and issues of local governments through JICA projects that they took part in, the Y-TAP report includes an interview study with participating water suppliers. For the Laos and Samoa projects, which are the subjects of the present study, Table 15 lists the effects of local governments participating in the projects.

Table 15 Key points of the analysis result of "Comparative Study of JICA Projects for Japanese Water Suppliers"

Target country	Laos	Samoa
Project name	Project for Improvement of Management Capacity of the Water Supply Sector (MaWaSU 2) in Laos	Capacity Enhancement Project for the Samoa Water Authority in Cooperation with Okinawa in Samoa
Participating local governments	Saitama City Government, Saitama Prefectural Government, Kawasaki City Government, and Yokohama City Government	Okinawa Prefectural Enterprise Bureau and Okinawa, Naha, Nago, Ishigaki, and Miyakojima City Governments
Key points of the analysis result	• Participation by local governments allowed implementation of support from the human resource development point of view such as strengthening of the abilities of officers to be dispatched. • Participation by local governments allowed creation of mid-to-long-term plans and flows including the administrative perspectives.	• Participation by local governments that are quite similar to the assisted party led to effective use of their experience and techniques. • Multiple local governments in Okinawa Prefecture worked together to implement the project.

Source: Yokohama Waterworks Bureau International Cooperation Expert Committee (Y-TAP) "Comparative Study of JICA Projects for Water Suppliers in Japan"

(3) Interviews with local relevant agencies and Japanese water suppliers currently carrying out activities locally

Since travel from Japan has been difficult due to the novel coronavirus, we decided to carry out, instead of field studies, online interviews with individuals involved in the projects such as Japanese water suppliers currently engaged in international cooperation activities locally and officers of local agencies. In line with the study policy of this fiscal year, we obtained information on water projects in the studied countries such as: the effect of collaboration of water suppliers in international cooperation in the water supply sector, opinions on collaboration among Japanese water suppliers or collaboration between the target country and Japanese water suppliers, the effect of projects implemented through such collaboration, and the state of international cooperation including other countries.

Among Laos, Samoa, and Cambodia where international cooperation has been implemented through collaboration of water suppliers, we chose Laos and Cambodia as the study subjects where experts from Japanese water suppliers are currently stationed. Table 16 shows the studied agencies and study dates.

Table 16 Study details including local participants in online interviews

Target country	Laos	Cambodia
Office of experts from Japanese water suppliers	Individuals involved in MaWaSU 2 (Saitama Prefectural Enterprise Bureau, Saitama City Government, Yokohama City Government, and Kawasaki City Government)	Individuals associated with the Kitakyushu City Government (Kitakyushu Water Service)
Local relevant agencies	• Director, General Affairs Division, Vientiane's Water Supply Authority (Nampapa Nakhonluang; NPNL) • Director, Planning and Cooperation Division, Luang Prabang Province Waterworks (Nam Papa Luang Prabang; NPLP)	• Director General of the General Department of Potable Water, Ministry of Industry, Science, Technology and Innovation (MISTI) • Vice-Director General, Siem Reap Water Supply Authority (SRWSA) • Vice President, Plan and Project Department, Phnom Penh Water Supply Authority (PPWSA)
Study date	December 28, 2021	PPWSA: December 17, 2021 SRWSA: December 27, 2021 MISTI: January 5, 2022

(4) Organizing the study result

We organized responses from interviews for each project. Then, to learn the characteristics of each project and obtain information that would become useful when implementing international cooperation through collaboration of multiple water suppliers, we sorted our findings from four perspectives: (1) benefit to the target country (and for project implementation), (2) benefit to the implementing parties (water suppliers), (3) factors and background of the benefit, and (4) findings that should be effectively applied. Finally, we summarized the effects and issues of collaboration of water suppliers and discussed the future direction of international cooperation through collaboration of water suppliers.

Chapter 4 Project for Improvement of Management Capacity of the Water Supply Sector (MaWaSU 2) in Laos

4-1 Project Overview

The Technical Cooperation Project "Project for Improvement of Management Capacity of the Water Supply Sector" (MaWaSU) from August 2012 to August 2017 (5 years) was implemented with the cooperation of four water suppliers, who were the Saitama City Waterworks Bureau, Saitama Prefectural Enterprise Bureau, City of Kawasaki Waterworks Bureau, and Yokohama Waterworks Bureau, and also the Matsuyama City Public Enterprise Bureau (through public bidding of individuals). This project supported staff members of three water authorities in the capital city Vientiane, Luang Prabang Province, and Khammouane Province to enhance water supply operation planning. At these three water authorities, the subject individuals obtained the basic ability to operate water service as planned. Meanwhile, most water authorities including these three had a weak management foundation. They relied on donors and funds from private sector investments for capital investment and equipment update. There were also no established legal systems or business licensing systems for supervising private sector companies that were involved in facility improvement and operation. In response to the situation in which there was no environment for appropriate water supply operation by the public and private sectors, the Laotian government, with the goal of strengthening of water administration capabilities and improvement of water authority management, requested the Japanese government to implement a Technical Cooperation Project consisting mainly of five activities: (1) clarification of responsibility of the central and provincial governments' administrative agencies to enhance the ability to implement water administration required at each level, (2) creation of a long-term, low-interest financing system, (3) creation of a public-private collaboration system to use private sector funds, (4) further enhancement of the water supply operation capabilities of the water authorities in the capital city Vientiane, Luang Prabang Province, and Khammouane Province, and (5) nationwide implementation of the water supply operation model that has been strengthened in the three cities/provinces as described above. Upon this request, the Japanese government launched the Project for Improvement of Management Capacity of the Water Supply Sector (MaWaSU 2) in May 2018 with the goal of strengthening of the water administration and water supply operation capabilities of the Laotian parties concerned[32].

In this Technical Cooperation Project, in 2018, JICA for the first time signed a collaboration agreement with local governments for a Technical Cooperation Project in the water supply sector called "Agreement on Implementation of a Technical Cooperation Project by the Saitama Prefectural Enterprise Bureau, Saitama City Waterworks Bureau, Yokohama Waterworks Bureau, City of Kawasaki Waterworks Bureau, and the Global Environment Department of the Japan International Cooperation Agency."[33] Figure 1 provides a map of areas of cooperation, and Table 17 shows the project overview.

[32] Ex-ante evaluation https://www2.jica.go.jp/ja/evaluation/pdf/2017_1700437_1_s.pdf
[33] JICA news release https://www.jica.go.jp/press/2018/20180521_01.html

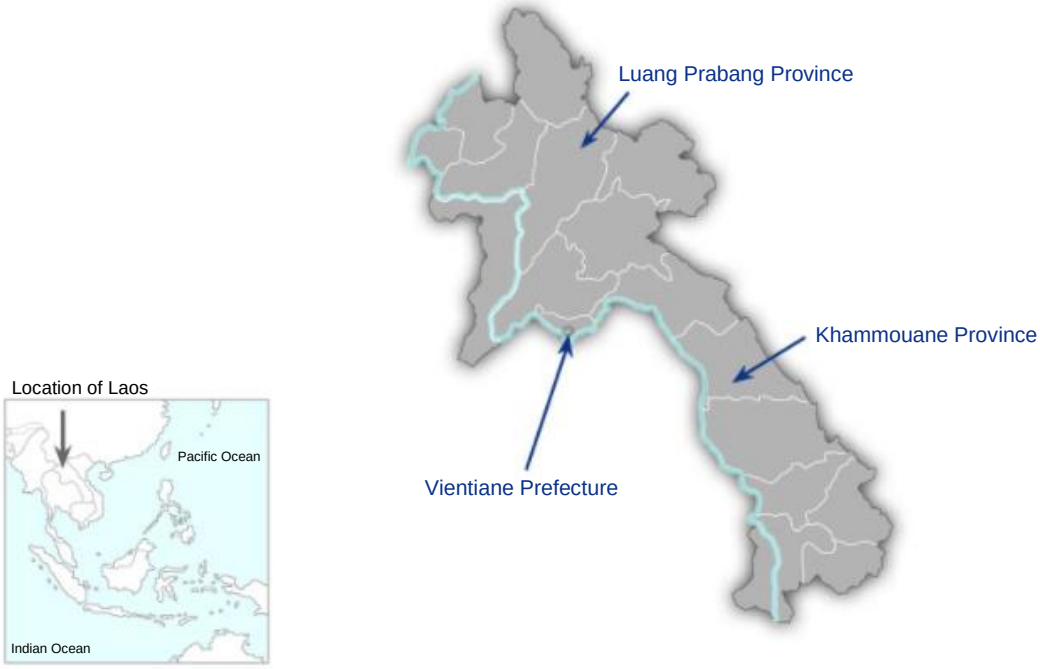

Figure 1 Map of areas of cooperation (from the ODA Visual Presentation website)

Table 17 Project overview

Item	Details
Country	Laos
Project name	Project for Improvement of Management Capacity of the Water Supply Sector (MaWaSU 2)
Type of assistance	Technical Cooperation Project
Amount of cooperation	680 million yen (Source: Ex-ante evaluation)
Period of cooperation	Record of Discussion (R / D): December 26, 2017 May 2018 to May 2023 (5 years)* *At the Joint Coordinating Committee (JCC) meeting in July 2021, the period of cooperation was changed from 5 years to 5 years and 7 months due to the novel coronavirus.
Laotian parties involved	Ministry of Public Works and Transport, Water Authority and Department of Public Works and Transport of the capital city Vientiane, Luang Prabang Province, and Khammouane Province, and the Water Authority and Department of Public Works and Transport of other provinces.
Japanese cooperating agencies	Saitama City Waterworks Bureau, Saitama Prefectural Enterprise Bureau, Yokohama Waterworks Bureau, and City of Kawasaki Waterworks Bureau
Description	[Goal] Development of a foundation necessary for strengthening the water supply sector management system and capabilities of water authorities. [Expected outcomes] 1. Improvement of water administration results in strengthening of transparency, accountability, and governance (“TAG”) of the water supply sector. 2. Strengthening of the Water Authorities’ planning and implementation abilities in facility improvement projects and strengthening of screening, monitoring, and assessment abilities of the Ministry of Public Works and Transport (MPWT) and the Department of

Item	Details	
	Public Works and Transport (DPWT). 3. Creation of the technical standards necessary for water supply operations. 4. Strengthening of Water Authorities' abilities to plan and implement water supply operations. [Implementation details] • Long-term dispatch of three experts (two chief advisers and a sub-chief adviser / water system techniques and work coordination) • Short-term dispatch of experts: 158 man-months (civil engineering, water quality, financial affairs, system improvement, water supply sector development fund, design / construction supervision) • JICA Knowledge Co-Creation Program (Country Focus): the program is planned for the six themes listed below. There will be six instructors per theme spanning from 1 to 3 weeks. Role division in the water supply sector, water works association, planning, financial administration, water quality, and technical standards • Provision of equipment (water quality-related devices))	
Note	For the purpose of implementing this project, JICA for the first time signed a collaboration agreement with local governments for a Technical Cooperation Project in the water supply sector. (It signed the "Agreement on Implementation of a Technical Cooperation Project by the Saitama Prefectural Enterprise Bureau, Saitama City Waterworks Bureau, Yokohama Waterworks Bureau, City of Kawasaki Waterworks Bureau, and the Global Environment Department of the Japan International Cooperation Agency" with the Saitama Prefectural Government, Saitama City Government, Yokohama City Government, and Kawasaki City Government.)	
References and studied websites	Project website	https://www.jica.go.jp/project/laos/023/index.html
	Project overview	https://www.jica.go.jp/project/laos/023/outline/index.html
	Project news	https://www.jica.go.jp/project/laos/023/news/index.html/index.html
	ODA Visual Presentation Website	https://www.jica.go.jp/oda/project/1700437
	JICA news release	https://www.jica.go.jp/press/2018/20180521_01.html
	Saitama Prefectural Government	https://www.pref.saitama.lg.jp/a0001/news/page/2018/0521-01.html
	Saitama City Government,	https://www.city.saitama.jp/001/006/002/034/001/p063561.html
	Yokohama City Government	https://www.city.yokohama.lg.jp/city-info/koho-kocho/press/suidou/2018/20180521-034-27478.files/300521.pdf https://www.city.yokohama.lg.jp/kurashi/sumai-kurashi/suido-gesui/suido/torikumi/koken/laos-project.html
	Kawasaki City Government	https://www.city.kawasaki.jp/800/page/0000118434.html

4-2 Result of Interviews with Water Suppliers in Japan

This section provides the result of interviews with the Saitama City Waterworks Bureau and the Yokohama Waterworks Bureau about the background of four water suppliers deciding to work together to carry out cooperation activities, any creative ways to carry out cooperation activities or any caution required, the effect of collaborative cooperation activities, the impact of such collaborative activities on their own organizations, and their opinions on international cooperation activities through collaboration of water suppliers.

- International cooperation activities implemented through collaboration of the subject water suppliers and the background of the decision to collaborate

Item	Description
Characteristics of the project	• Three Water Authorities in the capital city Vientiane, Luang Prabang Province, and Khammouane Province (“the Three Areas” collectively) have been set as the bases for the pilot project. • Institutional support is being provided, and private sector consultants are also participating in the project.
Man-months and the outline of the implementation	• MaWaSU 2 is carried out by three experts x five years (long-term dispatch) and one expert x the first and second halves of the project, respectively (short-term dispatch) x six areas. • In the Three Areas, there is a monthly onsite guidance session, a joint meeting by the three water authorities every other month, a semi-annual workshop in each area, and an annual outcome reporting seminar for all provinces. • For activities outside the Three Areas, it has been a great advantage that the double-chief adviser system allows simultaneous activity implementation in multiple areas.
Background	• The Saitama City Government had been dispatching experts and holding seminars. It however could not carry out MaWaSU alone because it required a wide range of experts (both in areas and the number of experts). For this reason, it established collaboration with the Saitama Prefectural Enterprise Bureau, which it had already signed an agreement with, and by approaching the neighboring Kawasaki City Government and Yokohama City Government, taking advantage of the connections that the leader at that time had. These four water suppliers also participated in MaWaSU 2.

- Creative ways to carry out international cooperation activities through the collaboration of multiple water suppliers and the actual situation.

Item	Description
Maintenance of the collaboration system	• Considering that MaWaSU 2 is a five-year project, water suppliers signed an agreement so that the project would not be impacted by their policy changes. Signing of this agreement has allowed them to provide fine-tuned, stable assistance.
Method of dividing responsibility among the local governments	• Prior to the project launch, JICA conducted a cooperation feasibility study, and considered and assigned the area of cooperation and responsibility to each water supplier. Note that all the water suppliers had limited resources for the water quality area, so JICA did not assign a water supplier and instead coordinates expert dispatch each year.
Organizational structure (e.g., chief adviser assignment)	• Introduction of a double-chief adviser system has reduced chief adviser tasks, allowing multifaceted implementation of local activities.

Item	Description
Term adjustment	• The timing of switching the chief and sub-chief advisers has been adjusted to avoid the absence of experienced individuals.
Backup system in Japan	• Individuals having experience of being experts in similar projects and each water supplier office individually respond to requests of local experts. • The Yokohama City Government has a dedicated backup unit (support team).
Consensus-building efforts of the local governments	• Before the short-term dispatch of experts, JICA and the four local governments hold a coordination meeting and handle additional tasks individually as needed. • Coordination was smooth for this project because a framework was already created in the previous phase (MaWaSu), and there were individuals who had the experience of being dispatched. If this project were to start from scratch, quite a lot of effort would have been necessary for initial consensus building and coordination.
Work coordination among the local governments	• Involvement of multiple local governments increases the burden of work coordination, but the benefit as described above far exceeds this burden.
Work procedure differences among the local governments	• Different water suppliers work differently. In the previous phase (MaWaSu), the policy was established under the strong leadership of the chief adviser, and each water supplier and experts who were dispatched for a short period of time supported it. • In MaWaSU 2, two chief advisers express their opinions and willingly accept suggestions from each of the water suppliers. • There are no conflicts in terms of work procedure in the activity areas where division of responsibility is clear.
Explanation to the local assembly	• In Saitama City, the Saitama City Government has been recognized as the leader of the project. Note, however, the four local governments are in an equal position in carrying out the project, and PR to avoid under-evaluation of the role of other organizations is necessary.

• The effect of international cooperation activities through collaboration of water suppliers

Item	Description
Impact and effect of collaboration on their own organizations	• The collaboration allows team activities beyond the organizational border without hierarchy or organizational/departmental politics. • The collaboration is providing a valuable opportunity to learn other water suppliers' techniques and knowledge. • The collaboration allows creation of a solid personal relationship that goes beyond international cooperation and continues on into the future.

Item	Description
Formulation of the organizational structure for cooperation (structure and the number of individuals)	• Increasing the number of organizations allows securing of competent and experienced experts. • Particularly in areas where there are only a few officers to start with (e.g., water quality area), involvement of multiple water suppliers has allowed effective coordination leading to more sophisticated and flexible technical cooperation.
Formulation of the organizational structure for cooperation (contents and techniques)	• What is expected of experts is becoming increasingly difficult. While each water supplier has resource shortages, aggregation of techniques and knowledge of the four water suppliers has increased technical options. “Four suppliers” does not mean a four-fold increase, but there is the impression that it has more than doubled. • In training programs provided in Japan, too, this organizational structure allows arrangement of a wide variety of training menu items and the use of facilities.
Others	• Since the water suppliers had experience of taking part in cooperation activities as experts and developed relationships with their counterparts, they were able to expand MaWaSU to Grassroots Technical Cooperation Projects (Saitama Prefectural Government and Saitama City Government).

• Caution required in international cooperation activities through collaboration of water suppliers.

Item	Description
Division of burdens and responsibility, and consensus building among the local governments	• Coordinating the division of burdens and responsibility of expert dispatches is challenging. It was possible in MaWaSU owing to powerful leadership and also in MaWaSU 2 because core members were experienced individuals. Coordination would be difficult without these backgrounds. • Consensus building takes time. Effective and joint implementation of the project requires careful consideration for the situation of each water supplier. • Coordination takes a lot of effort when many water suppliers collaborate.
Policy differences	• The policy of each organization and the project policy sometimes do not agree in terms of the length of dispatch period (long-term/short-term) or requirement for expert experience in cooperation activities. At the end, convenience and the policy of dispatching organizations must be prioritized.
Adjustment of work procedure differences among the local governments	• At the site of cooperation activities, adjustment may be necessary to deal with work procedure differences among the water suppliers. In Laos, however, there was no such issue because the procedures were standardized already in the MaWaSU phase under its powerful leadership.
Reporting of achievements to departments under direct management of the mayor	• When multiple water suppliers are involved, there is a concern that they feel hesitant to claim that they made achievements. Planning of effective PR to avoid under-evaluation of contribution of participating water suppliers is necessary.

Item	Description
Communication method	• Information sharing using the cloud storage service Dropbox is effective, but the net security of the water suppliers sometimes causes problems. • It is necessary to effectively use locally used communication methods such as the message app WhatsApp.
Coordination between the local governments and private sector companies	• Coordination between the water suppliers and private sector companies is challenging because each water supplier manages private sector companies.

• Comments on water supplier collaboration

Item	Description
Comments on collaboration of water suppliers in international cooperation activities	•It has far more advantages than disadvantages. • The ideal situation is to respond to local needs, which are increasingly sophisticated, by creating a system for responding to their requests locally at any time by pairing experts on long-term and short-term dispatches in each key area.
Discussion and suggestions	• Collaboration is easier if participating water suppliers are from nearby areas so that they can meet in person to make necessary adjustments. • If there is already a water supplier working in the target country, letting that supplier be the leader seems to make coordination relatively easy. • For a water supplier participating in international cooperation (expert dispatches or grassroots projects) for the first time, it is recommended to first take part in a Technical Cooperation Project carried out by another water supplier as an assistant member to build up experience and create relationships. Collaboration of water suppliers will provide an opportunity to gain experience for the water supplier that joins in international cooperation later.

4-3 Result of Interviews with Local Relevant Agencies and Japanese Water Suppliers Currently Carrying Out Activities Locally

We interviewed Vientiane's Water Supply Authority (Nampapa Nakhonluang; NPNL) and Luang Prabang Province Waterworks (Nam Papa Luang Prabang; NPLP) in the presence of experts on long-term dispatch currently engaged in the MaWaSU 2 activities locally and asked them about international cooperation activities through collaboration of Japanese water suppliers. This section provides the result of the interviews.

• Particularly effective activities

Responding agency	Details
NPNL	• Each department showed effective improvement. The Electronic Division in particular successfully saved energy after participating in the training program in Japan. • NPNL plans to continuously follow-up on the activities and expand their application to the whole system.
NPLP	• NPLP was able to introduce document-based management (manuals, standards, and reports) from the local to central governments of Laos and successfully enhanced the skills of each level of officers engaging in the water supply area. • NPLP considers that, if this kind of project continues, the number of experienced and knowledgeable officers increases, and a water works association is formed to have relationships with water authorities of other countries, the whole NPLP can improve. It hopes that, like Japan, engineers can disseminate their techniques at multiple training centers. • The Laotian water supply sector is still quite new and has not been completely systematized. A large number of its regulations are outdated and some are insufficient. Stakeholders must clarify and understand their responsibility, and under the current circumstances, the MaWaSU 2 activities have been quite effective.

• Points recognized as future tasks

Responding agency	Details
NPNL	• Since there are only a few engineers at NPNL who are specialized in electricity and pumps, it is desirable to increase the number of officers who know a lot about electricity. It will be good if the number of experts increases and they teach more.
NPLP	• NPLP will establish a water supply training center and promote research and development. • NPLP will continuously communicate the achievements of MaWaSU and MaWaSU 2 to stakeholders in the water supply area to provide them knowledge about correct management and development methods. • NPLP needs funds for expanding the water supply network of the existing service area and creating a water supply system for farming villages.

• Comments on multiple Japanese water suppliers working together

Responding agency	Details
NPNL	• NPNL has recognized that support from Japan comes from multiple water suppliers (Saitama City Government, Saitama Prefectural Government, Kawasaki City Government, Yokohama City Government, etc.). While NPNL thinks that these suppliers participated in the project as one team, it believes it has gained wider experience and knowledge by receiving assistance from multiple water suppliers.

Responding agency	Details
NPLP	• NPLP recognizes support from the Saitama City Government, Saitama Prefectural Government, Kawasaki City Government, and Yokohama City Government. Compared to the assistance received from other projects, the collaborative assistance seems to have been more effective for long-term human resource development than assistance from other countries. • What was good specifically about MaWaSU is that individuals who built up work experience and are still working in Japan were dispatched and provided their knowledge to Laotian officers. Other projects by the Asian Development Bank (ADB) or the Norwegian Agency for Development Cooperation (NORAD), for example, were like a school where professors came and taught. • The Japanese party considered the method suitable for the situation in Laos and introduced what would be useful, and this strategy was also effective. • Japanese support in the area of human resource development seems to be very good because of the mechanism of knowledge transfer and long-term effects.

4-4 Summary of the Study Report

1) Benefit to the target country (and for project implementation)

- The target country considered that it gained wider experience and knowledge by receiving assistance from multiple water suppliers and rated their assistance as having a long-term benefit in human resource development.
- Collaboration of water suppliers has allowed them to continue maintaining expert activities and build up relationships with their counterparts. These factors contributed to expansion of the project into a new Grassroots Technical Cooperation Project.

2) Benefit to the implementing parties (water suppliers)

- While a single water supplier cannot provide assistance in multiple areas in terms of quality or volume, collaboration of participating water suppliers has expanded the scope of assistance to allow them to meet the needs of the target country.
- Although it should be kept in mind that coordination takes time, the benefit of collaboration of water suppliers has exceeded the coordination burden considering the flexibility of forming the organizational structure and the increase of technical options available.
- Collaboration has provided a valuable opportunity to learn other water suppliers' techniques and knowledge.
- Participation in the same project for a long period of time has allowed the water suppliers to create personal relationships that goes beyond international cooperation.

3) Factors and background of the benefit

- The water suppliers had already built a relationship with the assisted country prior to the project by dispatching experts and holding seminars. This relationship allowed the water suppliers to know their target beforehand.

- Continuation of operation allows the project to proceed smoothly. The four water suppliers who participated in MaWaSU also participated in the following MaWaSU 2. This allowed smooth handover of operations to be implemented.
- An expert with powerful leadership invited neighboring water suppliers with passion. This moved collaboration negotiations forward.
- There were local governments already under an international cooperation agreement. In addition to these local governments, neighboring water suppliers joined, resulting in collaboration of four water suppliers. Signing a collaboration agreement was effective in maintaining a stable collaboration framework without being impacted by policy changes of the water suppliers.

4) Findings that should be effectively utilized

- When multiple water suppliers participate in a project and collaborate with each other, it is important that a local expert coordinates such collaboration, and it is desirable that an experienced expert manages it.
- Joint project implementation requires fine-tuned consideration that matches the situation of each water supplier. It is desirable that the necessary and sufficient number of water suppliers collaborate, not too many of them.
- Coordination through the leadership of an expert on a long-term dispatch was initially effective in adjusting differences in the policy or how work is done by each water supplier. Based on such coordination, improvement was made as needed by adopting good ideas from each water supplier.

Chapter 5 Capacity Enhancement Project for the Samoa Water Authority in Cooperation with Okinawa in Samoa

5-1 Project Overview

The Samoa water supply project is run by the Samoa Water Authority (SWA) that has about 220 employees and supplies water to approximately 85% (160,000 people) of the total population (2012). The Alaoa water supply district that is the largest in the Samoan capital, Apia, is also the most important one being managed by the SWA. Despite this, the supply pipes have severe leakage issues and about 60% of water consumed is non-revenue water. In addition, the water treatment plant is not managed properly so the water supplied is below SWA water quality standards, having a negative impact on the hygienic environment of residents. The low service standards also result in a low water tariff collection rate, bringing financial difficulties to the SWA that further lower water service standards, creating a vicious cycle.

Miyakojima in Okinawa cooperated with the SWA in Water Business Support in Samoa Using the Miyakojima Water Supply Model (Grassroots Technical Cooperation Project: 2010-2013) to enhance the capacity to repair and detect leaks and to operate the slow sand filtration (biological purification) water treatment plant. However, the transferred technology was not accessible to the entire organization due to the lack of manuals and other infrastructure. Moreover, as a system had not been developed for measuring leakage rate or water quality, these indicators were not being monitored regularly or quantitatively. This project was therefore conducted to create standard operating procedures (SOP) for each type of activity and train SWA staff so that the technology is accessible to the entire organization. JICA also cooperated by creating a water distribution plan and water pressure management plan for the respective district and installed flow measurement meters to enable monitoring of leakage rate and other indicators[34]. A map of areas of cooperation is shown in Figure 2, and a summary of the project is shown in Table 18.

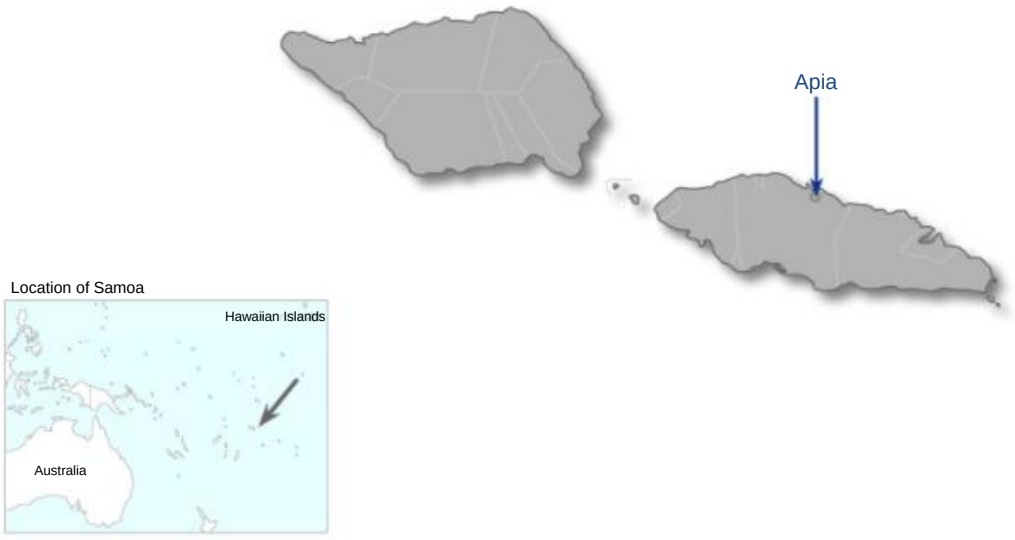

Figure 2 Map of areas of cooperation (from the ODA Visual Presentation website)

[34] Ex-ante evaluation https://www2.jica.go.jp/ja/evaluation/pdf/2014_1300358_1_s.pdf

Table 18 Project overview

Item	Item	
Country	Samoa	
Project name	Capacity Enhancement Project for Samoa Water Authority in Cooperation with Okinawa	
Type of assistance	Technical Cooperation Project	
Amount of cooperation	320 million yen (Source: Ex-ante evaluation)	
Period of cooperation	Date of signature (agreement) February 24, 2014 August 2014 to August 2019 (5 years) (Source: JICA Project Summary)	
Samoan parties involved	The Samoa Water Authority (SWA), Urban Operations Division (authority on Apia water supply operation, maintenance, and management), and other relevant departments	
Japanese cooperating agencies	Okinawa Prefectural Enterprise Bureau, Naha City Water Works, Nago City Environment and Water Department, Okinawa City Waterworks Bureau, Nanbu Water Supply Authority, Ishigaki City Water Department, Taketomi Water Department, Miyakojima City Water and Sewerage Department	
Description	[Goal] Provide safe and sustainable water supply to users in Alaoa water supply district [Expected outcomes] 1: Enhance the capacity for pipeline works and leakage repair 2: Enhance flow rate and water pressure control 3: Enhance the capacity of leak detection 4: Enhance the water quality control system 5: Improve operation of the Alaoa purification plant [Implementation details] • Dispatch of experts (chief advisor, operational coordination, pipeline work, pressure control, leak detection, water quality control, water treatment plant management): Total of 148 man-months • Equipment supplied: Sand cleaning device, electromagnetic flowmeter, other • Training in Japan (water resource management, pipeline work, leak detection, water treatment plant management)	
Note	Phase 2 of this technical cooperation project is scheduled[35].	
References and studied websites	Project outline	https://www.jica.go.jp/project/samoa/001/outline/index.html https://www.jica.go.jp/project/samoa/001/index.html
	Newsletter	https://www.jica.go.jp/project/samoa/001/newsletter/index.html
	ODA Visual Presentation Website	https://www.jica.go.jp/oda/project/1300358/index.html
	Okinawa Prefectural Enterprise Bureau	http://www.eb.pref.okinawa.jp/torikumi/1126/1135
	Naha City Government	https://www.city.naha.okinawa.jp/water/suidoukyoku/kouhou/kouhousi/nahanomizubackn.files/H27pan10.pdf

[35] Survey to formulate a detailed plan for Capacity Enhancement Project for Samoa Water Authority in Cooperation with Okinawa Phase 2 (Assessment and Analysis) Bidding Notice https://www2.jica.go.jp/ja/announce/pdf/20200930_205512_1_01.pdf

Item	Item	
	Nago City Government	Waterworks newsletter http://www.city.nago.okinawa.jp/soshiki/kankyousuidou-nav/2018071700079/file_contents/2018suidoudayori.pdf http://www.city.nago.okinawa.jp/soshiki/kankyousuidou-nav/2018071700079/file_contents/2017suidoudayori.pdf
	Okinawa City Government	City assembly news https://www.city.okinawa.okinawa.jp/sp/userfiles/oki074/files/dayori47.pdf PR https://www.city.okinawa.okinawa.jp/kouhou/H27/10/08.html
	FY2018 Commissioned Seminar Instructions	http://www.okitel.com/UL/20180515_39364.pdf
	Documents related to Water Business Support in Samoa Using the Miyakojima Water Supply Model	https://www.mofa.go.jp/mofaj/gaiko/oda/shiryo/hakusyo/12_hakusho/column/column05.html http://www.miyakomainichi.com/2011/11/25728/ http://www.miyakomainichi.com/2012/02/29848/ https://committees.jsce.or.jp/engineers/w33

5-2 Result of Interviews with Water Suppliers in Japan

This section provides the results of an interview with the Okinawa Prefectural Enterprise Bureau about the history leading up to cooperation activities with suppliers in Okinawa, methods used to improve the projects and important points to consider, effects of the projects and impact on the suppliers, and opinions about collaboration of water suppliers.

- International cooperation activities implemented through collaboration of the subject water suppliers and the background of the decision to collaborate

Item	Description
Man-months and the outline of the implementation	The technical cooperation project was 5 years. Various suppliers participated.
Background	• The idea for the project began with Miyakojima conducting a Grassroots Technical Cooperation Project using slow sand filtration (biological purification) technology. When expanding the target to include measures to reduce non-revenue water, JICA approached the Okinawa Prefectural Enterprise Bureau that was conducting a Knowledge Co-Creation Program and Okinawa city, Naha, Nago, and other local governments joined, each taking on their own area of expertise in the collaboration. • Considerable efforts were also made by Miyakojima and Nago staff who participated in the Grassroots Technical Cooperation Project. • Underpinning Okinawa's international cooperation efforts in Oceania are the Okinawa Promotion and Development Special Treatment Act, the Okinawa 'Kizuna' Declaration made in May 2012, and a partnership agreement signed between Okinawa and JICA in March 2013.

• Creative ways to carry out international cooperation activities through the collaboration of multiple water suppliers and the actual situation.

Item	Description
Maintenance of the collaboration system	• There are no documents like memorandums. Each supplier joins individually, and meetings are held regularly to share progress and plans, coordinate activities, and make decisions.
Method of dividing responsibility among the local governments	• The lectures to be allocated to each local government are decided at the training stage. Local governments can also conduct projects in the area of expertise. • The Enterprise Bureau is responsible for liaison and coordination with local governments.
Organizational structure (e.g., chief adviser assignment)	• Several people from suppliers in Okinawa made an offer as experts in waterworks and the offers were accepted by past Enterprise Bureau staff and Nago staff. They are appointed to a rotating two-year term.
Backup system in Japan	• In addition to suppliers, civilians were also requested to give some of the training lectures.
Consensus-building efforts of the local governments	• Meetings are held with one representative from each supplier. The representatives were in positions higher than managerial, and decisions were made in those meetings.
Work coordination among the local governments	• Before holding meetings with one representative from each supplier, work was coordinated among those in charge.
Work procedure differences among the local governments	• Pipeline work was commissioned to Okinawa city, leak control surveying (and later takeover of pipeline work) was commissioned to Nago, and leak control, surveying, and repair was commissioned to the Nanbu Water Supply Authority. The three organizations coordinated their views to ensure proper handover, for example including what information was taught.
Explanation to the local assembly	• Half a year after the start of the project, there were no questions about the international cooperation from the assembly or others. There were also no problems.

• Benefits of international cooperation activities through collaboration of water suppliers

Item	Description
Impact and effect of collaboration on their own organizations	• In addition to the project itself, it provided opportunities for suppliers to exchange opinions and increase their knowledge. • Interaction and handover between people in charge were linked to site management.
Formulation of the organizational	• The Enterprise Bureau cannot accomplish this alone and originally wanted to ask the local governments.

Item	Description
structure for cooperation (structure and the number of individuals)	
Formulation of the organizational structure for cooperation (contents and techniques)	• Suppliers exchanged technologies and expertise to complement what a single supplier on its own would lack. While the Enterprise Bureau can take on water quality testing and water treatment plant management, other aspects are the strengths of other suppliers.

• Caution required in international cooperation activities through collaboration of water suppliers.

Item	Description
Division of burdens and responsibility, and consensus building among the local governments	• As various local governments are involved, the process for receiving approval when needed multiplies. • There were instances where, even when the plan was followed, other suppliers could not dispatch staff according to plan, resulting in the timing of dispatch being altered. There was difficulty coordinating the timing of dispatch of short-term stay experts.
Policy differences	• JICA proposed short-term stay experts to stay for 2 months, but local governments wanted 2 weeks and 1 month was decided as a compromise. • It was very difficult to dispatch experts when there was no one with such experience. It may be difficult to conduct partnership projects without any previous information. • Obtaining information from the actual site is important. The difficulties decreased as those dispatched gained experience at the location and shared their expertise.
Adjustment of work procedure differences among the local governments	• There was no need to coordinate differences in work style at the site as the dispatch period and field were different. • Style among Okinawa city, Nago, and the Nanbu Water Supply Authority that provided similar training was coordinated through discussions with the three organizations. A chief and coordinator were designated at the site to ensure proper coordination. Efforts were made to create a written request to be sent to short-term stay experts before their dispatch outlining what was wanted of them.
Communication method	• Communication was generally by email. At the time, there were no web conferencing systems like Zoom available. • Web conferencing was also unfeasible due to the high local Internet fees.
Coordination between the local governments and private sector companies	• Although there was no direct work with private sector companies in this project, there have been instances of companies in Okinawa applying for other projects (dissemination, demonstration project; Samoa).

• Need for international cooperation and target country

Item	Details
Need for international cooperation activities by Japan, requests from the target country, opinions of project workers	• Made achievements in improving the water quality and the non-revenue water ratio. Phase 2 has begun, and the Enterprise Bureau is also planning to dispatch staff. • The ratio of non-revenue water is also decreasing in the urban area and public opinion of the waterworks is improving. Samoa is requesting expansion of the project.
Method for selecting target countries for training and possibility of change in method	• No specific instructions from the Enterprise Bureau. The method is based on request from JICA. • Okinawa generally provides training to geographically similar island countries but will consider requests from other regions as well.

• Comments on water supplier collaboration

Item	Details
Comments on collaboration of water suppliers in international cooperation activities	• Such partnerships have the benefit of supplementing the Enterprise Bureau where it alone is insufficient and enabling comprehensive support. It is seen as positive.
Positioning of each supplier in international cooperation activities and future direction	• The Enterprise Bureau’s international cooperation is based on a management plan. It is also outlined in Okinawa’s promotion plan. The Enterprise Bureau is hoping to conduct training in Phase 2 from next year as well.
Japan’s international cooperation in the water supply sector, expectations for international contribution, and other opinions	• Want evidence to easily convey the meaning and positioning of international cooperation to explain the need for holding international cooperation activities.

5-3 Summary of the Study Report

1) Benefit to the target country (and for project implementation)

- JICA was able to expand the scope of the technical cooperation target from slow sand filtration technology to management of non-revenue water using the initial assistance relationship with a single supplier as a base.
- The activities decreased non-revenue water in the urban area. Based on that result, the Samoan waterworks was able to make a request for the next project and phase 2 of the project was established.

2) Benefit to the implementing parties (water suppliers)

- This setup supplements areas that cannot be covered by one supplier alone to provide comprehensive support.
- Supplier partnerships enable the building of a system for comprehensive cooperation using the characteristics and strengths of each local government including facilities and scale.
- Participation in the joint project provided opportunities for suppliers to exchange opinions and increase their knowledge and enabled communication.

3) Factors and background of the benefit

- When Miyakojima was conducting a Grassroots Technical Cooperation Project in Samoa using slow sand filtration technology, it was asked to provide guidance on measures to reduce non-revenue water, but Miyakojima was unable to dispatch experts and consulted the Okinawa prefectural government through JICA. This was the start of the project.
- With the system for allocating roles that JICA has already been using for its Knowledge Co-Creation Program, the Okinawa Prefectural Enterprise Bureau became the center of the project, partnering with neighboring local governments.
- The efforts of the experts who participated in Miyakojima's Grassroots Technical Cooperation Project were key to advancing the partnerships.
- Important points for ensuring the project proceeds smoothly are coordination of who is in charge at the site, consensus formation in meetings attended by all the suppliers, and sending of written requests to experts before short-term dispatch.

4) Findings that should be effectively utilized

- Activities and coordination were quite difficult in the initial stage when there was no information.
- Regarding the duration and timing of dispatch of experts required for the project, the possible duration and timing of dispatch varied with the policy of each supplier, making coordination of dispatches difficult.
- It may not always be possible to share information by web conferencing or other such tools depending on the setting of Internet fees.

Chapter 6 Project for Expansion of Water Supply Systems in Kampong Cham and Battambang in Cambodia

6-1 Project Overview

To improve the water supply facilities that had become severely deteriorated in the twenty-year-long civil war, Japan and other donors provided assistance to develop the water supply facilities in the capital of Cambodia, Phnom Penh, and train personnel in operation, maintenance, and management of the facilities, thereby improving the water supply capacity. Although these efforts achieved a 24-hour water supply, 90% water supply coverage, and 6% non-revenue water ratio in Phnom Penh (as of 2010), issues remained in water suppliers in rural cities where a certain level of water supply facility operation was made possible through Japan's technical cooperation, but weak finances and the lack of medium- to long-term plans to develop and update the facilities has kept the quality of water supply services down and left a portion of the public without a stable supply of drinking water.

Battambang and Kampong Cham have the second and fourth largest populations in Cambodia, respectively, and the Asian Development Bank (ADB) enhanced the water supply facilities in those cities in 2006. United Nations Human Settlement Programme (UN-Habitat) provided assistance to develop the water distribution pipes in Kampong Cham. JICA conducted the Project on Capacity Building for Water Supply System (Phase 2) aimed at enhancing the capacity of the waterworks staff in eight rural cities including the two above from 2007-2011 and Phase 3 of the project from 2012-2017. Efforts have therefore been made to boost the water supply capacity in rural areas in terms of both training and infrastructure, but extension of the water supply facilities was urgently needed to further boost the water supply capacity. In this project, JICA extended the water supply facilities (e.g., intake pumps, water conduit, water treatment plant, water lines, and water distribution network) and established water quality analysis equipment in Kampong Cham and Battambang. JICA built water treatment plants capable of supplying 22,000 m^3 of water a day in Battambang and 11,500 m^3 of water a day in Kampong Cham, laid a water distribution network to homes covering more than 120 km in total for the two areas, improved access to stable water in both cities, and improved the urban living environment for city residents[36, 37, 38].

Collaboration with water suppliers in this project was not created through multiple local governments in Japan, but through a partnership between one local government in Japan and the local governments in the target country for the project. The partnership was formed between the City of Kitakyushu Water and Sewer Bureau and staff of the Phnom Penh Water Supply Authority (PPWSA) that is the supplier in Cambodia. Training and transfer of technical knowledge were provided to PPWSA in rural cities as the soft component (technical assistance) of grant aid. From the time of Phase 1 of the Project on Capacity Building for Water Supply System technical cooperation project started with PPWSA as the target, JICA envisioned that Kitakyushu's technical cooperation with Cambodia would result in PPWSA supporting rural areas. This goal was partially achieved in Phase 1, and Phase 2 and 3 that targeted rural water suppliers were completed in cooperation with PPWSA to support rural areas. Based on this background, the current project is also a

[36] Ex-ante evaluation https://www2.jica.go.jp/ja/evaluation/pdf/2013_1360280_1_s.pdf
[37] Ex-Post Evaluation for Japanese Grant Aid Project https://www2.jica.go.jp/ja/evaluation/pdf/2019_1360280_4_f.pdf
[38] Speech by Ambassador Kumamaru at the inauguration ceremony at the Embassy of Japan in Cambodia https://www.kh.emb-japan.go.jp/speech/2016/7/sp20160721-j.pdf

partnership between Kitakyushu and PPWSA.

A map of areas of cooperation is shown in Figure 3, and a summary of the project is shown in Table 19.

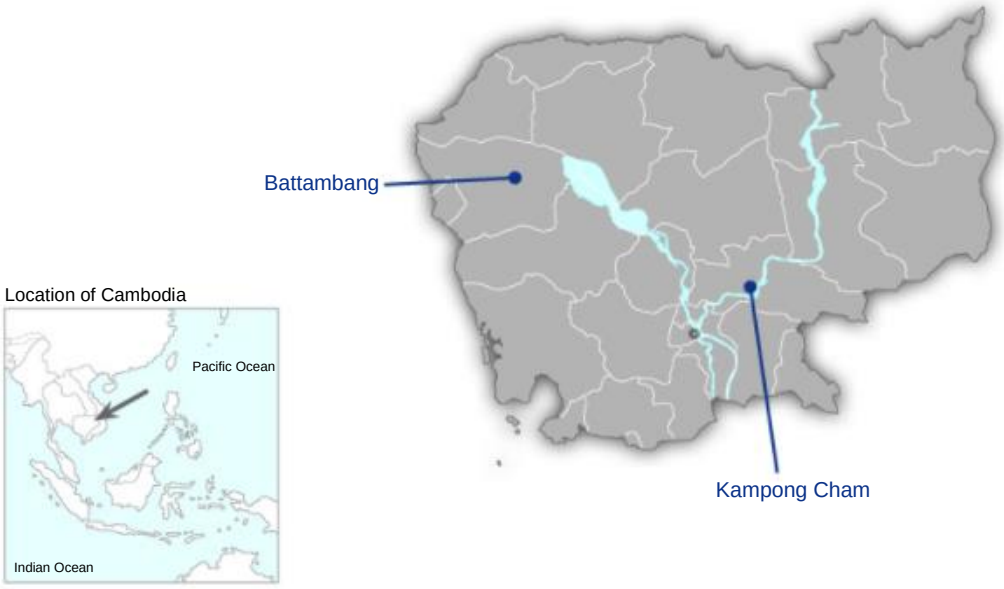

Figure 3 Map of areas of cooperation (from the ODA Visual Presentation website)

Table 19 Project overview

Item	Details
Country	Cambodia
Project name	Project for Expansion of Water Supply Systems in Kampong Cham and Battambang
Type of assistance	Grant Aid
Amount of cooperation	Total project cost of 3.393 billion yen (estimate of assistance amount: 3.355 billion yen from Japan, 38 million yen from Cambodia) (Source: Ex-ante evaluation)
Period of cooperation	Signing of loan agreement: June 5, 2013 Planned for July 2013 to June 2016 (36 months in total. Includes details designs and bidding period.) (Source: Ex-ante evaluation)
Cambodian parties involved	Executing Agency: Ministry of Industry and Handicraft (MIH) *Formerly the Ministry of Industry, Mines and Energy. Renamed the Ministry of Industry, Science, Technology and Innovation (MISTI) in March 2020. Operation, maintenance, and management organizations: Department of Industry, Mines and Energy (DIME) in each province and the water authorities
Japanese cooperating agencies	City of Kitakyushu Water and Sewer Bureau, Nihon Suido Consultants, CTI Engineering International (JV), Kubota Construction
Description	[Purpose] Extend the water supply facilities in Kampong Cham and Battambang to improve access to a stable water supply and help improve the urban living environment in both cities. [Implementation details]

Item	Details	
	Installation of water supply facilities (e.g., intake equipment, water conduit, water treatment plant, water lines, and water distribution network) in Kampong Cham and Battambang, procure equipment needed to operate, service, and manage the facilities (e.g., water quality analysis devices, equipment for connecting to the water pipeline), and training in operation, maintenance, and management of the facilities	
Note	This project was conducted with effective cooperation with the Project on Capacity Building for Water Supply System (Phase 2 and 3) technical cooperation project in order to roll out PPWSA's successful activities at local waterworks. The City of Kitakyushu Water and Sewer Bureau and PPWSA partnered to implement training and transfer of technology.	
References and studied websites	Press release by the Ministry of Foreign Affairs of Japan (signing of the official agreement document)	https://www.mofa.go.jp/mofaj/press/release/press6_000309.html
	ODA Visual Presentation Website	https://www.jica.go.jp/oda/project/1360280/index.html
	Ex-ante evaluation based on the Policy Evaluations Act	https://www.mofa.go.jp/mofaj/gaiko/oda/shiryo/hyouka/2013_jizen/cambodia01.html
	JICA Cambodia Office	https://www.jica.go.jp/cambodia/office/others/ku57pq00000seur9-att/newsletter_no60.pdf
	City of Kitakyushu Water and Sewer Bureau	Press release: Completion of plan https://www.city.kitakyushu.lg.jp/files/000745851.pdf Main water business orders (Cambodia) https://www.city.kitakyushu.lg.jp/files/000714153.pdf
	Kubota Construction	News: Inauguration ceremony https://www.kubota-const.co.jp/news/2016/news_03.html

6-2 Result of Interviews with Water Suppliers in Japan

This section provides the results of an interview with the City of Kitakyushu Water and Sewer Bureau about the history leading up to the supplier partnership with PPWSA, needs for international cooperation, and opinions about cooperation with the partner country's water supplier.

• Background of the decision to collaborate

Item	Description
Background	• A Japanese company received an order for construction work in a JICA grant aid project, and Kitakyushu was placed in charge of technical assistance (soft component work) concerning design and construction supervision of water distribution facilities and operation, maintenance, and management of new water supply facilities as one member of the consultant team. • Kitakyushu cooperated with PPWSA on this soft component. This was based on the trust built between the two organizations through Kitakyushu's continued involvement in Phase 2 and 3 following the 2003 Project on Capacity Building for Water Supply System technical cooperation project, Kitakyushu's superior knowledge of the status of Cambodia's local waterworks, and its Sister City status with Phnom Penh.

Item	Description
	• Kitakyushu has conducted international cooperation projects for about 30 years, mostly in Southeast Asia, and has been actively involved in water business in recent years. Specifically, it established the Kitakyushu Overseas Water Business Association (KOWBA), through which it conducts overseas water business in cooperation with private sector companies after building trust with the partner countries. Kitakyushu provides on-the-job training (OJT) and holds seminars in Cambodia once a year in which it matches companies with projects. The KOWBA office is run by Kitakyushu Water Service that is an external company, and the Water and Sewer Bureau plays an administrative role, assisting in policymaking and providing expertise to local governments.

• Need for international cooperation and target country

Item	Details
Need for international cooperation activities by Japan, requests from the target country, opinions of project workers	• Assistance needs for rural areas in terms of training and infrastructure: While there are diverse needs in rural areas, there is a limit to how much local operations can be improved, and it is important to simultaneously boost the understanding and capacity of the central government agencies and local branches. For this reason, the current technical cooperation project is being conducted for local branches of central government agencies.

• Comments on water supplier collaboration

Item	Details
Comments on how to succeed in partnership with the partner country's water supplier	• PPWSA achieved successful results in Phase 1 of the project in 2003 and then partnered with Kitakyushu to roll out those activities to rural areas. • In local assistance, Kitakyushu and PPWSA have maintained a friendly relationship that continues today through collaboration on OJT and other activities. • Local staff understand the assistance better when it is in their native language. • In addition to a Sister City relationship with Phnom Penh, Kitakyushu cooperates with PPWSA and central government agencies and memorandums are signed as needed.

Item	Details
Positioning of each supplier in international cooperation activities and future direction	• The Kitakyushu Water and Sewer Project Basic Plan also includes contribution to other countries. • Overseas projects begin with the General Affairs Division and the Overseas Projects Division and Overseas Projects Department become involved when the scope of the project increases. The team of staff running practical work excluding managers is too small, including only three administrative workers and seven technical staff. • Long-term dispatches are handled by this department and short-term dispatches by other departments. The city hall as a whole is downsizing and there are not enough workers for the Bureau's overseas projects, so Kitakyushu is unable to meet all of its counterpart's requests. • The Bureau coordinates with other departments for about a year and dispatches two to three staff a year for short-term stays.

6-3 Result of Interviews with Local Relevant Agencies and Japanese Water Suppliers Currently Carrying Out Activities Locally

The following are the results of an interview with the Ministry of Industry, Science, Technology and Innovation (MISTI), Siem Reap Water Supply Authority (SRWSA), and Phnom Penh Water Supply Authority (PPWSA), with Kitakyushu Water Service staff who run local activities in attendance, about the history leading up to the partnership with a Japanese supplier, role sharing and consensus building activities, the benefits of partnering with a water supplier, and important points.

• History leading up to cooperative activities with a Japanese supplier

Responding agency	Details
MISTI	• Assistance for Cambodia began with the Yokohama Waterworks Bureau, and MISTI started working with the City of Kitakyushu Water and Sewer Bureau after that. MISTI and PPWSA have been communicating with Japan. Kitakyushu first provided training seminars on project operation, maintenance, and management for PPWSA and taught PPWSA its technologies, and then later provided training seminars to water suppliers in other provinces.
SRWSA	• The partnership with Kitakyushu began through JICA when Kitakyushu staff were sent to PPWSA on a JICA project. The City of Kitakyushu Water and Sewer Bureau participates in this project as a supervising consultant.

• Techniques for developing and maintaining systems

Responding agency	Details
MISTI	• MISTI has signed a memorandum of cooperation (MOC) with MHLW. • Japanese companies began coming to Cambodia after Japanese experts conveyed information about Cambodia to Japan. • MISTI holds an annual conference (Cambodia-Japan Waterworks Seminar) to share information and expertise. Kitakyushu introduces companies with good Japanese technologies and discusses how to match them with Cambodia.
SRWSA	• Core SRWSA staff receive training from Japan and PPWSA through OJT in technical cooperation projects. When SRWSA creates teams, it combines those with and those without experience. • There have been no problems coordinating the contributions of the SRWSA, PPWSA, and Kitakyushu.
PPWSA	• All requests to JICA for projects are made through line ministries and agencies. After projects finish, JICA always conducts an ex-post evaluation of the project.

• Method for deciding how to divide roles

Responding agency	Details
MISTI	· Decisions are based on a manual and action plan with detailed points for running projects. When holding a conference with Kitakyushu, staff in charge and division of roles are decided. To determine the current staff, the team discussed who to send and submitted their choice to the manager who checked it and gave approval. • In addition, Japan inspects Cambodia's waterworks, and dispatches experts to provide technical assistance if there are any points needing improvement.
SRWSA	• When starting in 2014, Kitakyushu staff visited and discussed the technologies and the division of roles was decided after defining the work, including water treatment (machines, electrical engineers, chemistry), water distribution, business, finance, management, plan, and project relationship.

• Activities to build a consensus

Responding agency	Details
SRWSA	• Consensus is formed through meetings, conferences, and separate meetings between experts and supplier managers. When a problem arises, SRWSA asks the opinion of those actually working on the project and makes decisions based on their opinion. • In recent cases, discussions were held to coordinate response to the predicament in which tourism decreased dramatically in the pandemic, resulting in a drop in water use by hotels and restaurants and subsequent decrease in income, but the SRWSA is unable to cut the number of staff or their salaries.

Responding agency	Details
PPWSA	· PPWSA clearly allocates roles and responsibilities to each person involved. All stakeholders related to projects (JICA, MEF, PPWSA) take part in problem resolution.

• Coordinating work load

Responding agency	Details
SRWSA	• SRWSA forecasts future operations and prepares members of its staff based on those projections, providing them with OJT so that they can share the work burden as it increases.
PPWSA	• PPWSA reaches a consensus with line ministries and agencies and development partners.

• Benefits of partnering with a Japanese water supplier

Responding agency	Details
MISTI	• PPWSA experts who have received training take charge of training seminars to enhance the capacity of other suppliers. Participation by the PPWSA increases the number of people who can teach the technologies.
SRWSA	• The benefits of partnership (especially OJT) are many and include building mutual trust, technological development, improved operation, maintenance, and operation capacity of the water supply system, and improved cooperation among Japanese experts, Japanese water suppliers, and Cambodian water suppliers. • SRWSA has a system in which experienced experts provide OJT to the next experts, so that 'the second liner catches up to the first liner.' This system enables beginners to ask those with vast experience questions at any time. • Understanding of problems has improved not only through interaction with Japanese experts, but also through a two-way learning relationship between the PPWSA and SRWSA. • PPWSA and SRWSA cooperate, for example with experts working as trainers in PPWSA training and then switching to SRWSA, to accelerate the pace of developing experienced staff.

• Important points for partnering with a Japanese water supplier

Responding agency	Details
MISTI	· MISTI plays a large role in conferences. In addition to PPWSA and SRWSA, public and private water suppliers in other provinces see and hear about Japan's programs and technologies.

Responding agency	Details
SRWSA	• SRWSA reports the results of its work in its meetings, presentations, internal seminars, regular business operations, and OJT held in partnership with the SRWSA. For communication, it uses official letters, meetings, email, and phone.

6-4 Summary of the Study Report

1) Benefit to the target country (and for project implementation)

- Staff in Cambodia also enhance their own capabilities when they share their knowledge and experience with other water suppliers.
- Through participation by the PPWSA, staff who have completed Kitakyushu training become trainers themselves, thereby increasing the number of people who can teach the technologies and accelerating the pace of developing experienced staff. Especially in OJT, staff understand the assistance better when it is in their native language.
- In Cambodia-Japan Waterworks Seminars held as part of international cooperation activities based on a long assistance relationship, Cambodia receives Japanese technologies and information that is suited to Cambodia.

2) Benefit to the implementing parties (water suppliers)

- With the reality that a single supplier cannot meet all of Cambodia's requests, the project makes many staff capable of teaching the technologies and increases the effects of human resource development.
- By building relationships through the activities, Japanese companies have been able to establish locations in Cambodia.
- OJT methods are rated especially highly by local operation staff and are likely to create lasting relationships.

3) Factors and background of the benefit

- Kitakyushu partnered with PPWSA to hold activities such as human resource development as the soft component (technical assistance) of a grant aid project. The two organizations have already successfully cooperated to train staff in Phases 1, 2, and 3 of the Project on Capacity Building for Water Supply System technical cooperation project and have built a relationship.
- Cambodia-Japan Waterworks Seminars are held every year and are attended by not only the two countries' main suppliers, but also Cambodia's other provincial water suppliers and both private water suppliers from both Japan and Cambodia.
- Signing of a memorandum of cooperation (MOC) between MHLW and the Cambodian Ministry of Industry, Science, Technology and Innovation (MISTI)
- The City of Kitakyushu Water and Sewer Bureau cooperates with PPWSA and central government agencies and memorandums are signed as needed.
- Consensus is formed through official meetings, conferences, and separate meetings between Japanese experts and supplier managers, and problems that arise are resolved based on the opinions of the staff in charge.
- Detailed points for running projects are set in advance based on a manual and action plan.

4) Findings that should be effectively utilized

- The City of Kitakyushu Water and Sewer Bureau coordinates activities among suppliers and continues to dispatch long- and short-term stay experts, helping resolve issues in Cambodia in technical cooperation projects and developing its own staff through overseas experience.

Chapter 7 JICA Knowledge Co-Creation Programs: Operation and Maintenance of Urban Water Supply System (Water Quality and Purification)

7-1 Project Overview

Operation and Maintenance of Urban Water Supply System (Water Quality and Purification) programs aim to train engineers engaged in water quality and purification work in urban water supply maintenance and management organizations in the target countries, and the goal is to share the parts of Japan's knowledge and experience that are applicable to those engineers. The target organizations are organizations that operate, service, and manage urban water supply and participants must be engineers engaged in water quality and purification work in urban water supply maintenance and management organizations who have at least 5 years of field experience in water quality and purification and are responsible for training other engineers[39]. The Osaka Waterworks Bureau has been conducting urban water supply maintenance and management programs since 1994 to help create a safe and stable drinking water supply in urban cities of developing nations through the effective use of urban water supply facilities. In FY2012, it separated programs into Operation and Maintenance of Urban Water Supply System (Water Quality and Purification) and Operation and Maintenance of Urban Water Supply System (Water Distribution and Service) to provide more specialized training. The Osaka Waterworks Bureau signed an agreement with the Kobe City Waterworks Bureau for an Operation and Maintenance of Urban Water Supply System (Water Quality and Purification) (B) program in FY2015 and with the Kyoto City Waterworks Bureau for an Operation and Maintenance of Urban Water Supply System (Water Quality and Purification) (A) program in FY2016 and has been cooperating on those programs since[40]. In FY2019, the organizations accepted nine trainees from eight countries for the Operation and Maintenance of Urban Water Supply System (Water Quality and Purification) (A) program and nine trainees from seven countries for the Operation and Maintenance of Urban Water Supply System (Water Quality and Purification) (B) program who came to Japan for training[41]. In addition to these three cities, the Nara City Enterprise Bureau began accepting trainees to tour the facilities in 2017[42]. A summary of training is shown in Table 20.

Table 20 Summary of training[43]

Item	Details
Program	Operation and Maintenance of Urban Water Supply System (Water Quality and Purification)
Purpose	Intensive and practical training aimed at technical transfer and dissemination, especially targeting field engineers who are specifically engaged in water quality and purification work within urban water supply maintenance and management.

[39] Operation and Maintenance of Urban Water Supply System (Water Quality and Purification) https://www.jica.go.jp/activities/schemes/tr_japan/summary/lineup2019/sector/ku57pq00002jvsd4-att/201984468_j.pdf

[40] Japan Water Works Association - Information about international activities by water suppliers http://iwa-jnc.jp/jigyou/kaigai_02.html

[41] JICA Kansai - Past Knowledge Co-Creation Programs (Group and Region Focus) https://www.jica.go.jp/kansai/enterprise/kenshu/gijutsu/index.html

[42] JICA press release (July 12, 2019) https://www.jica.go.jp/kansai/press/ku57pq00000knu8h-att/ku57pq00000lb2rb.pdf

[43] 2019 Lineup of JICA Knowledge Co-Creation Programs (Water Resources) https://www.jica.go.jp/activities/schemes/tr_japan/summary/lineup2019/sector/water.html

Item	Details	
Period	Conducted in cooperation. (A) From FY2016, (B) from FY2015	
Trainees Operation and Maintenance of Urban Water Supply System (Water Quality and Purification) (A)	FY2016	9 trainees from 7 countries (Pakistan, Nepal (2), Nigeria (2), South Sudan, Azerbaijan, Iran, Sudan)
	FY2017	9 trainees from 7 countries (Nepal, Bangladesh (2), South Sudan (2), Egypt, Nigeria, Kenya, Azerbaijan)
	FY2018	5 trainees from 5 countries (Afghanistan, India, Nepal, Nigeria, Uganda)
	FY2019	9 trainees from 8 countries (Bangladesh, Brazil (2), Egypt, Laos, Nepal, Panama, Sudan, Tanzania)
Trainees Operation and Maintenance of Urban Water Supply System (Water Quality and Purification) (B)	FY2015	13 trainees from 13 countries (Democratic Republic of the Congo, Ecuador, Eritrea, Ethiopia, India, Iraq, Laos, Malawi, Solomon Islands, Republic of South Africa, Sri Lanka, Turkey, Zimbabwe)
	FY2016	14 trainees from 10 countries (Eritrea, Ethiopia (2), Laos, Malawi, Myanmar (2), Rwanda (2), Sri Lanka (2), Zambia (2), Laos (By country 1))
	FY2017	12 trainees from 10 countries (Ethiopia, Iraq (2), Malawi, Myanmar, Rwanda, Republic of South Africa, Sri Lanka (2), Tunisia, Venezuela, Zimbabwe)
	FY2018	6 trainees from 6 countries (Benin, Eritrea, Pakistan, Rwanda, Sri Lanka, Tunisia)
	FY2019	9 trainees from 7 countries (Eritrea, Cambodia, Democratic Republic of the Congo (2), Sri Lanka (2), Haiti, Rwanda, Myanmar (Renumeration 1)
Training organizations	(A) Osaka Waterworks Bureau, Kyoto City Waterworks Bureau (Nara City Enterprise Bureau) (B) Osaka Waterworks Bureau, Kobe City Waterworks Bureau	
Program details	The following activities were held in each city. Lectures: Water quality control, chlorination theory, overview of facilities (water intake, distribution, and purification equipment), maintenance and management of machines and electrical facilities, disaster management Tours: Facilities (water intake, distribution, and purification equipment), pump manufacturing plant, water meter manufacturing plant, Water Science Museum Practicals: Water leak inspection and maintenance, operation and management of water purification facilities, maintenance inspections of water quality monitoring equipment Discussions: Consultations, discussion among trainees about creating action plans	
Documents released by local governments	Osaka City Government	Osaka City Waterworks - Regional collaboration and overseas development strategy https://www.city.osaka.lg.jp/suido/cmsfiles/contents/0000500/500701/R020409_senryaku.pdf
	Kyoto City Waterworks Bureau	Miyako Water Vision - Creating the Future (Chapter 6) https://www.city.kyoto.lg.jp/suido/cmsfiles/contents/0000233/233138/v4.pdf Medium-Term Management Plan (2018-2022) https://www.city.kyoto.lg.jp/suido/cmsfiles/contents/0000233/233138/p.pdf

7-2 Result of Interviews with Water Suppliers in Japan

In the course of conducting the survey, JICA learned that Nara is also participating in the training programs held by Osaka. To extract the opinions of not only water suppliers engaged in central activities in international cooperation projects but also water suppliers receiving advice and assistance when participating in projects, both the Osaka Waterworks Bureau and Nara City Enterprise Bureau were interviewed. The following are the results of the interview about the history leading up to training in cooperation with suppliers, methods used to improve the projects and important points to consider, effects of the training held in cooperation and impact on the suppliers, need for training, and opinions about collaboration of water suppliers.

・ International cooperation activities implemented through collaboration of the subject water suppliers and the background of the decision to collaborate

Item	Description (Osaka)	Description (Nara)
Characteristics of the project	• The program was joined by Kobe in 2015, Kyoto in 2016, and Sakai in April 2021, and the four cities signed a cooperation agreement. No cooperation has been signed with Nara. • Osaka consulted Nara about slow sand filtration training. Nara was consulted because the city could help increase the global development index performance indicators (PI) and because it has a relatively large-scale slow sand filtration plant near Osaka. In addition, they are geographically close and it was the ancient capital.	• Nara provided tours of its large-scale slow sand filtration process and provided trainees with surface scraping experience.
Man-months and the outline of the implementation	• The Osaka Water General Service (OWGS) was commissioned by JICA Kansai and set a training syllabus that matches the characteristics of the four cities. • As the number of employees also differs among the cities, OWGS holds meetings every year to adjust the training syllabus.	• One day on the site. Held for 7 to 10 people on the site, covering everything, including preparation and explanation. • If JICA provides a schedule, the program timing is adjusted to comply with that schedule. Coordination with the slow sand filtration scraping company is also required.
Background	• Initially, the format was not a partnership, but in the form of cooperation requests, but then changed to a partnership in 2015 after a proposal from Osaka to JICA. • The intention was to reduce the load.	• Nara's involvement began when the top project manager wanted to develop the global mindedness of the staff. • Nara connected to Osaka through JICA.

- Creative ways to carry out international cooperation activities through the collaboration of multiple water suppliers and the actual situation

Item	Description (Osaka)	Description (Nara)
Maintenance of the collaboration system	• Each cooperation agreement was signed by three or four parties. The partnership period is 3 years to match the duration of JICA's Knowledge Co-Creation Program. Withdrawal from the partnership in the middle would create problems.	• Although there was talk about a cooperation agreement last year, that level was not reached due to concerns about staffing and the organizational system.
Method of dividing responsibility among the local governments	• Roles are divided based on the strengths and facilities of each local government. They are decided through discussions.	• Likely decided from talks about what Nara can provide.
Organizational structure (e.g., chief adviser assignment)	• The four cities take turns being the head city. As OWGS has signed a commission contract with JICA Kansai, the Osaka Waterworks Bureau plays the primary role. • In general, the head city is the leader. There are staff in charge of training in each local government, and so it is those staff who make actual requests to instructors.	• The water supply management center at the water treatment plant that is the training site is primarily in charge. The center generally aims to involve younger staff in the training. The wishes of the individuals are also considered. • The water supply management center is primarily in charge of training. The Enterprise Bureau is the contract point for JICA.
Backup system	• One problem is that there are no activities related to overseas development. • English is essential. Although TOEIC test fees are subsidized, this is a major hurdle, and the number of people does not increase. • Fukuoka City has a staff system to register all government staff who are interested in overseas work so that people can be chosen from that pool. This type of system may be helpful.	
Consensus-building efforts of the local governments		• One day is reserved for Nara, so no coordination is necessary.

Item	Description (Osaka)	Description (Nara)
Work procedure differences among the local governments	• Although flexibility is required for consultation, roles are divided so there is no clashing.	• Activities are carried out independently by each supplier, so there have been no problems.
Explanation to the local assembly	• The assembly asks about overseas development but has no questions about the JICA programs. There are sometimes questions about water business.	• Nara does not give reports to the assembly.

• Benefits of international cooperation activities in partnership with suppliers

Item	Description (Osaka)	Description (Nara)
Impact and effect of collaboration on their own organizations	• As overseas water suppliers participate and join discussions, the project leads to human resource development related to the resolution of problems through action plans. • Can develop the competence staff participating in overseas development. • Builds friendly relationships that are not limited to international cooperation and enables consultations with neighboring cities about difficulties.	• Fosters global mindedness in staff and is an opportunity to make international cooperation more familiar to staff. • Establishes connections for staff who are good at English. • Enables interaction that is not limited to international cooperation at the site and through meetings and other opportunities.
Formulation of the organizational structure for cooperation (structure and the number of individuals)	• Osaka decreased the load by increasing the number of staff • Partnerships of three or four cities enable the hosting of more trainees than a single city alone could offer.	
Formulation of the organizational structure for cooperation (contents and techniques)	• Can reinforce weaknesses in Osaka's explanations (e.g., gravity flow water distribution method). • Can show multiple facilities. • Expands the range of needs that can be met and enables training that is matched to each country's needs.	• Some trainees do not know about the actual field, so these experiences make a strong impression and create memories.

Item	Description (Osaka)	Description (Nara)
Others	• There is also the benefit to Japan in that many suppliers can participate in international cooperation, and good matching was achieved. • Osaka wants to find more links to business from international contribution through JICA training programs. Osaka considers training as a gateway.	

• Caution required in international cooperation activities through collaboration of water suppliers

Item	Description (Osaka)	Description (Nara)
Division of burdens and responsibility, and consensus building among the local governments	• Involvement of other cities that are different from Osaka creates an increase in workload for inter-city cooperation.	• Slow sand filtration scraping work is subcontracted and the schedule needs to be coordinated with the contractor. The work is outdoors, and it is difficult to judge if it will rain. • There was very little burden on Nara for coordination of local governments.
Adjustment of work procedure differences among the local governments		• Not a problem as there are few large suppliers that have slow sand filtration.
Communication method	• An in-person meeting was held in June this fiscal year for relevant individuals. All other communication is by email.	
Coordination between the local governments and private sector companies	• Osaka's international business is in Ho Chi Minh City and Yangon, and there have been no problems yet.	• As Nara is a core (medium-sized) city, the scope is not particularly large.

• Need for international cooperation and target country

Item	Response (Osaka)	Response (Nara)
Need for international cooperation activities by Japan, requests from the target country, opinions of project workers	• The level varies by country and is very inconsistent, so it is important to resolve issues after the training instructors have determined what the needs are. • In addition to international contribution, there is also support for international development of water business, so there is a need for the technologies and products of private sector companies to resolve issues and it would be useful to propose Japanese technologies to other countries through consulting, for example.	• Nara considers it very useful to provide field experience. Level of enthusiasm varies with what the trainee wants to learn, whether the content matches their needs, and their general position. • Nara wants feedback like reports to determine how the information learned in Japan is being used in trainees' countries.
For future training programs, information such as effective training syllabus and opinions of those in charge of running the program		• Programs that use small-scale facilities requiring minimum funds may better meet the needs of developing nations.
Method for selecting target countries for training and possibility of change in method	• Although this concerns local assistance programs and not training in Japan, Osaka is concerned about country risk. The city is hesitant about politically unstable countries. • Public safety is also a concern. The responsibility is huge if their staff become caught up in a serious situation.	

• Comments on water supplier collaboration

Item	Response (Osaka)	Response (Nara)
Positioning of each supplier in international cooperation activities and future direction	• 20 years have passed since the start of JICA training and about 10 years since full-scale overseas development. Improvements are made as issues arise. • There was nowhere to show visiting water bureaus Japanese products that Osaka did not have, so the city is renovating its facilities and preparing product exhibition booths for private sector companies by the end of 2022.	• Nara is currently considering whether to keep its slow sand filtration facilities and is happy to have them used for field work.
Japan's international cooperation in the water supply sector, expectations for international contribution, and other opinions		• Although there is a limited number of staff and none to spare, participation in international cooperation may expand their horizons. • As this is the supplier's first time participating in international cooperation, they can accommodate JICA requests for field experience to see their unique water business. It is hard for Nara to initiate participation when it is not called upon. It is best to ask for what is needed.

7-3 Summary of the Study Report

1) Benefit to the target country (and for project implementation)

- As the number of people in charge of training increased in the supplier partnership, the number of trainees can also be increased.
- Supplementing the weaknesses of individual suppliers expanded the range of needs that can be met.
- The inclusion of Nara added training about slow sand filtration facilities that the large suppliers do not possess. Having small and medium size suppliers participate in cooperation in addition to large suppliers fills the gaps in expertise and resources of large suppliers, such as small pipelines and unique facilities, enabling better matching with the needs of trainees in developing nations.

2) Benefit to the implementing parties (water suppliers)

- An increase in the number of staff helped lessen the burden of training work.
- Creating action plans for overseas water suppliers in the training led to human resource development for the suppliers to resolve problems in waterworks.
- Although it is difficult for a core (medium-sized) city supplier to participate in international cooperation, supplementary participation in activities through supplier partnership fostered global mindedness in staff and was an opportunity to make international cooperation more familiar to them.
- The programs built friendly relationships that are not limited to international cooperation between the water suppliers that participated in the partnership and made it easier to consult neighboring cities.

3) Factors and background of the benefit

- Although Osaka asked Kobe and Kyoto to participate in training, the city made a proposal to JICA and signed a cooperation agreement to maintain the system.
- Osaka, Kobe, Kyoto, and Sakai signed the cooperation agreement. The training roles were divided based on the strengths and facilities of each supplier and were set in annual meetings led by the head city, a position filled by each city in turn.
- Nara is one of the few local governments in the Kansai region with a large slow sand filtration facility and began providing field experience after decided by the head of the organization and being approached by Osaka. An agreement was not signed due to concerns about staffing and the organizational system.

4) Findings that should be effectively utilized

- The period of the cooperation agreement to maintain the system for this project was set to three years to match the years set for the duration of JICA's Knowledge Co-Creation Program and is a means of maintaining a stable system in which the cooperation cannot be revoked mid-year and that is not affected by changes in the suppliers' circumstances. However, the survey results suggest that Nara may be hesitant to sign a cooperation agreement due to its smaller size as a core (medium-sized) city.
- Feedback is needed to determine if the programs being conducted are actually contributing to water business development in the trainee countries.

Chapter 8 JICA Knowledge Co-Creation Program: Non-Revenue Water Management (Leakage Control)

8-1 Project Overview

The purpose of the "Non-Revenue Water Management (Leakage Control)" project is to create an action plan relating to measures for management of non-revenue water that are suitable for the actual circumstances of individual countries and regions. The practical training program curriculum imparts competence with measures for management of non-revenue water (e.g., leakage detection/prevention, leakage water volume analysis, and water leakage plans) to be enhanced. Specific examples of what takes place in the training program curriculum include exercise, facility tours, lectures by practitioners, and information sharing and discussion by participants. Targeted organizations are central governments, local governments, and departments responsible for water supply services, and targeted personnel are engineers or middle management administrative officers with practical experience of 5 years or longer[44].

In relation to the Non-Revenue Water Management (Leakage Control) (A) implemented in 2014, Hamamatsu City, Toyohashi City, and the Mie Prefectural Enterprise Bureau as well as Nagoya City that had implemented separate waterworks training programs until then shared schedule-related and were in charge of inspection tours, lectures, etc.[45] The period by three cities and one prefecture was from 2014 through 2019. Only two of the cities and one prefecture, excluding Hamamatsu City, implemented the aforementioned measures in 2018[46]. A summary of training is shown in Table 21.

Table 21 Summary of training [47]

Item	Description	
Program	Non-Revenue Water Management (Leakage Control) (A)	
Purpose	Targeting administrative officers in charge of non-revenue water, etc. in developing nations, competence with measures for management of non-revenue water (e.g., leakage detection/prevention, leakage water volume analysis, and water leakage plans) is to be imparted. In addition to the Japan's legal system, water system plans, etc., factors related to leakage water, systems for leakage prevention, technologies, etc. are to be learned.	
Period	FY2014 - FY2019	
Trainees	FY2014	11 trainees from 10 counties (Philippines, Brazil, Bangladesh, East Timor, Morocco, Marawi, Nigeria, South Sudan, Palestine, and Bhutan)
	FY2015	11 trainees from 8 counties (Afghanistan, Tajikistan, Malawi, Morocco, South Sudan, Zambia, Zimbabwe, and Palau)
	FY2016	8 trainees from 7 counties (Bangladesh, Jordan, Malawi, Palestine, South Sudan, East Timor, and Zambia)
	FY2017	7 trainees from 5 countries (Marshall Islands, Uganda, East Timor,

[44] "Non-Revenue Water Management (Leakage Control)"
https://www.jica.go.jp/activities/schemes/tr_japan/summary/lineup2019/sector/ku57pq00002jvsd4-att/201984464_j.pdf
[45] JICA Press Release (September 19, 2014)
https://www.jica.go.jp/chubu/press/ku57pq00000d63ta-att/ku57pq00000dju2c.pdf
[46] Acquisition of opinions from Nagoya City by the Bureau
[47] 2016 Outline of training programs 3. Water resource and disaster risk reduction
https://www.jica.go.jp/activities/schemes/tr_japan/summary/ku57pq00001zgxwc-att/program2016_gaiyou_03.pdf

Item	Description	
		Zimbabwe (2 trainees), and Malawi (2 trainees))
	2018	6 trainees from 5 countries (Afghanistan, Malawi (2 trainees) Marshal Islands, Philippines, and Zimbabwe)
	2019	9 trainees from 9 countries (Afghanistan, Ethiopia, Nepal, Nigeria, Philippines, Sri Lanka, Tanzania, Zambia, and Zimbabwe)
Training organizations	Nagoya City Waterworks & Sewerage Bureau, Toyohashi City Waterworks & Sewerage Bureau, Hamamatsu City Waterworks & Sewerage Bureau, and Mie Prefectural Enterprise Bureau	
Program details	Nagoya City: Outline of water supply services of Nagoya City, history and transition of water leakage prevention, design specifications, design details, water pipe renewal plans, maintenance management service plans, repairing for leakage water, water pipe joint information, works completion inspection, and the like Mie Prefectural Government: Roles of the central government, prefectural government, and city governments in water supply services, history and outline of water supply services for waterworks, and facility tours Hamamatsu City: Relating to water leakage, water leakage investigation services, exploration of water leaking spots, introduction to special efforts, etc. for water supply in hilly and mountainous areas, and the like Toyohashi City: Water delivery volume analysis, water distribution pressure control system training program, etc.	
Documents released by local governments	Nagoya City Waterworks & Sewerage Bureau	International cooperation efforts https://www.water.city.nagoya.jp/category/kokusaikyouryoku/16538.html
	Toyohashi City Waterworks & Sewerage Bureau	International cooperation activities https://www.city.toyohashi.lg.jp/item/35003.htm#itemid35003
	Mie Prefectural Government	Notification from the Mie Prefectural Enterprise Bureau https://www.pref.mie.lg.jp/TOPICS/2015100055.htm

8-2 Result of Interviews with Water Suppliers in Japan

Results of efforts to obtain opinions about certain matters are described as follows: (i) background leading multiple water suppliers to performance of training programs through their mutual cooperation for the Nagoya City Waterworks & Sewerage Bureau; (ii) inventiveness and points to note for moving ahead with activities; (iii) effects from implementation of training program through mutual cooperation and impact on individual water suppliers of the same; (iv) needs for training program and collaboration with water suppliers.

- International cooperation activities implemented through collaboration of the subject water suppliers and the background of the decision to collaborate

Item	Description
Characteristics of the project	• Nagoya City has implemented relevant activities since 1996. • The period for implementation by three cities and one prefecture was from 2014 through 2019. Only two cities and one prefecture implemented relevant activities in 2018 (excluding Hamamatsu City).
Man-months and the outline of the implementation	• In 2019, during the period of September 20 through October 29, Nagoya City, Hamamatsu City, the Mie Prefectural Government, and Toyohashi City were in charge of relevant activities based on the aforementioned priority order (copied from the schedule table). • The Japan International Cooperation Center (JICE) has been entrusted by JICA, obtaining requests from JICA. Training programs are conducted based on the aforementioned priority order considering the nature of training program and positional relationships.
Background	• There are two types of non-revenue water training programs of which JICA Chubu is in charge. NAWS has been entrusted with the training program since 1996, Nagoya City solely implements the same, JICE was entrusted therewith after 2014, and the courses for responding to an increase in acceptance of trainees have been increased. However, burdens on the sections in charge were so great that Toyohashi City, Hamamatsu City, etc. consulted on such matter with Nagoya City. Therefore, their collaboration was realized. • In 2020, trainees were not able to visit Japan due to COVID-19. Many Knowledge Co-Creation Programs were postponed in the following year. Given such circumstances, JICA requested that the collaboration-based training program be ceased once and be integrated into a sole training program.

- Creative ways to carry out international cooperation activities through the collaboration of multiple water suppliers and the actual situation

Item	Description
Maintenance of the collaboration system	• No documents have been exchanged.
Method of dividing responsibility among the local governments	• Nagoya City (outline and history of services) was in charge of water pipe design specifications, maintenance management service plans, leakage water repairs, water pipe joints, work completion inspection, and the like. The Mie Prefectural Government was in charge of history and facilities for water supply. Regarding water leakage, Hamamatsu City in charge of water leakage investigation services, exploring water leaking spots, special effort introduction, etc. relating to water supply in hilly and mountainous areas and the like. Toyohashi City was in charge of water delivery volume analysis. • Role sharing is based on decisions achieved mutual consultation in 2014.

Item	Description
Organizational structure (e.g., chief adviser assignment)	• JICE was entrusted with placement of orders by JICA, and JICE played a central role in adjustment with other water suppliers. JICE: Japan International Cooperation Center
Consensus-building efforts of the local governments	• Prior adjustment is required. Communication among water suppliers during the period of implementation of the training program is difficult.
Work coordination among the local governments	• It was necessary to share content that overlapped explanations among water suppliers, as well as questions, opinions, and the like by trainees in each case. Through inventive endeavors such as sharing information through use of emails by JICE and listening to lectures by other water suppliers.
Work procedure differences among the local governments	• Matters of which water suppliers are in charge differ from each other, and thus, no adjustment was necessary.
Explanation to the local assembly	• No problems have occurred because of the explanation that acceptance has taken place through JICA's training program, basically. • Technical cooperation has taken place with Sri Lanka triggered by the fact that trainees from Sri Lanka participated in the training program in question. However, individual projects are not promoted but contributing to improvement of technical abilities as achievement of the training program as a whole. • The purpose of international cooperation is to improve the technical abilities of large-scale water suppliers.
Other	Effects for improvement of technical abilities were obtained.

• Benefits of international cooperation activities in partnership with suppliers

Item	Description
Impact and effect of collaboration on their own organizations	• Nagoya City shared the nature of its implementation with other water suppliers. In this way, know-how international cooperation was constructed through collaboration. • New persons responsible for international cooperation joined the training program. Therefore, momentum for international cooperation related to waterworks technologies in the Chubu area was enhanced. • Effects for improvement of technical abilities were obtained. • The period of non-revenue water training program is 1.5 months. It is difficult to come into contact with water suppliers during implementation of the training program. However, it was useful to share information on the method of attendance, schedule tables, etc.

Item	Description
Formulation of the organizational structure for cooperation (structure and the number of individuals)	• The nature of training program was constructed based on the nature of courses implemented thus far. When thinking about implementation of the same solely, it was possible to share roles concerning training items, which led to burden mitigation.
Formulation of the organizational structure for cooperation (contents and techniques)	• It is possible to conduct training programs for the field that reflect the skills of water suppliers. Therefore, more extensive training programs than those conducted solely are possible. • Trainees are able to study their own geographical conditions concerning multiple domestic water suppliers, knowledge and know-how related to measures for leaked water fostered through experience, and the like.
Other	• Connections among ordinance-designated cities are so strong that collaboration with neighboring water suppliers is not very tight. However, through future expansion, Nagoya City would like to play a central role while using the Nagoya International Training Centre (NITC), etc. as a core city in the Chubu area. This possibility is kept in mind.

• Caution required in international cooperation activities through collaboration of water suppliers

Item	Description
Division of burdens and responsibility, and consensus building among the local governments	• It is necessary to adjust sharing of roles and programs among water suppliers in advance. Activities are conducted within a limited schedule. Thus, it is difficult for subsequent water suppliers to reflect opinions gained during the training program. • During the period of the training program, communication hardly ever takes place among water suppliers. Thus, it is necessary to promote collaboration, such as in delivering messages.
Communication method	• In principle, communication takes place by email. JICE plays a central role. • Persons in charge of training program have attended training program of other water suppliers. • An opinion was expressed to the effect that it would be efficient for trainees to be able to directly input information regarding degree of understanding, questions, etc. on the cloud and for local governments to access relevant information.
Coordination between the local governments and private sector companies	Regarding separate international cooperation efforts, there are examples of cases in which private sector companies have joined the Life of Water Chubu Forum in Nagoya. However, this matter has not been an issue related to the training program.

• Need for international cooperation and target country

Item	Description
Need for international cooperation activities by Japan, requests from the target country, opinions of project workers	• We have heard that there are many needs for this training program.
For future training programs, information such as effective training syllabus and opinions of those in charge of running the program	• It can be thought that there would exist needs for water leakage measures, which will be among the training program menus items in the future as well. Remote training programs will become mainstreamed in the midst of COVID-19 pandemic. Given such circumstances, effective training program development will be demanded.
Method for selecting target countries for training and possibility of change in method	• JICA adjusts targeted counties. However, explanations for the reason for Nagoya City supports relevant water suppliers would be required. Requests from MHLW and JICA are of significance for justification of causes. • Sister cities have frequently had exchanges, and thus, it can be easy to understand their needs. In this regard, Mexico City is a sister city and thus, it is easy to understand their needs.

• Comments on water supplier collaboration

Item	Description
Comments on collaboration of water suppliers in international cooperation activities	• In general, it is easy to participate in remote training programs and there is a possibility for the framework of collaboration involving water suppliers to become broader. • It is difficult to have substantiative experiences via the web training program alone. Using a training program that involves visits to Japan is considered to be is significant.
Discussion and suggestions	• According to the “Guide to Creation of Water Supply Service Vision” by MHLW, as an attitude for taking on challenges, it is also desirable for large-scale water suppliers to carry out roles for international development. However, large-scale water suppliers face difficulties participating in international cooperation. In the midst of such situation, collaboration of water suppliers is deemed to be necessary. • At the same time, collaboration among water suppliers is difficult. Thus, it is desirable for the central government, the prefectural governments, and JICA to make relevant proposals.

Item	Description
Positioning of each supplier in international cooperation activities and future direction	• Significant roles have been played by Japan's waterworks and sewerage entities for resolution of water problems in developing nations. • For employees belonging to authorities to be involved in development of waterworks and sewerage projects is an opportunity to obtain valuable experiences differing from those in Japan, which faces an era of maintenance and management. Systematic findings and the knowledge of predecessors are to be understood. Moreover, conveying the same in a manner easily understandable for other parties allows personnel to be developed.

8-3 Summary of the Study Report

1) Benefit to the target country (and for project implementation)

- For water suppliers to undertake the training program made the breadth of the nature of the training program broader than would have been possible with implementation by a sole water supplier. It was possible for trainees to obtain extensive knowledge and know-how relating to leakage control measures, etc. held by multiple water suppliers.

2) Benefit to the implementing parties (water suppliers)

- Content from previously implemented instances of international cooperation was shared among water suppliers and know-how for international cooperation could be gained. Thanks to such new persons responsible for international cooperation, momentum for international cooperation related to waterworks technologies in the Chubu area was enhanced.
- Burdens were reduced compared with the situation of implementation by a sole water supplier.
- It was possible to use methods employed for services by other water suppliers as references.
- Effects for improvement of technical abilities of individual water suppliers were obtained.
- In light of participation in the Knowledge Co-Creation Program, Toyohashi City and Hamamatsu City subsequently implemented projects relating to Grassroots Technical Cooperation for Indonesia. It can be thought that water suppliers with less experience in international cooperation can easily participate in cooperation for the training programs in Japan as an entrance point for international cooperation.

3) Factors and background of the benefit

- Nagoya City believed it was difficult to implement the training program due to an increase in burdens accompanying increasing the number of the training program courses. Water suppliers of Toyohashi City, Hamamatsu City, etc. that desired to newly develop international cooperation were matched. Therefore, there were mutual merits in implementing the training programs through mutual collaboration.
- JICE, which had been entrusted with a certain project, played a central role to in relevant adjustments with water suppliers.
- Each water supplier conducted its own training program in line with sharing of burdens determined through prior adjustment. In this way, no adjustment in differences regarding policy or style has been made.

- Water suppliers with achievements in international cooperation collaborated with water suppliers that would participate for the first time. Through this, their experience and know-how have been shared, and it is possible to increase the number of persons responsible for international cooperation. Dissemination of and encouragement for efforts of collaboration of water suppliers together with water suppliers with achievements from the international cooperation of water suppliers and JICA are considered to be effective as well.
- In relation to choosing of targeted countries, explanations for the reason for assistance will be required. Thus, requests by MHLW and JICA are meaningful as reasons for explanations for the heads of governments and parliaments.
- A sister-city affiliation allows needs of the other parties to be easily understood through exchanges. Thus, it is possible for such affiliations to lead to international cooperation.

4) Findings that should be effectively utilized

- Communications among water suppliers after commencement of the training program are difficult. Thus, it is important to make meticulous prior adjustments.
- When sharing of information among water suppliers becomes possible after commencement of the training programs concerning the degree of understanding of and questions from trainees, etc. more effective training is expected.

Chapter 9　Effects Relating to Collaboration by Water Suppliers and Future Direction

9-1　Summary of Effects and Issues Relating to Collaboration by Water Suppliers

Effects and issues relating to collaboration of water suppliers were investigated. As a result of such investigation, particular points to be noted were revealed, and these are described as follows.

1) Effects and merits based on collaboration of water suppliers

International cooperation involving mutual multiple water suppliers allows the effects of implementation of the project itself to be enhanced. This effect can be considered to be beneficial for partner countries as well as cooperating water suppliers in Japan. As such, the following points are listed as merits for both parties.

(i) Response to various needs

Collaboration by water suppliers with strength and characteristics resulting from involvement in different fields allows fields where there is a lack of knowledge for a sole water supplier to be addressed with supplementary information, and it also and allows a comprehensive system for cooperation to be constructed. Specifically, it is possible to extensively respond to various needs of different fields of partner countries, such as those relating to water quality management, non-revenue water control, and managerial know-how.

(ii) Proposal for technologies that are suitable for actual conditions of developing nations

The promotion of participation by small and medium size water suppliers, etc. that face difficulties regarding engagement in international cooperation on their own can take place. The promotion of participation in international cooperation by water suppliers with project patterns and facilities that are suitable for actual circumstances of developing nations (e.g., facilities with a low extent of dependency on machinery facilities such those necessary for slow filtration) can be easily achieved.

(iii) Continuous long-term assistance

It is possible to construct a continuous and stable system for cooperation through collaboration.

(iv) Improvement of technical abilities of water suppliers that are not the targets of assistance

International cooperation based on collaboration with local water suppliers allows effects of local activities to be remarkably enhanced. The number of participating personnel can be enhanced. Moreover, education in local languages can be performed through OJT, in particular. As such, the remarkable spreading of effects is possible. Moreover, technical assistance can be extended to private water suppliers, etc. of partner countries that are not the targets of direct assistance.

At the same time, water suppliers in Japan can obtain benefits. Examples are reduction of burdens related to international cooperation and expansion of the breadth of experience of employees. Specific examples can be confirmed as follows.

(i) Mitigation of burdens on water suppliers in Japan

While mitigating burdens on water suppliers, personnel involved in the project can be enriched as a whole. Securing personnel while spare energy for water suppliers is being lost is an important issue

for the future international cooperation. This problem can be mitigated.

(ii) Human resource development through exchanges among local governments

Through personal exchanges among employees with different specialties who are involved in the same project, high-level effects for human resource development can be gained. Beyond the differences of styles of water suppliers, the solution of problems takes place with the cooperation of experts at other water suppliers. In this way, the breadth of response experiences can be expanded.

(iii) Development for a new domestic project based on constructed human relationships

The human relationships constructed through projects will form a foundation for new activities for domestic services. Human relationships among employees of different water suppliers that have participated in the same project can be maintained even after they have returned to domestic operations. In this way, cases that contribute to regional collaboration among water suppliers can be observed.

(iv) Development of water supply system based on a master plan that cannot be experienced in Japan

Employees at water suppliers in Japan can obtain valuable experience that cannot be gained in Japan. In relation to projects in developing nations, in many cases, employees can be involved in such projects during a master plan phase for the development of the water supply system. At present, it is difficult to experience such opportunities in Japan. Thus, employees at water suppliers in Japan can gain valuable experience.

(v) Participation in international activities by new water suppliers

Through these opportunities, local governments that have no or less experience with international cooperation can participate in international activities. For such local governments to participate in precedent projects of other local governments secondary roles allows them to accumulate experiences while resolving concerns and answering questions.

(vi) New development based on continuous and long-term assistance

Construction of a continuously stable cooperation system allows the construction of long-term relationships with counterparts to be expected. Such relationships will form foundations that can lead to the development of new international cooperation.

(vii) Creation of opportunities for overseas development of private sector companies in Japan

Opportunities for not only water suppliers that are targets of direct assistance but also private water suppliers, etc. that are not targets of direct assistance to learn technologies and know-how can be created. At the same time, opportunities for overseas development for private sector companies in Japan can be also created. Local seminars continuously held as a parts of international cooperation activities play large roles.

2) Factors that have allowed collaboration of water suppliers to be realized

Based on investigation of case examples in which international cooperation has been realized through collaboration by multiple water suppliers, the background, history, etc. regarding the realization of such collaboration have been understood. Selected factors that have become important points in the course of progressing with collaboration are described as follows.

(i) Understanding of needs of partner countries

Local conditions and needs of partner countries should be sufficiently understood in advance. When collaboration of water suppliers is to be performed, shared recognition concerning the nature of project

and expected effects will be of greater significance than is possible with a project conducted on a solo basis. When the construction of relationships with partner countries has been realized, it will be easy for water suppliers to collaborate with each other. Such collaboration is realized through implementation of a training program that involves visiting Japan, seminar attendance, sister-city tie-ups and affiliations, activity achievements, etc. based on other schemes, etc. as well as continuous implementation of projects through technical cooperation, etc.,

(ii) Leadership taking the initiative for collaboration

Personnel with leadership take the initiative for collaboration. In many cases, in relation to cases in which one's own water suppliers alone were not able to secure experts for problem solution, experts with local activity experiences sought in order to conduct participation and collaboration by other water suppliers with the aforementioned entities.

(iii) Negotiable opportunities concerning the nature of collaboration and existence of negotiators

There exist opportunities for direct and indirect negotiation (e.g., that involving JICA) between water suppliers leading international cooperation and unexperienced water suppliers that intend to participate in international cooperation.

3) Points to note and responses in the course of collaboration

The following points should be noted for preparation in cases in which international cooperation is conducted based on collaboration with other water suppliers. Such points should be matters to be revised in advance in the course of performance of the future activities.

(i) Adjustment for sharing of roles by water suppliers

In relation to international cooperation based on collaboration, it is necessary to previously adjust the scope of services and sharing of roles by water suppliers. JICA's role is to perform introduction and assistance, and does not function for adjustment of sharing of roles among water suppliers. According to the investigation in question, analysis has taken place with a central focus on case examples in which adjustment among water suppliers has been appropriately performed. There are potential cases in which collaboration may not have worked well, and thus negotiation among water suppliers might not have been carried out well. Such situations should be avoided as much as possible through sufficient negotiation.

(ii) Various forms of consensus building among water suppliers

An increase in the time and service quantity related to conferences for consensus building among water suppliers, sharing of services, the period for dispatching, and adjustment for differences in style, etc. should be expected. A conflict between the ideal competence of experts and period required by a project and the actual competence of experts in charge in an avoidable manner. Therefore, it is important to expect the necessity for adjustment.

(iii) Thorough adjustment

For adjustment among water suppliers, conferences conducted by representatives of water suppliers, leadership adjustment, discussion by on-site dispatched representatives and persons in charge, prior transmission of written requests to short-term experts, transmission of messages, sharing of information, etc. should take place. In any case, more thorough adjustment than is required in the case of solo implementation is necessary.

(iv) Number of appropriate water suppliers

The number of and relationships regarding water suppliers participating in collaboration are appropriate. Meticulous consideration that is suitable for the actual circumstances of water suppliers is necessary. Thus, it is desirable to determine the required sufficient number of water suppliers, but there should not be an excessive number of them. Moreover, neighboring water suppliers can be easily adjusted.

As inventiveness that allows collaboration of water suppliers to be easily conducted, the following points to note and response measures should be considered.

- In relation to consensus building and adjustment, burdens during an initial phase until the relevant system is arranged is large. In particular, during the initial phase, adjustment by personnel with leadership is effective.
- Entering an agreement, etc. is a significant method for prevention of a dissolution of collaboration in the midst of a projects due to changes to policy by different local governments. However, there are some cases in which core cities that are not large-size local governments may face difficulties executing of collaboration agreements due to the burden placed thereby on project continuation.
- Regarding efforts requiring inventiveness for continuous assistance, confirmation concerning intention by organization heads and basic policies of local governments, request for cooperation to neighboring water suppliers, matching with water suppliers reviewing a means of international cooperation, assistance for personnel dispatched overseas unique to local governments, the personnel stock system, etc. are performed.
- It is possible for differences in work styles to become issues depending upon water suppliers. However, this problem can be avoided through inventiveness in the sharing of roles for services in relevant fields, adjustment of time periods, etc.
- There is a possibility of difference concerning PR outcomes in each organization, and inventiveness may be required.
- Information sharing is remarkably important for collaboration. When using tools for information sharing, the net security of local governments may be a barrier. Therefore, it is necessary to review effective measures.

As such, it has been confirmed that international cooperation based on collaboration with multiple water suppliers allows the breadth of and effect from assistance to be enhanced while mitigating burdens of water suppliers. In particular, for water suppliers that have not had sufficient experience in international cooperation to use such opportunities for participation in collaboration as described above is remarkably effective, which is a notable merit. Despite the fact that inventiveness regarding adjustment among water suppliers is necessary, even considering the relevant burdens, the effects can be considered to be clear.

At the same time, in order to establish collaboration among water suppliers, accumulation of sufficient knowledge related to local needs and for personnel with leadership who conduct negotiation necessary with the motivation to be involved in relevant processes are of great significance.

9-2 Future Directions

In light of the review results thus far, for the future promotion of international cooperation in the water supply sector, efforts that are considered to be effective will be proposed hereinafter.

1) Proposals regarding the nature of water suppliers

The environment surrounding water suppliers will be more severe than before due to population declines, etc. in the future. Therefore, it has been pointed out that it would become difficult to gain understanding concerning activities that would not directly impact operational administration, such as international cooperation. Therefore, it is not easy to demonstrate the merits for water suppliers that arise from conducting international cooperation via numerical figures and evidence.

However, as a result of the investigation in question, it has been confirmed anew that regarding the proactive participation of water suppliers in international cooperation, there have existed the following examples of effects: (a) human resource development through experiencing an environment that is difficult to experience within the scope of daily services; (b) construction of relationships with other water suppliers; and (c) international developmental assistance by local enterprises or the like.

Moreover, for multiple water suppliers to implement international cooperation through mutual collaboration is to reduce burdens on local governments and to expand the range of potential assistance for partner countries. At the same time, it has been understood that the form of the aforementioned international cooperation can create initial opportunities for water suppliers that intend to conduct international cooperation in the future.

Based on the aforementioned results, for water suppliers to engage in international cooperation through mutual collaboration can be said to be an effort to be recommended, and one that forms the ideal for a water supply utility. From such standpoint, possible forms of inventiveness that can further promote collaboration in the future is described as follows.

(i) Introduction of significance of and effect regarding international cooperation by MHLW

MHLW should spread awareness of the fact that the significance of and effects from international cooperation based on collaboration have been confirmed. MHLW has already explained the significance of participating in international cooperation through the current waterworks vision. In particular, MHLW has also stated significance of the participation of large-size water suppliers in international cooperation. Through this investigation, it has been possible to collect specific examples of the significance of and effect from activities in reality. Therefore, it can be thought that information on such outcome will be proactively introduced.

(ii) Sharing of outcomes from and experiences of international cooperation activities

Outcomes from and experiences by water suppliers that have actually conducted activities should be shared. Study sessions, etc. among water suppliers that have already had relationships with JICA projects have been implemented. It is desirable to create opportunities for further information exchanges for water suppliers, etc. that are considering new participation in international cooperation.

(iii) Supply of information to water suppliers reviewing new participation

For water suppliers considering engaging in new international cooperation projects, a method of accumulating experiences of international cooperation should be introduced involving participation by leading international cooperation case examples. Opportunities for new water suppliers to learn about

precedent projects and opportunities for leading water suppliers to learn about efforts involving distinctly characterized new water suppliers should be prepared. This is effective. For example, the Regular Conference for International Development Platform for Local government Waterworks held by the Bureau of Waterworks, Tokyo Metropolitan Government and the Japan Water Works Association as a joint bureau has offered a great opportunity for collecting information for international activities conducted by other water suppliers.

(iv) Utilization of OB/OG personnel with experiences and leadership

The fact that OB/OG personnel with experiences and leadership that vigorously play active parts are effective should be thoroughly disseminated. In relation to examples of cases in which international cooperation took place based on collaboration, there have been many examples in which experts who had experiences with international cooperation, gained understanding local circumstances, and exercised strong leadership were in charge of adjustment and negotiation for collaboration. Based on these results, it can be thought that use of OB/OG personnel with good experience and strong motivation is very important.

(v) Use of networks beyond those of water suppliers of personnel with experience

For realization of collaboration, the fact that networks beyond those of water suppliers among personnel with experiences involving international cooperation have also effectively functioned should be disseminated. In this way, exchanges among water suppliers should be promoted. It was suggested that the network of personnel who have come to know each other through experiences of international cooperation has backed up collaboration. It is desirable to accelerate exchanges among water suppliers through opportunities for information sharing and information exchange.

(vi) Dissemination of efforts through which experiences for international cooperation can be gained

Information on efforts that allow experiences for international cooperation to be gained should be disseminated. Some examples of relevant efforts are as follows: (a) the observer system at Knowledge Co-Creation Program (i.e., a system that has young employees of neighboring water suppliers attend JICA Knowledge Co-Creation Programs together and engage in exchanges with trainees); and (b) strengthening capacity for training operations (i.e., participants from water suppliers can learn while exchanging trainees from developing nations participating in Knowledge Co-Creation Program), etc.

2) Proposals for construction of relationships with assisted partner countries

For promotion of international cooperation based on collaboration of water suppliers, an appropriate form of team participation that is suitable for the circumstances of partner countries is necessary. Even regarding water suppliers whose backup systems have been relatively well arranged for international cooperation activities, personnel for international cooperation are deficient and it is becoming difficult to respond to requests. From the standpoint of mitigation of burdens, international cooperation based on collaboration is considered to be more important than ever before.

Points to be performed in the future in order to effectively promote collaboration of water suppliers from the viewpoint of relationships with assisted partner countries are listed below.

(i) Maintenance of continuous cooperation relationships

It is very important for efforts for international cooperation to be continuous. As a result of the investigation in question, it has been reconfirmed that firm understanding and sharing of local

circumstances are of remarkable significance in the course of appropriate performance of cooperation activities. Maintaining continuous cooperation relationships allow local circumstances to be understood at all times. Given this, it can be thought that continued efforts for international cooperation are highly important. In the case of a new project, sufficient prior investigation and adjustment should be required.

(ii) Participation by parties concerned with water suppliers of partner countries

Parties concerned with water suppliers of partner countries should be proactively incorporated in international cooperation efforts of Japan. It has been confirmed that international cooperation together with employees from leading water suppliers generates extensive effects for other water suppliers of partner countries and further effects for private water suppliers that fall outside the scope of the targets of the project. With reference to a project that will allow Cambodia and Laos to continuously perform international cooperation, it will be effective to involve local employees as cooperating parties. Such efforts should be proactively considered for future project formation.

3) In conclusion (expectations for Japan's ODA efforts)

Needs for international cooperation in the water supply sector are sufficiently high compared with the need in other fields. It is obvious to construct relationships with partner countries gained through continued international cooperation and to serve the national interests of Japan gained through the aforementioned construction. At the same time, as shown with reference to the waterworks vision, etc., it has been confirmed that merits obtained by water suppliers and local governments through international cooperation have included human resource development, assistance for expanding local corporations into new business opportunities (overseas), etc.

The difficulties in the management environment for water suppliers are increasing. Based on such environment, it has become more difficult to allocate human resources for international cooperation than before. In the midst of such situation, according to the investigation in question, it has been confirmed that international cooperation based on collaboration among water suppliers is an effective measure for maintaining relevant activities. In order to perform international cooperation through use of limited resources without duplication, diagrams of competent authorities, sharing of roles, etc. are necessary. In this way, creation of grounds for explaining that international cooperation in the water supply sector is objectively demanded is expected.

Moreover, according to the investigation in question, in order to promote collaboration of water suppliers, it has been verified that efforts to achieve familiar knowledge of local circumstances, leadership personnel, sufficient prior adjustment, etc. are important. It can be recognized that today's activities have been built on top of our processors' efforts and struggles. At the same time, it can be confirmed that continued personnel dispatching is important. Such work should be developed for efforts for international cooperation. We would like to end this report on the note of this recognition and confirmation.

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the Ministry of Health, Labour and Welfare

FY2021

Report of International Cooperation Projects

in the Water Sector

Material 1

March 2022

Japan International Corporation of Welfare Services

JICWELS

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Material 1. Research findings of examples, effects, and challenges of online training programs for international cooperation in the water sector that have become widespread due to the impact of the COVID-19 pandemic since FY2020

1－1 Background of online training programs for international cooperation and the purpose of this research

Training programs organized by JICA in Japan for people visiting from developing countries consist of the knowledge co-creation program, the training program for young people, the country-specific training program, and the long-term training program. In 2019, 17 courses were conducted in the knowledge co-creation program for the water supply sector and again in 2020, 17 courses were scheduled to be conducted as initially planned. However, in response to the impact of COVID-19 that was spreading around the world, JICA issued a notice entitled “2020 JICA trainees hosting program during the COVID-19 pandemic” to host and cooperation organizations on June 10, 2020. JICA informed the organizations of the cancellation of the knowledge co-creation program and training program for young people, which were scheduled to be conducted for trainees who were due to visit Japan on or before December 31, 2020. JICA also requested them to consider the feasibility of replacing all courses of the knowledge co-creation program and the training program for young people, including courses which were scheduled to be conducted for trainees who were due to visit Japan on or after January 1, 2021, with remote training courses with no visits to Japan involved, as an alternative measure. JICA also requested their cooperation in making preparations to remotely conduct the courses of the country-specific training program which they believed could be conducted remotely. Thus, most training courses for 2020 were conducted remotely. There were, however, some courses that had to be canceled in the end. Some of the training courses for technical cooperation projects in Japan, local training courses held by local authorities in Japan, and international seminars had to be switched to online courses because it was difficult for trainees to travel to Japan and for instructors to travel overseas.

Face-to-face training and online training may differ in many aspects, such as what needs to be done before and during the training, communication, the effects and challenges of training, and how to make improvements. It will be necessary to communicate and share information online if the impact of the COVID-19 pandemic continues or restrictions are imposed on international travel for whatever reason in the future. Therefore, it is effective to organize and accumulate important points and know-how about conducting training courses online in order to make online activities one of the effective ways to implement international cooperation efforts in the future. In this respect, we collected information on training courses conducted online and interviewed representatives from training organizations to find out about the differences between face-to-face training and online training, challenges of online training and how to deal with them, and know-how about conducting training courses online.

1－2 Examples of online training programs for international cooperation

Online training courses of the 2020 JICA knowledge co-creation program are shown in Table 1 below whereas the survey findings of online training courses, seminars, and information sharing sessions, including other international cooperation projects carried out in 2020, are shown in Table 2 below.

Table 1: Online training courses of the JICA knowledge co-creation program (The water resources sector, 2020)[1]

Category (Subcategory)	Training course	Training organization in Japan	Language of instruction
Urban water supply	Comprehensive Engineering on Water Supply Systems (A)	JICA Tokyo	English
Urban water supply	Water Supply Administration for Better Management of Water Supply Services (A)	JICA Tokyo	English
Urban water supply	Water Supply Administration for Better Management of Water Supply Services (B)	JICA Tokyo	English
Urban water supply	African Region Urban Waterworks Engineering	JICA Yokohama	English

Table 2: Examples of online activities

Organization	Project name	Description of online activities	Training project
Bureau of Waterworks, Tokyo Metropolitan Government	Asian Waterworks Utilities Network of Human Resource Development (A1-HRD)	The 13th meeting was held online on November 20, 2020.	

[1] A list of courses in the JICA 2020 knowledge co-creation training program https://www.jica.go.jp/activities/schemes/tr_japan/summary/lineup2020/index.html

Organization	Project name	Description of online activities	Training project
Yokohama Waterworks Bureau, City of Yokohama	Activities based on the Agreement on Technical Cooperation for Water Supply with Vietnamese Parties	In 2020, a web conference system was used to address challenges facing water supply authorities and to discuss future activities including seminars.	
Yokohama Waterworks Bureau, City of Yokohama Yokohama Water Co., Ltd.	JICA knowledge co-creation program “African Region Urban Waterworks Engineering”	An online training course was conducted for 10 days from January 18 to 29, 2021. 15 lecture videos, each of which lasted 20 to 30 minutes, were made and uploaded on YouTube for participants from different time zones to view. Weekly Zoom Q&A sessions were also held.	○
Yokohama Waterworks Bureau, City of Yokohama	JICA technical cooperation project “The Project for Strengthening the Capacity of Non-revenue Water Reduction for Lilongwe Water Board (LiSCaP)” in Malawi	A JICA expert returned to Japan at the end of March 2020 and the project team continued to provide support remotely in weekly video meetings every Friday. An online training course was conducted using a web conference system that was linked to Malawi from November 4 to 27. An internal support team was set up to collect information online.	
Yokohama Waterworks Bureau, City of Yokohama	Technical Exchanges based on the Memorandum of Understanding between Water and Sanitation Agency of Faisalabad in Pakistan and Yokohama Waterworks Bureau	An online seminar was held in place of hosting trainees. Taking advantage of the benefits of online seminars, Lahore, the capital city of Punjab state where Faisalabad is located, was also invited to attend the seminar. • Online seminar (February 15 to 16, 2021) - Discussions on water purification and the maintenance and management of water purification plants; tariff and customer management; and water distribution management and water supply. - An online business matching opportunity for six member companies of the Yokohama Water Business Association (YWBA)	

Organization	Project name	Description of online activities	Training project
Public Enterprises Agency of Kanagawa Prefectural Government	MOU with Lang Son Province, Vietnam	There were no visits of Kanagawa prefectural officials to Vietnam or of Vietnamese officials to Kanagawa Prefecture. Monthly water supply volume analysis and pipe network analysis in the pilot area were carried out by email (16 times in total).	
Saitama City Waterworks Bureau	JICA partnership program “The Project for Improvement of Pipeline Management and Maintenance in Water Supply State Enterprises of Lao PDR”	A mid-term report was given online on August 19, 2020. 36 participants (24 from JICA, 7 from Saitama City, and 5 from other organizations)	
Nagoya City Waterworks and Sewerage Bureau	JICA technical cooperation project “The project for Enhancement of Operational Efficiency and Asset Management Capacity of Regional Support Center-Western South of NWSDB in Sri Lanka”	• The dispatch of experts was postponed. • Regular meetings with relevant stakeholders were held online to report project progress. • A training video was made to follow up on the instructor training course.	
Nagoya City Waterworks and Sewerage Bureau	JICA partnership program “Project for Enhancement of Measures against Earthquake of Water Supply and Sewerage in Mexico City”	• The dispatch of experts was postponed. • Regular meetings with relevant stakeholders were held online to report project progress.	

Organization	Project name	Description of online activities	Training project
Osaka Municipal Waterworks Bureau (OMWB)	Technical Exchange between Saigon Water Corporation (SAWACO) and OMWB	On March 13, 2021, OMWB had an online technical exchange with nine SAWACO officials to share views and information on the water supply sector.	
Osaka Municipal Waterworks Bureau (OMWB)	Exchanging ideas on improvement of waterworks in Mandalay region, Myanmar	On January 25, 2021, OMWB held an online meeting with Mandalay Regional Development Affairs (MRDA) to exchange ideas about the improvement of waterworks in the Mandalay region.	
Fukuoka City Waterworks Bureau	JICA partnership program: Project to improve water supply services in the Nadi/Lautoka region, Fiji (second project)	Support was provided in online meetings for water leakage investigations and repairs in the Nadi region to improve non-revenue water rates. Support was also provided remotely to train instructors and to raise water users' awareness of saving water.	
Japan Waterworks Association	JICA knowledge co-creation program “Comprehensive Engineering on Water Supply Systems: Basic Planning and Design for Water Supply System (A)”	A one-week course was conducted online. The course involved intensive lectures and discussions, with a focus on non-revenue water countermeasures.	○
Japan Waterworks Association	SALGA-JWWA Joint Seminars for Water Supply Sector	Three joint seminars were held online from January 28 to March 19, 2021.	

Organization	Project name	Description of online activities	Training project
Japan International Corporation of Welfare Services (JICWELS)	JICA knowledge co-creation program: "Water Supply Administration for Better Management of Water Supply Services (A and B)"	2019 follow-up training (November 12, 2020) 2020 training (January 18 to 22, 2021)	○

Source: Excerpts from Japan Waterworks Association: International Activities by Water Utilities (2020),[2] An internal documents of Japan International Corporation of Welfare Services

1－3 Collecting information on important points about conducting online training programs for international cooperation

As mentioned earlier, face-to-face training and online training may differ in many aspects and both have advantages and disadvantages. There seem to be differences between these two types of training in terms of what needs to be done before, during, and after the training and how the training is conducted, e.g. the results of the training. One of the advantages of online training is that the number of participants is less likely to be limited as no travel is required and thus no travel expenses are incurred while a disadvantage would be that participants cannot gain hands-on experience or cannot visit work sites, for example. Nevertheless, online training does offer knowledge gained through experience. In fact, online training sometimes requires participants and instructors to deal with unforeseen setbacks or mishaps during a training session and it may bring about results that no one has expected.

In this survey, key survey items were classified into: what needs to be done before, during, and after the training; how the training is conducted, e.g. communication and training results; and knowledge gained from overall experience, and those who were involved in online training were interviewed accordingly and survey findings were organized. The key survey items and the interviewees are shown in Table 3 and Table 4 below, respectively.

[2] Japan Waterworks Association: International Activities by Water Utilities (2020) http://www.jwwa.or.jp/jigyou/kaigai_02.html

Table 3: Key survey items

Item		Description
What needs to be done	What needs to be done before the training	Creating an online training environment, securing a venue, preparing training materials, selecting an instructor, making adjustments, etc.
	What needs to be done during the training	Maintaining an online training environment, arranging for an interpreter, performing time management, conducting a course (video-based or dialog-based), collecting views, etc.
	What needs to be done after the training	Interviewing course participants, taking follow-up actions, preparing a report, etc.
How the training is conducted	Communication	Course participants' reactions, questions, discussions, etc.
	Effect	Degree of understanding of the course, degree of difficulty in attending the course, etc.
Overall	What is lacking	What is lacking in the training, e.g. visits to work sites, and how to compensate for it.
	Challenges and how to make improvements	Overall challenges of the course and how to make improvements
	Know-how etc.	Important points and know-how about online training and knowledge that should be accumulated
	Outlook	How to conduct training courses in the future

Table 4: Interviewees

No.	Project name	Interviewee
1	JICA knowledge co-creation program evaluation meeting results	JICA

No.	Project name	Interviewee
2	JICA knowledge co-creation program “W Water Supply Administration for Better Management of Water Supply Services (A)”	Japan International Corporation of Welfare Services (JICWELS)

1－4 Organizing knowledge about conducting online training programs for international cooperation

Feedback on what happened and what needs to be improved and how to make improvements for each of the survey items is shown in Table 5 below. The feedback will be examined to see whether it can be utilized for future online training programs.

Table 5: Interview survey findings

Item		Description	What happened and what needs to be improved	How to make improvements
What needs to be done	What needs to be done before the training	Creating an online training environment, securing a venue, preparing training materials, selecting an instructor, making adjustments, etc.	・ The training was conducted in a meeting room at JICA Tokyo. The Wi-Fi connection was weak and audio cut out occasionally. It may have had something to do with the participants' internet connections. ・ Training materials were provided on JICA-VAN, but the participants were not sure how to use it.	・ Increase internet connections. ・ Familiarize participants with the use of JICA-VAN.

Item		Description	What happened and what needs to be improved	How to make improvements
	What needs to be done during the training	Maintaining an online training environment, arranging for an interpreter, performing time management, conducting a course (video-based or dialog-based), collecting views, etc.	・We use Zoom more than Teams because Teams cuts out often. If everyone is familiar with Zoom, training can go smoothly and liven up easily. If not, then, it takes time to create breakout rooms, for example. When Zoom cuts out or freezes, you have to keep others waiting while you fix the problem. Someone asked a question all of a sudden. The internet connections went down for both the trainees and the instructor and extra communication was needed.	・Use a tool that everyone is familiar with and cuts out less often in order not to keep others waiting or waste time on small talk.
			・Some trainees' names are too long to remember or hard to pronounce and sometimes we don't know how to address them. ・Both the instructor and the trainees lack English skills. ・Sometimes the trainees couldn't hear what was being said when the internet connection was poor. They can ask the instructor questions if they are in an in-person training session, but that's not possible in an online session. An online session may be over before they have a chance to ask questions.	・If the trainees were in Japan, they could wear a name tag. How about giving everyone a nickname in an online session? ・Lots of improvements should be made, e.g. providing a question time, a live chat, a training summary, pre-training materials. ・It may be a good idea to show a video to the trainees for most parts of the training session and to limit online content to a Q&A session.

Item		Description	What happened and what needs to be improved	How to make improvements
			・ An awkward silence can make you feel pressure to say something.	・ Allow more time for the training. It is important to have plenty of time to explain and ask questions.
How the training is conducted	Communication	Course participants' reactions, questions, discussions, etc.	・ The trainees did not have a full understanding of the purpose of group discussions. They did not know what they were supposed to discuss and why. The discussion themes got mixed up. ・ When the trainees were prompted to have a discussion, someone often monopolized the discussion without giving anyone else a chance to speak. Everyone can participate in a discussion in a face-to-face training session. The instructor seemed to be having a hard time in the online session.	・ Make what should be discussed clear. Make the purpose and reason for having a discussion clear. ・ Devise a way to make it easier to participate in a discussion.

Item		Description	What happened and what needs to be improved	How to make improvements
	Effect	Degree of understanding of the course, degree of difficulty in attending the course, etc.	・ The instructor lacks English skills. He may be proficient in English, but the way he speaks English often makes it harder for the trainees to understand him. An interpreter was provided for some courses, but the sessions took longer than they should. The interpreter helped the trainees to understand better. She took the trouble to summarize what was being said and gave additional explanations.	・ A training session with an interpreter tends to take longer, but it helps to increase the level of understanding. It is even better if an interpreter gives a summary or additional explanations.
Overall	Challenges and how to make improvements	Overall challenges of the course and how to make improvements	・ Some trainees were late or absent. Extra time and effort were needed to deal with late attendance or non-attendance.	・ Extra communication is needed, e.g. reminding the instructor how to deal with trainees' non-attendance or late attendance or passing a note to the instructor in addition to verbal communication.
			・ When the trainees attended the training while at home, they found it hard to stay focused because of home distractions.	・ The trainees should be in a public place, e.g. an JICA office, to attend training.
	Know-how etc.	Important points and know-how about online training, and knowledge that should be accumulated	・ Local authorities have many innovative ideas to offer. It would be a good idea for them to learn from each other. They all have know-how. Some local authorities have interesting know-how.	・ It would be a good idea to have an opportunity to mutually organize workshops.
			・ It is difficult to facilitate discussions.	・ The way that group discussions are conducted should be modified and improved.

Item		Description	What happened and what needs to be improved	How to make improvements
	Outlook	How to conduct training courses in the future	・ The perception of a training program varies depending on local authorities. For example, local authorities that only arrange an instructor for a JICA project tend to lack flexibility and are less likely to try something new. On the other hand, more willing and more flexible local authorities think that a training program is beneficial to them and they tend to have a good action plan and want to build a good relationship with trainees. They also seem to be looking for business matching opportunities. It seems to me that those local authorities which regard a training program as a valuable opportunity seem to be a vigorous organization.	・ The effect of a training program depends on how the training program is perceived by a training organization. Being flexible is more likely to achieve an extra effect that can lead to a business matching opportunity.

How to devise a way to conduct online training more smoothly

Respondents pointed out that internet connections should be improved and that a tool everyone is familiar with should be used. The lack of English skills was also mentioned. It was difficult to prompt trainees to take part in group discussions and express their opinions during several training courses. For online training, it is particularly important to devise a way to (1) prompt trainees to speak and facilitate group discussions, (2) communicate the content of the training correctly, and (3) ensure the trainees gain a better understanding. Specific ways to address (2) and (3) that were suggested by respondents include providing a question time or a live chat, handing out training materials beforehand, showing videos, having plenty of time for training, and engaging an interpreter.

Each of the specific suggestions is useful. Giving everyone a nickname instead of wearing a name tag makes it easier to address those who have a difficult name to pronounce and may also be effective in facilitating communication. This idea can be put into practice immediately because it is easy to do so.

How to deal with trainees' non-attendance and late attendance

A problem with training courses targeted at trainees from other countries is that they tend to think of training attendance differently. A respondent pointed out that time was wasted in dealing with non-attendance and late attendance. It was suggested that instructors should be informed beforehand how to deal with trainees' non-attendance and late attendance. It was also suggested that trainees should attend a training course in a public place where they can concentrate more easily.

Online training has its problems, which are different from problems with in-person training held in Japan. Online training can be conducted more efficiently if past experience is shared in advance with all those involved in the training and there are pre-arranged measures that everyone should take (e.g. increase the frequency of sending reminders, inform trainees in advance that they will only receive training materials if they are late or absent).

How JICA training is regarded and its effects

According to a respondent who mentioned the perception of JICA training programs, attending JICA training programs with a flexible attitude is more likely to achieve an extra effect that could lead to business matching opportunities.

The use of online tools for training or other purposes will open the door for more trainees and countries to participate in training programs and for other organizations and private sector companies to observe them and will also help to increase business matching opportunities. It will bring many benefits if ingenuity is exercised.

Sharing know-how

A respondent mentioned that each of the training organizers has their own training know-how and that it would be a good idea to provide opportunities to visit and learn from each other. Those who organized online training had to adapt to the unprecedented situation, but their experience and knowledge will definitely benefit them not only during the ongoing COVID-19 pandemic but also in any other situations in the future.

As a respondent pointed out, organizing workshops or providing opportunities to share knowledge with other training organizations is expected to make online training more effective and achieve an extra effect.

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Report of International Cooperation Projects

in the Water Sector

Material 2

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Material 2. Research findings of international cooperation in the water sector by other countries

1－1 Characteristics of Japan's international cooperation and the purpose of this research

Supporting self-help efforts is Japan's philosophy for assistance that has been shaped since the country started to provide assistance to developing countries in 1954. The Japanese way of providing cooperation is to support the efforts of people in developing countries to enable them to sustain and develop their projects by themselves after Japan ends assistance. In the Development Assistance Committee (DAC) Development Cooperation Peer Review published in October 2020, Japan is highly praised for aiming to achieve sustainable development with a whole-of-society approach and with a combination of diplomacy, peace, and development efforts, for emphasizing the self-reliant development of developing countries, and for playing a pivotal role in disaster risk prevention and reduction in the world. The Peer Review also mentions that Japan provides ODA loans (yen loans) to developing countries to support their self-help efforts by being in an equal relationship with them and its effectiveness is highly commended.[1,2]

Japan's international cooperation is characterized by its emphasis on recipient countries' requests. Japan encourages self-help efforts and aims to provide opportunities for developing countries to start taking action by thinking for themselves and requesting assistance. However, the basic policies of Japan's Official Development Assistance (ODA) Charter, which was revised in 2015, clearly state that Japan will also go beyond waiting for requests from partner countries by focusing on dialogue and collaboration with diverse actors not limited to governments and regional agencies of these countries, including proactively presenting proposals while giving full consideration to policies, programs and institutions related to development in the country concerned.

Another feature of Japan's assistance is the promotion of human security. In order to comprehensively address and deal with a wide range of complex, global-scale issues that can threaten people's survival and livelihoods, Japan believes that countries, international organizations, and NGOs should work together to protect people and build capacity to combat the threats.[3]

Although international cooperation provided by Japan based on the above concept is highly praised, as mentioned earlier, aid workers working on the front line have expressed their views that there is still some room for improvement to make their efforts even better. In one of nine recommendations made in the DAC Development Cooperation Peer Review, Japan is expected to continue to improve its systems, procedures, and capabilities to improve its agility and adaptability.[4]

International cooperation is participated by not only Japan's public agencies, but also relevant organizations of recipient countries, multilateral international organizations consisting of various countries

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[1] White Paper on Development Cooperation 2020
https://www.mofa.go.jp/mofaj/gaiko/oda/press/shiryo/page22_001366.html

[2] The Ministry of Foreign Affairs, ODA email newsletter No. 432 (November 27, 2020)
https://www.mofa.go.jp/mofaj/gaiko/oda/mail/bn_432.html

[3] JICA, “Essential knowledge about ODA” 6. Trends in international assistance and Japan's efforts
https://www.jica.go.jp/aboutoda/basic/06.html#a01

[4] OECD/DAC Development Cooperation Peer Review
https://www.mofa.go.jp/mofaj/gaiko/oda/doukou/dac.html

and their public agencies, and NGOs. Other countries may often provide support under their organizational structure and policies that are different from those of Japan. Conducting research into such organizational structure and policies will provide useful information for Japan's future efforts.

Based on the above principle and information provided by committee members, research findings of international cooperation in the water sector provided by other countries will be obtained in the following manner:

• Identify target recipient countries based on information about commitments in international cooperation in the water sector.

• Collect and compile information about an overview of various countries' international cooperation frameworks (e.g. implementing agencies) from generally available materials.

• Collect the experiences of those who provide international cooperation on the front line and compile the information about each country's policies and methods that are different from those of Japan in particular.

Based on the research findings, perspectives that Japan should adopt in its future international cooperation efforts, implementation measures that it should use as a useful reference, and key points about adjustments and collaboration with international donor agencies will be examined and identified.

1－2 Characteristics of international cooperation of other countries

(1) Top donor countries in terms of commitments

Japan has made the world's largest commitments in the water and sanitation sector since the 1990s on a cumulative amount basis. Leveraging its vast experience, expertise, and technology, Japan has provided support, through yen loans, ODA grants, and technical cooperation that involves dispatching experts from Japan and hosting trainees from developing countries, to ensure people in developing countries have access to safe water. Japan also provides support via international organizations such as UNICEF.

The commitments in the water and sanitation sector by major OECD/DAC countries from 2014 to 2018 are shown in Table 1 below. The top five countries are Japan, Germany, France, the United States, and the United Kingdom. A comparison of the commitments of these five countries indicates that Japan has made far larger commitments than the other countries.

According to the OECD/DAC-CRS online database as of September 2021, Figure 1 below shows the percentage of commitments by DAC countries and international organizations in commitments in the water supply and sanitation sector by public agencies including international organizations between 2015 and 2019. The top 10 countries are Japan, Germany, France, the United States, the United Kingdom, the Netherlands, South Korea, Switzerland, Sweden, and Australia. However, it is important to note that the scope and definition of commitments vary from country to country and are not universally specified. Therefore, Figure 1 should be used for reference purposes only.

Table 1: Commitments in the water and sanitation sector by major DAC countries (Top five countries, 2014 to 2018)

Ranking	Country	Commitments US$ in millions (on a commitments basis)
1	Japan	5,933

Ranking	Country	Commitments US$ in millions (on a commitments basis)
2	Germany	4,606
3	France	2,924
4	United States	2,029
5	United Kingdom	1,273

Source: The Ministry of Foreign Affairs, ODA, Safe Water and Sanitation Statistics (OECD/DAC-CRS online database (as of November 2020))[5]

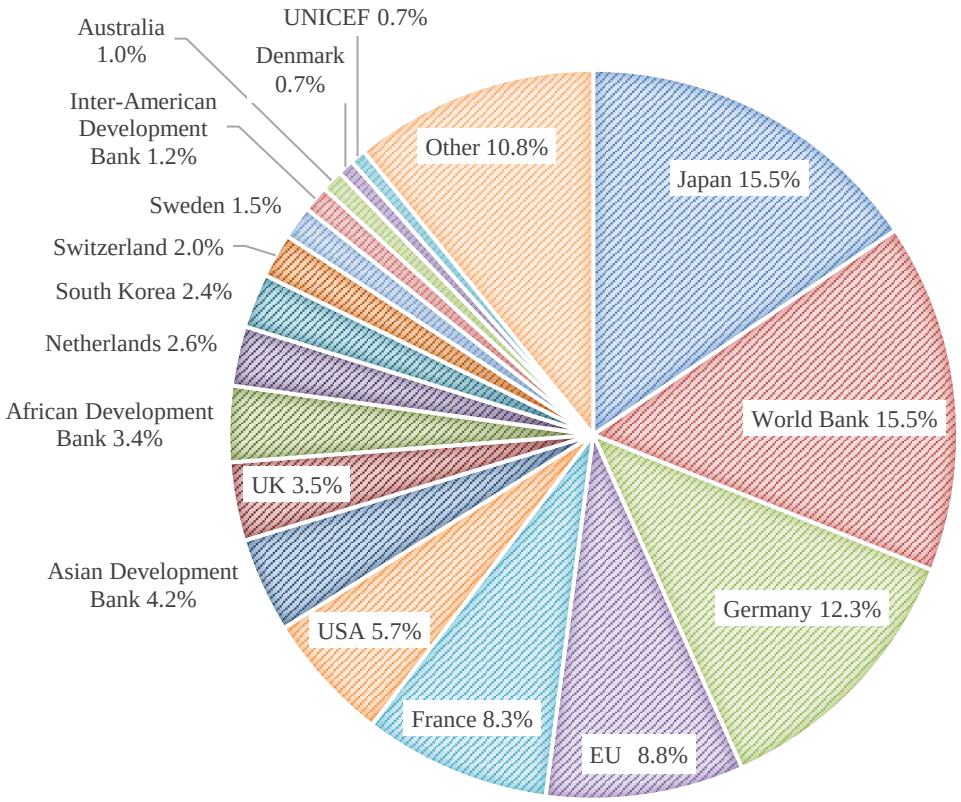

Figure 1: Percentage of commitments by international organizations and bilateral donor agencies in the water supply and sanitation sector between 2015 and 2019
Source: OECD-DAC Credit Reporting System as of September 2021[6]

Reference
The water supply and sanitation sector is divided into:
- Water sector policy and administrative management

[5] The Ministry of Foreign Affairs, ODA, Safe Water and Sanitation Statistics
https://www.mofa.go.jp/mofaj/gaiko/oda/bunya/water/statistic.html
[6] OECD.Stat
https://stats.oecd.org/Index.aspx?DataSetCode=CRS1#

- Water resources conservation (including data collection)
- Water supply and sanitation – large systems
- Water supply – large systems
- Sanitation – large systems
- Basic drinking water supply and basic sanitation
- Basic drinking water supply
- Basic sanitation
- River basins' development
- Waste management/disposal
- Education and training in water supply and sanitation

Appendix 2. Main Donors' Initiatives (page 154) to the JICA Theme-Specific Guidelines (Water Resources) issued in July 2017 following the 2009 revision contains a graph illustrating the figures of the water supply and sanitation sector to show the commitments of international organizations and bilateral donor agencies in the water supply and sanitation sector.

(2) Overview of international cooperation framework of top donor countries

Table 2 below shows the main international cooperation framework or bilateral donor agencies of eleven countries, namely the ten top donors mentioned above and China, an emerging donor, and the names of documents in which such agencies are mentioned.

Table 2: Cooperation framework of top donor countries in the water and sanitation sector

Country	Government donor	Material 1 (Characteristics)	Material 2 (Characteristics)	Material 3 (Support framework and Characteristics)	Material 4 (Characteristics)
Germany	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)	✓	✓	✓	✓
	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (BMZ)				
	Kreditanstalt für Wiederaufbau (KfW)	✓			
France	Agence Française de Developpement (AFD)	✓	✓	✓	✓
United States	The United States Agency for International Development (USAID)	✓	✓	✓	✓
United Kingdom	Foreign, Commonwealth & Development Office (FCDO)			✓	

Country	Government donor	Material 1 (Characteristics)	Material 2 (Characteristics)	Material 3 (Support framework and Characteristics)	Material 4 (Characteristics)
Netherlands	Ministry of Foreign Affairs of the Netherlands (MFA)			✓	✓
South Korea	Korea International Cooperation Agency (KOICA)			✓	
Switzerland	The Swiss Agency for Development and Cooperation (SDC)			✓*	
Sweden	Swedish International Development Cooperation Agency (Sida)	✓		✓	✓
Australia	Department of Foreign Affairs and Trade (DFAT)			✓	✓
China	China International Development Cooperation Agency (CIDCA)			✓	

Material 1: Project Strategy for Each Issue (Global Agenda) 19. Sustainable Management of Water Resources and Water Supply (draft) (June 8, 2021) 2. (3) International Donors' Efforts

Material 2: Direction of JICA Projects in the Water Resources Sector (Water Supply, Sanitation, and Water Resources Management) (June 25, 2021)

Material 3: White Paper on Development Cooperation 2020, development cooperation reference materials, *Development cooperation reference materials 2017

Material 4: JICA Theme-Specific Guidelines “Water Resources” (July 2017), Appendix 2. Major Donors' Initiatives for Water Resources