The 5th Executive Forum for Enhancing Sustainability of Urban Water Service in Asian Region

Implementation Report

October 2023

Japan International Cooperation Agency (JICA)

Japan International Corporation of Welfare Services

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The 5th Executive Forum
for Enhancing Sustainability of
Urban Water Service in Asian Region
2023, 22nd AUG – 25th AUG
Yokohama, Japan

Table of Contents

List of Figures and Tables

*This report is intended to serve as a report up to the actual holding of the 5th Executive Forum. For the follow-up after the completion of the 5th Executive Forum, please refer to the separate volume.

Abbreviations

Abbreviations	Formal name
ADB	Asian Development Bank
AFD	Agence Frangaise de Developpement
BCP	Business Continuity Plan
BIWASE	Binh Duong Water Environment Joint Stock Company
CAPEX	Capital Expenditure
CBO	Community-Based Organization
CEWAS	Center of Excellence for Water and Sanitation
CWASA	Chattogram Water Supply and Sewerage Authority
DAWACO	Da Nang Water Supply Joint Stock Company
DBP	Development Bank of the Philippines
DIP	Ductile Iron Pipe
DMA	District Metered Area
DWASA	Dhaka Water Supply and Sewerage Authority
DWS	Department of Water Supply, Ministry of Public Works and Transport
DX	Digital Transformation
ESG	Environment-Social-Governance
HRDIP	Hazard Resilient Ductile Iron Pipe
HueWACO	Thua Thien Hue Water Supply Joint Stock Company
IWA	International Water Association
JICA	Japan International Cooperation Agency
JICWELS	Japan International Corporation of Welfare Services
JMP	Joint Monitoring Programme
KPI	Key Performance Indicator
KUKL	Kathmandu Upatyaka Khanepani Limited
LGU	Local Government Unit
LWWA	Lao Water Works Association
Manila Water	Manila Water Company, Inc.
MaWaSU	Capacity Development Project for Improvement of Management Ability of Water Supply Authorities
Maynilad	Maynilad Water Services, Inc.
MCWD	Metropolitan Cebu Water District
MDGs	Millennium Development Goals
MISTI	Ministry of Industry, Science, Technology & Innovation
MoU	Memorandum of Understanding
MoWS	Ministry of Water Supply
MWA	Metropolitan Waterworks Authority
MWSEID	Ministry of Water Supply and Estate Infrastructure Development
NGO	Non-governmental Organization
NPKM	Khammouane Water Supply State Enterprise
NPLP	Luang Prabang Water Supply State Enterprise
NPNL	Vientiane Capital Water Supply State Enterprise
NRW	Non-Revenue Water
NWSDB	National Water Supply and Drainage Board
O&M	Operation & Maintenance
ODA	Official Development Assistance
OECD	Organization for Economic Co-operation and Development

OJT	On the Job Training
OPEX	Operating Expenses
PERUMDA	Perusahaan Umum Daerah
PPP	Public Private Partnership
PPWSA	Phnom Penh Water Supply Authority
PU (Cipta Karya)	Directorate General of Human Settlements, Ministry of Public Works and Housing
PWA	Provincial Waterworks Authority
PWRF	Philippines Water Revolving Fund
SAWACO	Saigon Water Corporation
SCADA	Supervisory Control and Data Acquisition
SDGs	Sustainable Development Goals
SPAM	Sistim Penyediaan Air Minum
SRWSA	Siem Reap Water Supply Authority
UP	Utility Profile
USAID	United States Agency for International Development
WASA-F	Water and Sanitation Agency, Faisalabad
WASA-L	Water and Sanitation Agency, Lahore
WASH	Water, Sanitation and Hygiene
WB	World Bank
WHO	World Health Organization
WOPs	Water Operators Partnerships

Chapter 1 Outline of the Executive Forum

1-1 Background and Overview of the Past Executive Forums

1-1-1 Background

Until now, the Japan International Cooperation Agency (hereinafter, "JICA") has implemented a number of development assistance projects in the field of waterworks, including the construction of waterworks facilities through financial assistance and technical cooperation, and has been working to improve waterworks services in various countries. In addition, through training in Japan and third countries, JICA is contributing to the strengthening of human networks among water utilities and the fostering of mutual learning as a "Water Family." In this process, it has been confirmed that for the improvement of water services, firstly, the leadership of water utility executives is important, and secondly, the sharing of lessons and initiatives within the region as well as collaboration by strengthening networks beyond national borders are necessary.

The Global Agenda currently being pursued by JICA aims to achieve greater social transformation by drawing up ideals that can be shared with diverse stakeholders, setting goals and quantitative and qualitative evaluation criteria for their realization, and mobilizing funds and resources with the involvement of stakeholders, and JICA has positioned the formation of a platform as a place where it can co-create knowledge with various stakeholders and promote collaboration toward the same goal as the role it should play.

The Executive Forum for Enhancing Sustainability of Urban Water Service in Asian Region (hereinafter, "Executive Forum") is positioned as a platform in the Cluster Strategy "Supporting the Growth of Water Utilities" under the Global Agenda "Sustainable Water Resources Management and Water Supply," as a place to promote "Co-creation" and "Collaboration" to share the knowledge of each stakeholder (including advanced water supply projects, promotion of public-private partnerships (hereinafter, "PPP"), active international cooperation by Japanese local governments, and progress of South-South cooperation within the Asian region) and utilize it for the development of water utilities in the Asian region. It will play a central role in the development of platform activities in the cluster hereafter.

Since 2010, JICA has conducted four Executive Forums for executives of water utilities and senior government officials.

Based on the results of the past four Executive Forums, the 5th Executive Forum for Enhancing Sustainability of Urban Water Service in Asian Region (hereinafter, "5th Executive Forum") was held in August 2023.

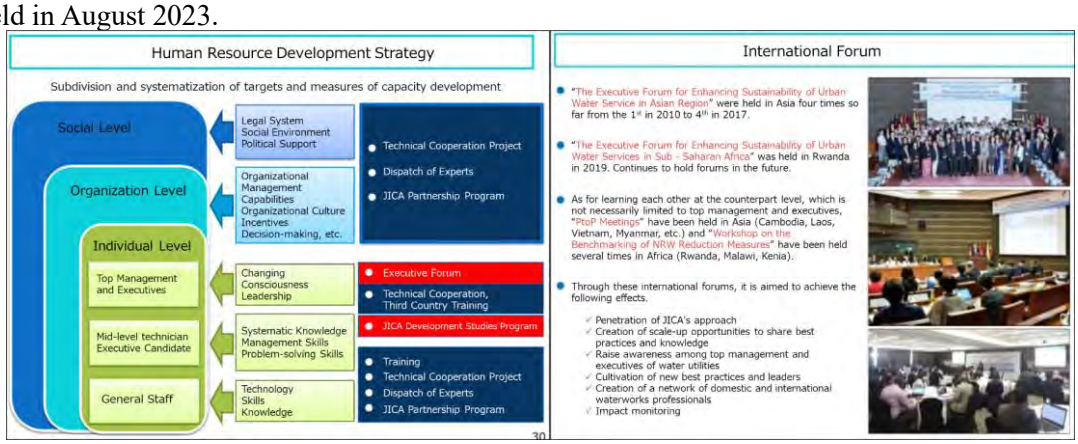


Figure 1-1 Positioning of the Executive Forum

Source: Materials of water sector study session with JICA and consultants (June 25, 2021), translated by the secretariat.

1-1-2 Overview of the Past Executive Forum

The following is an overview of the past four Executive Forums. Each Executive Forum had its theme, and water utilities in Asian countries and related organizations from Japan were invited to attend and participate in the focused discussion on the theme.

The 1st Executive Forum for Enhancing Sustainability of Urban Water Service in Asian Region (hereinafter, "1st forum") was held in January 2010 and executives of water utilities and those in charge of water supply policy in governments were invited from Asian countries. The Yokohama Forum Statement was adopted, and the need to resolve six common issues was confirmed; 1. Policy on Urban Water Supply (not only by the water utilities but together with the strong commitment of central and local governments), 2. Finance and Management (from vicious cycle to a virtuous cycle), 3. Measures against Non-Revenue Water (hereinafter, "NRW") (more economical than the cost of new water resource development), 4. Urban Water Service for the Poor, 5. Safe Water and Water Quality, 6. Human Resource Development.

Following this, the 2nd Executive Forum for Enhancing Sustainability of Urban Water Service in Asian Region was held in October 2011 in Tokyo with the theme of "Dialogue and collaboration." The need to resolve the six common issues in the Yokohama Forum Statement adopted at the 1st forum was re-affirmed. The importance of Official Development Assistance (hereinafter, "ODA"), Water Operators Partnerships (hereinafter, "WOPs"), and PPPs, as well as the importance of monitoring the launch and implementation of the activities by the forum participants in their respective countries, were confirmed. In addition, as a follow-up to the 1st forum, three seminars on Urban Water Service Management and Human Resource Development in the Asian Region were held focusing on the improvement of waterworks business management for executives of water utilities in the participating countries during the fiscal year 2010 to 2012. In fiscal year 2010, the program targeted Southeast Asian countries, in fiscal year 2011, South Asian countries, and in fiscal year 2012, water utilities in both regions to develop management personnel.

For the 3rd Executive Forum for Enhancing Sustainability of Urban Water Service in Asian Region held in July 2014, a total of 330 participants were invited including domestic water-services-related participants as well as 31 water utility executives from 12 Asian countries. Discussions were held on topics of high interest, such as raising revenue, maintenance of water supply facilities and procurement of equipment and materials, human resource development, partnerships, and disaster preparedness, and the results were compiled into the "Yokohama Forum Statement 2014."

After this, the 4th Executive Forum for Enhancing Sustainability of Urban Water Service in Asian Region (hereinafter, "4th forum") was held in August 2017, and a total of 281 people from domestic water-services-related participants in addition to 32 water utility executives from 13 Asian countries attended. Active discussions were held in three sessions: "Universal and Equitable Access to safely managed water," "Finance," and "Proactive improvement of enabling environment (Governance)." The results were compiled into the "Yokohama Forum Statement 2017."

Table 1-1 Overview of the past Executive Forums

No.	Date	Invited Countries	Forum Theme
1st	January 20 to January 22, 2010 at Yokohama Symposia and JICA Yokohama International Center	India, Indonesia, Philippines, Sri Lanka, Pakistan, Bangladesh, Cambodia, Thailand, Vietnam (9 countries)	From vicious circle to virtuous circle
2nd	October 1 to 5, 2011 at JICA Ogata Research Institute	India, Indonesia, Cambodia, Thailand, China, Pakistan, Philippines, Vietnam, Laos (9 countries)	Dialogue and collaboration
3rd	July 1 to July 4, 2014 at Yokohama Symposia	India, Indonesia, Cambodia, Thailand, Nepal, Myanmar, Sri Lanka, Bangladesh, Pakistan, Philippines, Vietnam, Laos (12 countries)	Sustainable management of water utilities
4th	August 1 to 4, 2017 at Yokohama Symposia	India, Indonesia, Cambodia, Thailand, Nepal, Myanmar, Sri Lanka, Bangladesh, Pakistan, Philippines, Vietnam, Laos, Timor-Leste (13 countries)	Take action toward the next step –Universal and Equitable Access, Finance, and Governance－

	1st Jan/20-22, 2010	2nd Oct/1-5, 2011	3rd Jul/1-4, 2014
Sessions	I. Policy on urban water supply	I. Policy on urban water supply	I. Raising revenue
	II. Sound management of urban water service	II. Finance and operation	II. “Maintenance of water supply facilities and procurement of equipment and materials
	III. Measures against NRW	III. NRW	III. Human resources development
	Group session (GS)：Urban water service for the poor, Financing Water Supply, Water Tariff System, Safe Water and Water Quality Management	IV. Measures for urban poor	Special session: Preparedness to disaster and continuity of water supply service
	IV. Public and Private Partnership on Urban Water Service, and New Technologies	V. Safe water and quality control	IV. Partnerships
	V. Introduction of JICA’s cooperation in Urban Water Service sector	VI. Human resources development	
	VI. Development of Human Resource in Urban Water Service		

4th: Aug/1-4, 2017		
Sessions	I. Universal and equitable access to safely managed water	1. Water supply development plans and long-term visions
		2. Water supply to low-income households
		3. Service improvement such as 24/7, water quality, and water pressure
	II. Finance	1. Financing from outside of the utility
		2. Cost reduction
		3. Water tariff
	III. Proactive improvement of enabling environment (Governance)	1. Sector governance
		2. Organizational governance
		3. Securing technical levels and human resource development

Source: Edited based on JICA Website and reports of the past Executive Forums

1-2 Objective of the Executive Forum

The Executive Forum invites top management of water utilities and senior government officials in Asian countries to share best practices and exchange opinions among participants, thereby motivating counterparts organization of Japan's ODA, following up their efforts and obtaining effects of enhancing the sustainability of cooperation. In turn, the goal is to increase the number of successful examples of sound water utilities that can provide sustainable water supply services through increased awareness of top management.

1-3 Formulation Process of the Program for the 5th Executive Forum

In planning the 5th Executive Forum, we collected opinions and information about initiatives from everyone concerned beforehand, including the participants, through field surveys, distribution and collection of questionnaires, etc. The program of the 5th Executive Forum was then formulated referring to these opinions as input. We would like to express our appreciation to everyone concerned with the 5th Executive Forum, including the participants, as their cooperation proved to be indispensable.

1-3-1 Implementation of the Field Survey

Prior to the implementation of the 5th Executive Forum, visits were made to five countries (Pakistan, Indonesia, Cambodia, Thailand, and the Philippines) to interview prospective forum participants and gather information. The following is a summary of the field survey.

Through this field survey and discussions, we collected further opinions from participants, selected presentation topics, and identified potential facilitators for group discussions at the 5th Executive Forum.

(1) Pakistan

The following is a summary of the field survey in Pakistan (December 18 - December 26, 2021).

[Member of the Field Survey to Pakistan]
Mr. Toru Tomioka: Japan International Corporation of Welfare Services (hereinafter, "JICWELS"): Project Manager (Director of Safe Drinking Water)
Mr. Takeo Yamaguchi: JICWELS: Assistant manager (CEO of WaterPartnersJP)

Table 1-2 Pakistan field survey itinerary (Actual results)

Date		Period	Contents	Accommodation
Dec. 17	Fri		Mr. Yamaguchi: PCR test at Shinagawa	
Dec. 18	Sat	Day 1	[Transfer] Departure from Narita 22:30 EK319 >	Flying overnight
Dec. 19	Sun	Day 2	> Arrival in Dubai 5:30, departure from Dubai 14:40 EK622 > Arrival in Lahore 18:30	Lahore
Dec. 20	Mon	Day 3	14:00-15:30: Water and Sanitation Agency, Lahore (WASA-L) interview	Lahore
Dec. 21	Tue	Day 4	09:00-14:00: WASA-L field trip [Domestic overland travel] Lahore > Faisalabad	Faisalabad
Dec. 22	Wed	Day5	14:00-15:30: Water and Sanitation Agency, Faisalabad (WASA-F) interview	Faisalabad
Dec. 23	Thu	Day6	09:00-14:00: WASA-F field trip [Domestic overland travel] Faisalabad > Lahore	Lahore
Dec. 24	Fri	Day7	08:00: PCR test (48 hours in advance)	Lahore
Dec. 25	Sat	Day8	AM: Receive the PCR test result [Transfer] Departure from Lahore 20:00 EK623 > Arrival in Dubai 22:30	Flying overnight
Dec. 26	Sun	Day9	Departure from Dubai 2:55 EK318 > Arrival in Narita 17:20 > Mandatory quarantine at the hotel	Mandatory quarantine for 14 days from the next day

(2) Indonesia

The following is a summary of the field survey in Indonesia (January 3 – January 20, 2022).

[Member of the Field Survey to Indonesia]
Mr. Tatsuo Morimoto: JICWELS: Assistant manager (CEO of GIEMONPRO, Ltd.)

Table 1-3 Indonesia field survey itinerary (Actual results)

Date		Period	Contents	Accommodation
Jan. 3	Mon	Day 1	Mr. Morimoto: Osaka > Narita (Railway), PCR test at Narita [Transfer] Departure from Narita 17:55 JAL729 > Arrival in Jakarta 23:55	Jakarta (Designated hotel) 1
Jan. 4	Tue			Jakarta (Designated hotel) 2
Jan. 5	Wed			Jakarta (Designated hotel) 3
Jan. 6	Thu			Jakarta (Designated hotel) 4
Jan. 7	Fri		Chage of the quarantine period from 10	Jakarta

			days*24 hours to 7 days*24 hours	(Designated hotel) 5
Jan. 8	Sat			Jakarta (Designated hotel) 6
Jan. 9	Sun		Completion of quarantine period	Jakarta
Jan. 10	Mon	Day 2	Coordination of interview appointments for Indonesia field survey Online meetings within the consulting team	Jakarta
Jan. 11	Tue	Day 3	Participation in the 7th Preparatory Meeting (08:00 - 12:00) Follow up for the online meeting with Perumda Tirtanadi to the Yokohama Waterworks Bureau Pre-confirmation of PU (Cipta Karya) visit (scheduled for 12th)	Jakarta
Jan. 12	Wed	Day 4	11:00: Directorate General of Human Settlements, Ministry of Public Works and Housing (PU (Cipta Karya))…Change on 11th 16:00: Mr. Subekti interview	Jakarta
Jan. 13	Thu	Day5	10:00: Persatuan Perusahaan Air Minum Seluruh Indonesia (PERPAMSI) interview 13:30: Perumda PAM JAYA interview Antigen test (24 hours in advance)	Jakarta
Jan. 14	Fri	Day6	[Domestic air travel] Departure from Jakarta 8:55 GA126 > Arrival in Jambi 10:20 13:00: Perumda Tirta Mayang Kota Jambi interview (1)	Jambi
Jan. 15	Sat	Day7	09:00: Perumda Tirta Mayang Kota Jambi interview (2)	Jambi
Jan. 16	Sun	Day8	11:00: Antigen test (24 hours in advance) [Domestic air travel] Departure from Jambi 14:45 LION16192 > Arrival in Jakarta 16:10	Jakarta
Jan. 17	Mon	Day9	[Domestic air travel] Departure from Jakarta 7:35 GA182 > Arrival in Medan 10:00 11:00: Perumda Tirtanadi interview (1) 17:00: Antigen test	Medan
Jan. 18	Tue	Day 10	08:30: Perumda Tirtanadi interview (2) and field trip [Domestic air travel] Departure from Medan 16:30 GA121 > Arrival in Jakarta 19:00	Jakarta
Jan. 19	Wed	Day 11	08:00: PCR test (48 hours in advance) 11:00: PU (Cipta Karya) interview 13:00: PT Sarana Multi Infrastruktur (PTSMI) interview (online meeting via zoom) 15:00: Perumda PAM JAYA field trip (hand-washing facilities)	Jakarta
Jan. 20	Thu	Day 12	AM: Receive the PCR test result	Flying

			15:00: JICA Indonesia office [Transfer] Departure from Jakarta 21:35 JAL726 >	overnight
Jan. 21	Fri		> Arrival in Japan 6:45 12:00: rent-a-car > driving to Osaka	Voluntary quarantine for 10 days from the next day > Changed to 7 days

(3) Cambodia

The following is a summary of the field survey in Cambodia (February 8 – March 11, 2022).

[Member of the Field Survey to Cambodia]
Mr. Tatsuo Morimoto: JICWELS: Assistant manager (CEO of GIEMONPRO, Ltd.)

Table 1-4 Cambodia field survey itinerary (Actual results)

Date		Period	Contents	Accommodation
Feb. 8	Tue	Day 1	[Transfer] Mr. Morimoto: Departure from Kansai 23:35 SQ623 >	Flying overnight
Feb. 9	Wed	Day 2	[Transfer] > Arrival in Singapore 5:25, Departure from Singapore 07:40 SQ154 > Arrival in Phnom Penh 8:35 14:00: JICA Cambodia office	Phnom Pehn
Feb. 10	Thu	Day 3	09:00: Ministry of Industry, Science, Technology & Innovation (MISTI) courtesy call (Interview changed to 15th) [Domestic overland travel] Phnom Penh > Siem Reap (6 hours by car)	Siem Reap
Feb. 11	Fri	Day 4	09:00: Siem Reap Water Supply Authority (SRWSA) interview and field trip	Siem Reap
Feb. 12	Sat	Day5	08:00: SRWSA field trip	Siem Reap
Feb. 13	Sun	Day6	[Domestic overland travel] Siem Reap > Phnom Penh (6 hours by car)	Phnom Pehn
Feb. 14	Mon	Day7	09:00: Phnom Penh Water Supply Authority (PPWSA) interview and field trip	Phnom Pehn
Feb. 15	Tue	Day8	08:00: PCR test 10:00: JICA Cambodia office 14:00: MISTI interview	Phnom Pehn
Feb. 16 – Mar. 9	Wed		Quarantine at the hotel in Phnom Penh (22 days)	Phnom Pehn
Mar. 10	Thu	Day9	Preparation before returning to Japan, organization of information, etc.	Phnom Pehn
Mar. 11	Fri	Day 10	[Transfer] Departure from Phnom Penh > Arrival in Kansai	

(4) Thailand

The following is a summary of the field survey in Thailand (March 13 – March 13, 2022).

[Member of the Field Survey to Thailand]
Mr. Toru Tomioka: JICWELS: Project Manager (Director of Safe Drinking Water)

Table 1-5 Thailand field survey itinerary (Actual results)

Date		Period	Contents	Accommodation
Mar. 12	Sat		Mr. Tomioka: PCR test at Narita Airport	Narita
Mar. 13	Sun	Day 1	[Transfer] Departure from Narita 11:45 TG643 > Arrival in Bangkok 17:05	Bangkok Designated hotel
Mar. 14	Mon	Day 2	Quarantine period	Bangkok
Mar. 15	Tue	Day 3	09:00: Provincial Waterworks Authority (PWA) interview and field trip (Changed to online interview)	Bangkok
Mar. 16	Wed	Day 4	08:00: PCR test at Bumrungrad International Hospital 10:00: Metropolitan Waterworks Authority (MWA) interview and field trip	Bangkok
Mar. 17	Thu	Day5	09:00: Thai Waterworks Association (TWWA) interview (Cancelled) 13:00: JICA Thailand office Receive the PCR test result [Transfer] Departure from Bangkok 23:55 TG642 >	Flying overnight
Mar. 18	Fri	Day6	[Transfer] Arrival in Narita 7:40	

(5) Philippines

The following is a summary of the field survey in Philippines (April 4 – April 13, 2022).

[Member of the Field Survey to Philippines]
Mr. Toru Tomioka: JICWELS: Project Manager (Director of Safe Drinking Water)
Mr. Tatsuo Morimoto: JICWELS: Assistant manager (CEO of GIEMONPRO, Ltd.)

Table 1-6 Philippines field survey itinerary (Actual results)

Date		Period	Contents	Accommodation
Apr. 3	Sun		Mr. Tomioka and Mr. Morimoto: PCR test	
Apr. 4	Mon	Day 1	[Transfer] Mr. Tomioka: Departure from Haneda 15:05 PR421 > Arrival in Manila 19:10, Mr. Morimoto: Departure from Kansai 15:10 PR411 > Arrival in Manila 18:25	Manila
Apr. 5	Tue	Day 2	09:00: Manila Water Company, Inc. interview and field trip 16:00: JICA Philippines office	Manila
Apr. 6	Wed	Day 3	09:00: Maynilad Water Services, Inc. interview *Field trip on April 11th 15:00: Philippine Water Works Association, Inc. (PWWA) interview *The executives of Angeles City Water District, Morong Water District, Bayawan Water District also participated in the interview.	Manila

Apr. 7	Thu	Day 4	[Domestic air travel] Departure from Manila 10:15 PR1813 > Arrival in Davao 12:10 15:00: Davao City Water District interview	Davao
Apr. 8	Fri	Day5	09:00: Davao City Water District field trip	Davao
Apr. 9	Sat	Day6	[Domestic air travel] Departure from Davao 15:40 PR1816 > Arrival in Manila 17:35	Manila
Apr. 10	Sun	Day7	Data organization, preparation for subsequent schedule	Manila
Apr. 11	Mon	Day8	08:00: Receive PCR test result at hotel 10:00: Maynilad Water Services, Inc. field trip 14:00: Metropolitan Cebu Water District (MCWD) online interview (Cancelled) (Evening: Return lent cell phone to JICA office, receive PCR test results by e-mail)	Manila
Apr. 12	Tue	Day9	09:00: Online participation in the 9th Preparatory Meeting	Manila
Apr. 13	Wed	Day 10	[Transfer] Mr. Tomioka: Departure from Manila 06:40 PR428 > Arrival in Narita 12:10, Mr. Morimoto: Departure from Manila 09:05 PR412 > Arrival in Kansai 14:15	
Apr. 14	Thu			

*The online interview with the Metropolitan Cebu Water District scheduled for April 11 was cancelled and rescheduled for April 19 at 9:00 a.m. (Philippine time).

1-3-2 Distribution and Collection of Questionnaires

A questionnaire was sent to all participating organizations and responses were collected, mainly for the purpose of checking the progress of efforts since the 4th forum and to identify topics for presentation at the 5th Executive Forum. The questionnaire was distributed to 30 organizations from 11 countries, and responses were finally received from 28 organizations from 11 countries (response rate = 93%).

The questionnaire was divided into three parts: the first part asked about information related to the Utility Profile (hereinafter, "UP"), which is basic information on water utilities; the second part asked about the progress of initiatives since the 4th forum (for organizations that participated in the 4th forum only); and the third part asked about the current status, issues, initiatives and future plans of each organization related to the theme and sub-themes of the 5th Executive Forum. The question items were as follows.

Table 1-7 Question items of the questionnaire

Contents		Question Items	Organization to be questioned
Part 1	Utility Profile	・ Performance Indicators (PIs) ・ Basic information ・ Financial information ・ Water tariff information ・ Information related to the other Donor's Projects ・ Information related to cooperation between utilities ・ Contact information	Basically, asked water utilities only

		・ Organization chart ・ Major water purification plant	
Part 2	Progress from the 4th Executive Forum	・ Progress made on each of the 10 items of the Yokohama Statement 2017, and specific details of progress	Basically, asked organizations participated in the 4th Executive Forum only
Part 3	Current status, issues, initiatives, and future plans of each organization related to the 5th Executive Forum's theme and sub-themes	・ Business Continuity Plan (hereinafter, "BCP"), employee protection ・ Digitalization ・ Human resource development ・ Funding (Subsidies, long-term funding, BOT, etc.) ・ Sound business management ・ Appropriate water tariff (Appropriate tariff levels, water tariff revision, cross-subsidies) ・ Financial liquidity (Retained earnings, water tariff collection, external financial support) ・ Risks (Infectious diseases, climate change, aging) ・ Importance of water supply as a measure against infectious diseases ・ Consideration for the low-income households ・ Cooperation ・ Information exchange ・ Personnel interaction	Basically, asked all the organizations (Water utilities and central governments)
		[Questionnaire regarding governance] ・ National goals and plans ・ Water-supply-related legislation ・ Segregation of urban and rural water supply, etc.	Basically, asked central government only

1-3-3 Holding of Secretariat Meetings

A secretariat was formed by the advisor, JICA, and the Yokohama Waterworks Bureau to formulate and prepare the program for the 5th Executive Forum. The secretariat held Secretariat Meetings once every one to two months to share the information gathered by each party, discuss the program, and prepare for the 5th Executive Forum. The following is the schedule of the Secretariat Meetings and their participants.

Table 1-8 Schedule of the Secretariat Meetings

No.	Date	Participants
No. 1	Apr. 3, 2020	Advisor, JICA, Yokohama Waterworks Bureau
No. 2	Dec. 23, 2020	Advisor, JICA, Yokohama Waterworks Bureau
No. 3	Feb. 22, 2021	Advisor, JICA, Yokohama Waterworks Bureau
No. 4	Sep. 22, 2021	Advisor, JICA, Yokohama Waterworks Bureau, Consultant (JICWELS)
No. 5	Oct. 27, 2021	Advisor, JICA, Yokohama Waterworks Bureau, Consultant (JICWELS)

No. 6	Dec. 1, 2021	Advisor, JICA, Yokohama Waterworks Bureau, Consultant (JICWELS)
No. 7	Jan. 11, 2022	Advisor, JICA, Yokohama Waterworks Bureau, Consultant (JICWELS)
No. 8	Feb. 24, 2022	Advisor, JICA, Yokohama Waterworks Bureau, Consultant (JICWELS)
No. 9	Apr. 12, 2022	Advisor, JICA, Yokohama Waterworks Bureau, Consultant (JICWELS)
No. 10	Sep. 1, 2022	Advisor, JICA, Yokohama Waterworks Bureau, Consultant (JICWELS)
No. 11	Dec. 5, 2022	Advisor, JICA, Yokohama Waterworks Bureau, Consultant (JICWELS)
No. 12	Feb. 2, 2023	Advisor, JICA, Yokohama Waterworks Bureau, Consultant (JICWELS)
No. 13	Apr. 13, 2023	Advisor, JICA, Yokohama Waterworks Bureau, Consultant (JICWELS)
No. 14	May 30, 2023	Advisor, JICA, Yokohama Waterworks Bureau, Consultant (JICWELS)
No. 15	Jun. 29, 2023	Advisor, JICA, Yokohama Waterworks Bureau, Consultant (JICWELS)
No. 16	Jul. 24, 2023	Advisor, JICA, Yokohama Waterworks Bureau, Consultant (JICWELS), JICA task support unit
No. 17	Aug. 9, 2023	Advisor, JICA, Yokohama Waterworks Bureau, Consultant (JICWELS), JICA task support unit

Table 1-9 Participants list of Secretariat Meetings

Organization		Name of participant (Honorifics omitted)
Representative of WaQuAC-Net Former JICA Senior Advisor		Keiko Yamamoto
JICA	Global Environment Department	Matsumoto, Inoue*, Miyagawa, Higo*, Uno, Kakegawa, Mori, Kubota
	JICA Yokohama International Center	Kamiya*, Abe*, Nishinoiri, Isobe
	Task support unit	Okumura, Koyama, etc.
Yokohama Waterworks Bureau		Shimoda*, Koyahata, Utsugi, Yonezawa*, Kuniyasu, Tanaka*, (Komiya), Takagi*, Miyazawa, Ueno
JICWELS (Consultant)		Tomioka, Morimoto, Yamaguchi, Miwa, Fujiwara, Imajyo, Yaguchi*, Owada, Isohata, Ochiai

*Shaded participants are those who participated up to the middle of the preparation of the forum due to transfer, retirement, or other reasons.

1-4 Overview of the 5th Executive Forum

1-4-1 Participants

As shown below, a total of 495 participants (for three days excluding the Day 3 technical tour) from overseas and Japan attended the event.

・ Overseas:
  - 28 delegates (Executive officials of 28 water utilities, related ministries and agencies) from 10 countries in total, consisting of Bangladesh (2 delegates), Cambodia (3 delegates), Indonesia (4 delegates), Laos (4 delegates), Nepal (2 delegates), Pakistan (2 delegates), Philippines (3 delegates), Sri Lanka (2 delegates), Thailand (2 delegates), Vietnam (4 delegates) and their accompanying persons participated. (A list of invited participants is available in "11-1 Invited Participants List.")

Table 1-10 List of Overseas Invited Organizations

Country Name		Organization Name (English: Official name) *Abbreviations in parentheses are used in this report hereafter.
Bangladesh	1	Dhaka Water Supply and Sewerage Authority (DWASA)
	2	Chattogram Water Supply and Sewerage Authority (CWASA)
Cambodia	3	General Department of Potable Water (GD/WAT), Ministry of Industry, Science, Technology & Innovation (MISTI)
	4	Phnom Penh Water Supply Authority (PPWSA)
	5	Siem Reap Water Supply Authority (SRWSA)
Indonesia	6	Ministry of Public Works and Housing, Directorate General of Human Settlements (PU (Cipta Karya))
	7	Perumda PAM JAYA (Same as described in the left)
	8	Perumda Tirtanadi (Same as described in the left)
	9	Perumda Tirta Mayang Kota Jambi (Perumda Jambi)
Laos	10	Department of Water Supply, Ministry of Public Works and Transport (DWS)
	11	Vientiane Capital Water Supply State Enterprise (NPNL)
	12	Luang Prabang Water Supply State Enterprise (NPLP)
	13	Khammouane Water Supply State Enterprise (NPKM)
Nepal	14	Ministry of Water Supply (MoWS)
	15	Kathmandu Upatyaka Kahanepani Limited (KUKL)
Pakistan	16	Water and Sanitation Agency, Lahore (WASA-L)
	17	Water and Sanitation Agency, Faisalabad (WASA-F)
Philippines	18	Manila Water Company, Inc. (Manila Water)
	19	Maynilad Water Services, Inc. (Maynilad)
	20	Metropolitan Cebu Water District (MCWD)
Sri Lanka	21	Ministry of Water Supply and Estate Infrastructure Development (MWSEID)
	22	National Water Supply and Drainage Board (NWSDB)
Thailand	23	Metropolitan Waterworks Authority (MWA)
	24	Provincial Waterworks Authority (PWA)
Vietnam	25	Saigon Water Corporation (SAWACO)
	26	Binh Duong Water-Environment Corporation- Joint Stock Company (BIWASE)
	27	Thua Thien Hue Water Supply Joint Stock Company (HueWACO)
	28	Da Nang Water Supply Joint Stock Company (DAWACO)

  - In addition to the above invitation, H.E. Ek Sonn Chan, Minister Attached to the Prime Minister of Kingdom of Cambodia and Vice Chairman of Council for Agriculture and Rural Development, also Former Director General of PPWSA, was invited from Cambodia as a special advisor for the 5th Executive Forum.

・ Japan (Domestic): Ministry of Health, Labor and Welfare, local governments (including Yokohama City), private companies, JICA, and others (A list of participated organizations is

available in “11-2 Presenters, Facilitators, and Participants from Japan.”)
・ Online participation: Development Bank of the Philippines (hereinafter, “DBP”)

1-4-2 Data and Venue

・ August 22 (Tuesday), August 23 (Wednesday), August 25 (Friday), 2023: 5th Executive Forum Program at the venue of Yokohama Symposia
・ August 24 (Thursday), 2023: Technical tour

1-4-3 Theme

The overall theme of the 5th Executive Forum is “Co-creating resilient and sustainable water supply service from Asia.”

Water utilities have the noble mission of supplying safe, fair, and affordable water that supports the lives of each individual and society as a whole, as well as the economy. Looking at the environment surrounding water utilities, there is a need to respond to changing risks such as climate change, environmental degradation, population change (urban concentration and depopulation), and changes in industrial structure, while opportunities such as digital technology and the use of private capital are also changing. The COVID-19 pandemic has once again highlighted the importance of providing a continuous supply of safe water while also revealing the importance of preparing for shocks and risks from the external environment by creating resilient waterworks. In this era of rapid change, in order to expand waterworks operations and provide water services sustainably, it is necessary to become a growing water utility that can respond to change, meet social and economic demands, and continually raise funds and train human resources. To this end, it is important to connect people involved in the waterworks industry, who are taking on various challenges, to learn from each other, and to co-create solutions. The 5th Executive Forum will serve as a forum for such co-creation, connecting people involved in waterworks in various parts of Asia, with the aim of creating an impact expansion that will make Asian waterworks more sustainable and resilient.

Table 1-11 Overall theme and session themes of the 5th Executive Forum

Overall Theme	
Co-creating resilient and sustainable water supply service from Asia	
Session Theme	Aim of each Session
Session 1 “Towards Water Utilities Resilient to Risk and Change”	・ The mission of water supply services is to continue to serve citizens as an infrastructure that supports society and the economy. ・ It has always been important to increase resilience to cope with various risks, such as responding to environmental changes, including climate change and deterioration of raw water quality, and preparing for disasters. The newly experienced COVID-19 pandemic, faced with the unavailability of employees to come to work and reduced water rate revenues due to decreased tourism and water rate exemptions, has heightened the awareness of the need to ensure resilience for service continuity. ・ The session aims to provide an opportunity for participants to share their own efforts in dealing with various risks and in ensuring business continuity, and to consider actions to be taken by their own organizations against various risks, not limited to COVID-19, in the future.
Session 2 “Towards	・ The realization of a positive cycle of improving water supply services -> increasing customer satisfaction -> getting the support of citizens

Achieving SDGs Goal 6”	and politicians to keep prices at a proper level -> creating more room for investment or mobilizing more funds, is the key to water utilities being able to meet the diversity and inclusiveness which Sustainable Development Goals (hereinafter, “SDGs”) aims for, and to meet the social and economic needs. ・ The session aims to provide an opportunity for executives to learn about the initiatives of other countries and draw a viable future plan with application to their own countries.
Session 3 “Collaboration and Co-Creation”	・ The session aims to share the concept* that it is important to implement what was discussed in Session 1 and 2 not solely by the water utilities themselves but also through collaboration with a variety of partners. *This concept is not limited to international cooperation but also includes collaboration between urban and rural areas in the same country. Furthermore, it also includes the concept of collective mobilization of funds (private and public funds).

1-4-4 Outline of the Schedule

Session 1, 2, and 3 were held on Day 1, 2, and 4 of the 5th Executive Forum, respectively, and a technical tour on Day 3. Each session consisted of presentations (from domestic and overseas water utilities and relevant ministries, etc.), group discussions (conducted by dividing participants into three groups), and feedback (presentations from each group, comments from Professor. Satoshi Takizawa, Professor, Department of Urban Engineering, Graduate School of Engineering, the University of Tokyo and H.E. Ek Sonn Chan).

The overall schedule of the 5th Executive Forum is shown below.

Table 1-12 Overall schedule of the 5th Executive Forum

Date	Overview
Day 1 Tuesday, August 22 Session 1	[AM] ・ Opening remarks, photo session ・ Keynote Speech 1 ・ Keynote Speech 2 ・ Program Orientation ・ Session 1 Presentation (3 presentations)
	[PM] ・ Business Session (2 companies) ・ Session 1 Presentation (3 presentations) ・ Session 1 Group Discussion ・ Session 1 Feedback
	[Evening] ・ Welcome Reception
Day 2 Wednesday, August 23 Session 2	[AM] ・ Summary of Day 1 ・ Session 2 Presentation (9 presentations)
	[PM] ・ Business Session (3 companies) ・ Session 2 Group Discussion ・ Session 2 Feedback
Day 3 Thursday, August 24	[Full day] ・ Technical Tour
Day 4	[AM]

Friday, August 25 Session 3	・ Summary of Day 2 & Day 3 ・ Session 3 Presentation (5 presentations) ・ Session 3 Group Discussion ・ Summarizing Each Country's Action Plan and Preparing for Presentation
	[PM] ・ Summary Session ・ Closing Remarks

*The presentation by DBP on Day 2 and the presentation from Perumda Tirtanadi on Day 4 were conducted in the form of pre-recorded video broadcasts.

1-4-5 Exhibition by Private Companies

At the venue, there were exhibits held by members of the Yokohama Water Business Association. Yokohama Water Business Association was established by the City of Yokohama, private local companies, and organizations in Yokohama City, in order to solve water environment problems in developing countries as well as promote overseas marketing for water supply and sewer-related companies and organizations. The exhibitors in the 5th Executive Forum are as follows.

ShinMaywa Industries, Ltd.
Nihon Genryo Co., Ltd.
JFE Engineering Corporation
Marubeni Corporation
Yokohama Water Co., Ltd.
TOKYO KEIKI INC.
Aichi Tokei Denki Co., Ltd.
Maezawa Industries, Inc.
Suidou Technical Service Co., Ltd.

Figure 1-2 Explanation at the exhibition booth (1)

Figure 1-3 Explanation at the exhibition booth (2)

Figure 1-4 Explanation at the exhibition booth (3)

Chapter 2 Opening Remarks

2-1 Ms. Tomoko Okubo, Deputy Mayor of City of Yokohama

The first opening remarks were given by Ms. Tomoko Okubo, Deputy Mayor of City of Yokohama.

Figure 2-1 Opening remarks by Ms. Tomoko Okubo

[Contents]

Everyone attending the 5th Executive Forum, welcome to Yokohama. I wholeheartedly welcome your visit. I would also like to express our gratitude to everyone who has contributed to the event.

This forum has been held since 2010 for the purpose of sharing the knowledge and know-how of water supply service among executives of water utilities in the Asian region to demonstrate leadership in their respective countries, and to provide sustainable water supply services. We are very pleased to host the 5th Executive Forum here in Yokohama, the first forum in 6 years since the 4th forum in 2017.

I will briefly introduce the international contribution of Yokohama. Since the opening of the port in 1859, Yokohama has been developing through exchanges and cooperation with foreign countries and cities for about 160 years. The basic policy of the city is to promote international cooperation and contribution, and we are holding international conferences and promoting inter-city collaboration and cooperation. Some of the participating countries this time include cooperating cities in various fields such as water supply, sewerage, and environment, sister cities, friendship cities, and partner cities. International contributions in the field of water supply have reached a milestone of 50 years this year. Since its dispatch of personnel to Afghanistan in 1973, Yokohama City has dispatched 460 personnel to 34 countries and accepted over 4,300 trainees from 137 countries. It is a great pleasure for Yokohama City to be able to contribute to the improvement of the water situation in the world, and I believe that we have obtained irreplaceable results such as the training of employees and the establishment of networks with overseas countries.

Next, I will talk about expectations for this forum. The UN Water Conference was held in March this year to achieve the SDGs Goals amid the global water crisis caused by climate change and conflicts, and the Water Action Agenda was adopted, incorporating more than 700 commitments from participating governments and companies. As interest in the world's water continues to grow, I believe it is very timely and meaningful for those who have various knowledge and technologies related to water to engage in discussions here in Yokohama under the theme "Co-creating Resilient and Sustainable Water Supply Service from Asia" in order to resolve issues in the water situation of each country.

In addition, eight member companies of the Yokohama Water Business Association are exhibiting in the venue. Yokohama City hopes that local companies will contribute to solving problems overseas and that they will be able to collaborate with your country and water utilities as a business. The technologies that Yokohama City can confidently recommend are introduced, so please take a look.

Lastly, I would like to express my gratitude once again to all participating countries, domestic water utilities, companies, and Japanese officials who have cooperated in many ways. I would like to close my opening remarks by wishing you a fulfilling stay in Yokohama. Thank you very much.

2-2 Mr. Eiji Iwasaki, Vice President of JICA

Next, Mr. Eiji Iwasaki, Vice President of JICA gave his opening remarks.

Figure 2-2 Opening remarks by Mr. Eiji Iwasaki

[Contents]

Thank you for attending the 5th Executive Forum. I would also like to express our gratitude to the co-organizer of this forum, Yokohama City, those giving support as moderators, presenters, facilitators, others who have contributed to the preparation and management of this forum, and all those involved in this forum.

Yokohama City was the first place in Japan to build a modern water supply system and plays an important role in international cooperation. Since 1973, the Yokohama Waterworks Bureau has been working to solve water problems in developing countries in Asia and Africa, using technologies and experiences that have been cultivated over its 135-year history, and 2023 marks the 50th year since such efforts started.

JICA has signed a comprehensive cooperation agreement with Yokohama City and has cooperated in a variety of fields, including water supply. This forum, co-hosted by JICA and Yokohama City, is one of the results. The Yokohama Forum Statement 2017 of the previous 4th forum promised to take the next step towards universal and equitable water supply as a Water Family so that all people have access to safe, sustainable, and affordable drinking water, based on the sharing of experiences and discussions at the forum. Since then, COVID-19 has raged around the world, affecting the management of water utilities, including those in Japan. The 4th Asia-Pacific Water Summit held last year in Kumamoto City confirmed that the water sector would be more important than ever to achieve a high-quality society that can withstand the threat of COVID-19 and climate change. In addition, there have been changes in the situation surrounding water services, such as the progress of PPPs in various countries and the progress of South-South cooperation in Asia. As a result, the importance of co-creation, in which Asian countries further strengthen their mutual cooperation and share the knowledge of each country in a timelier manner

to apply it to the development of water supply services in Asia, has increased.

Based on these circumstances, at the 5th Executive Forum, under the overall theme of "Co-creating Resilient and Sustainable Water Supply Service from Asia," we will discuss water supply services that are resilient to various risks and changes such as infectious diseases and climate change in session 1, expansion of water supply services toward achieving SDGs Goal 6 in session 2, and collaboration and co-creation in session 3.

I would like to share with you the three things that I expect to achieve from these discussions. First, I hope that the executives of water utilities and policymakers who gather here will be inspired by each other through active discussions and will return home with concrete ideas for the next steps. Leadership and commitment from senior management and managers of water utilities are important to achieve sustainable management with high resilience even in a discontinuous future marked by problems such as climate change and infectious diseases. I hope that you will use this forum to gain useful knowledge and experience and bring it back to your organization for practice.

Second, I hope that you will use this forum as an opportunity to build new networks and strengthen existing partnerships. Leaders of about 30 water utilities and ministries from 10 Asian countries that cooperate with JICA have gathered here. In addition, many Japanese water utilities, relevant ministries and agencies, private companies, and related organizations have also participated. Some of these organizations are already in contact with each other, sharing their experiences and challenges, and learning from each other. It is important to take advantage of lessons learned from the experiences of other organizations to gain new ideas and to work together to come up with improvements and implement them in collaboration. Expanding your network with other organizations is a great benefit for both organizations. I hope you will take advantage of this valuable opportunity to expand your network.

Third, I hope that you will use this opportunity to reaffirm Japan's water supply operations and technology, and ties with Japan. Those of you from Asian countries are from organizations that have already had some form of relationship with Japan and cooperative ties with JICA. I expect that you have many new findings during your stay. There is a steady supply of drinkable water from taps 24 hours a day, 365 days a year across Japan. This time, we offer experience sharing from several water utilities, and exhibitions and business sessions organized by private companies. I very much hope that you contemplate what supports the water supply in Japan from this series of activities and reflect on the Japanese society behind them. JICA intends to make the most of its network, know-how, and financial resources to contribute to the achievement of SDGs Goal 6 in Asian countries, particularly to the realization of resilient and sustainable water supply services.

In closing, I would like to express my gratitude for the opportunity to attend a milestone of the 5th Executive Forum with you and also hope that it will be a meaningful forum for all those who participate in the four-day sessions starting today.

Chapter 3 Keynote Speech

3-1 Keynote Speech 1 “Leadership Required in the Water Supply Sector in a Changing World”

Keynote speech 1 was delivered by H.E. Ek Sonn Chan, Minister Attached to the Prime Minister and Vice-Chairman of Council for Agriculture and Rural Development in addition to Former Director General of PPWSA.

Figure 3-1 Keynote speech by H.E. Ek Sonn Chan

[Contents]

As you may be aware, we are living in a world that changed in the most dangerous way ever. The world is vulnerable to new infectious diseases with huge loss of lives. With the economic crisis, millions of families are under the poverty line. Climate change, which is the biggest concern of our future generations, is neglected by some world leaders and it has caused the world to experience unprecedented flood, drought, and water scarcity that halts the world’s effort to provide universal access to clean water and basic sanitation in 2030. In such situations, the war between the two countries has dragged the world into economic crisis, divisions, confrontations, and repeated threats of nuclear war that are going to terminate our world forever. Please allow me to bring you back some memories that the world has spent its time and efforts to make this world a better place for all.

In 2000 September, 170 world leaders gathered and endorsed a program that they called the Millennium Development Goals (hereinafter “MDGs”). Related to water, Target 7C is to reduce by half the number of people without sustainable access to safe drinking water and basic sanitation. Since then, with the strong commitment of world leaders, great progress has been made in Asia by significantly achieving the MDGs for water in 2015. Worldwide, 2.1 billion people have gained access to improved sanitation, and the proportion of people practicing open defecation was reduced by half. That was a very great progress in MDGs. However, the focus of the MDGs is on quantity, not on quality, and it is not really concerned about water supply infrastructure or how to provide water with acceptable quality. As such, the MDG is just the starting point.

And in 2015, world leaders again endorsed a program, what they call, SDGs. As a socially conscious person, you'll likely share the dream of a world where everyone has access to clean water and basic sanitation. I have that dream for my country, but we are still struggling.

Goal 6 is composed of six components. And mostly here, we can talk about target 6-1, which is drinking water. Two keywords over there are “affordable” and “safe.” About the other components, if you love to discuss them, probably we can talk during the group discussion. The starting point of the SDGs is 2015. There are United Nations International Children's Emergency Fund (UNICEF) and World Health Organization (hereinafter, “WHO”) Joint Monitoring

Programme (hereinafter, "JMP") which are following the move of the SDGs very strictly, especially on water and sanitation. They found out that at the entry points of the SDGs in 2015, 2.1 billion people in the world lacked safe water at home. Among them, 263 million people spent more than 30 minutes per round trip to collect water. If you are living in the city, especially in Japan, you never know how difficult the life of the woman and children would be taking care of water for their family. I understand very clearly this issue. 159 million people drink water directly from surface water such as streams or lakes where we never wash our hands. 844 million people have no drinking water facilities at their homes. We would like to ask our men and women how important our mandate is.

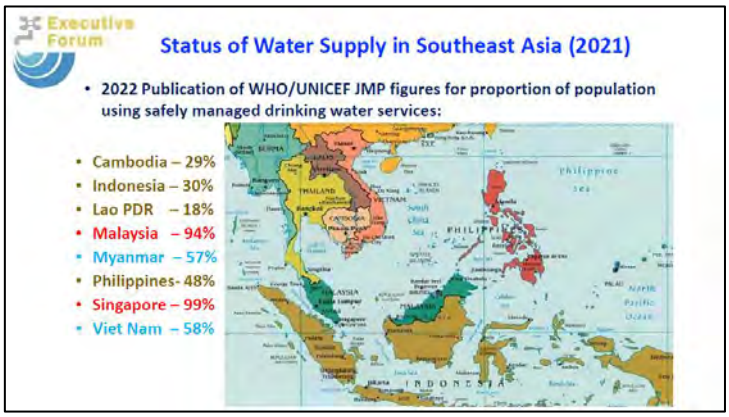


Figure 3-2 [Keynote speech 1] Status of water supply in Southeast Asia

Figure 3-2 shows the status of water supply in Southeast Asia based on the 2022 JMP publication. The figure for the proportion of the population using safely, managed drinking water services is 29% in Cambodia. You will have a question about why we just have achieved 29%. 71% still needs to improve. The number is 30% in Indonesia, 18% in Laos, 94% in Malaysia, 57% in Myanmar, 48% in Philippines, 99% in Singapore, and 58% in Vietnam. These figures are from 2021 but published in 2022. The latest estimate from the JMP report found that 27% of people around the world lack access to safely managed drinking water. For East and Southeast Asia which includes 14 countries, the figure is 21%. If the progress speed continues the same, we just reach only 77% in 2030, regarding the rate of people who can access safely managed drinking water. Because our world today is so complicated that efforts in achieving the SDGs are needed. The acceleration of the progress speed needs to be 6 times. I do not think we are able to do it. My personal opinion is that it's going to take at least five years longer by 2035. Cambodia already declared that we are not able to achieve the SDGs on time. It would need the condition in which all of our stakeholders related to the water sector and sanitation sector stop their selfishness and provide a big hand, and Japan provides great efforts and support to developing countries.

As a water man with 30 years of working in the water sector continually from 1993 up to today, please allow me to share with you some of my personal experiences and leadership.

Practically, irrespective of the number of investments in finance and in people, how the water utility is governed and managed is critical to its success and failure. There are critical elements needed to promote a good water utility; Leader being innovative, committed and having ownership, sound business management, and full administrative and financial autonomy. These combined, allow the potential for transparency, good future planning, efficiency of operations, sustainability, and inclusivity. These were fundamental building blocks for the success of Phnom Penh Water Supply Authority (PPWSA). PPWSA has changed from bankruptcy to one of the best water utilities in the region. Their elements have been used to plan and influence the improvement of public provincial waterworks across Cambodia.

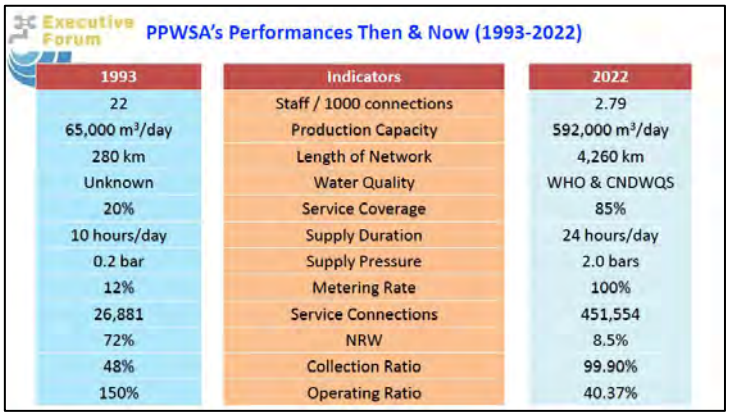


Figure 3-3 [Keynote speech 1] PPWSA's performances then & now (1993-2022)

Figure 3-3 shows the change in performance indicators of PPWSA. Through these indicators, you can see that PPWSA has changed dramatically. Especially, the water coverage has increased from 20% to 85%. Once, we reached 95%. But why it has come down to 85%? It is because the city of Phnom Penh is getting bigger and bigger and the government has decided to extend the service of Phnom Penh more than 10 times bigger than the value of 1999. To increase the water supply from 20% to 85%, of course, there needs to be investments. But the important thing is to reduce water losses. Our NRW rate was 72% in 1993, and we reached currently 8.5%. The collection ratio was 48% in 1993, which rose to 99.9% in 2022. This means that everyone pays the water bill.

We had 11 provincial waterworks in 2012. The size of them is just one by seven of Phnom Penh. Even so, the performances of those waterworks were still very low. At that time, I had been in the Ministry since 2012 and we started programs in order to help the improvements in operation efficiency of those provincial waterworks. With the support from the expert from JICA, we worked on institutional capacity building. It was primarily run by the Kitakyushu City Water and Sewer Bureau with support from PPWSA experts. By using PPWSA's experience, we have gone around for three years, and the number has changed completely. The water tariff has not changed but the profit has increased from 2012 to 2015.

Based on my long-term experience in the water sector, please allow me to make a call for action. The COVID-19 pandemic, ongoing political issues, and the increasing impact of climate change have severely affected the under-investments in general in the water supply sector and thwarted the progress towards SDGs. As leaders of our region, of water utilities, and of government bodies, we need to embrace and expedite the changes needed to: 1) Improve utility performance and water supply coverage, 2) Improve affordability and inclusivity, 3) Increase efficiency and transparency, and 4) Ensure sustainability and achieve SDGs. Water is our most precious resource and essential for all lives and activities, whether rich or poor. Some people say people can live without love, but they can't live without water. Based on the trend of the world today, I strongly believe, and you might probably agree with me that the 19th century was the century of yellow gold, the 20th century was the century of black gold, and our current century onwards is and will be the century of blue gold. Therefore, I strongly encourage you to share your thoughts and experiences and work together to make this forum meaningful and influence change.

Before ending my speech, I give you two tips. The first tip is from the Climate Economy report of 2023. They find out that the water supply and sanitation system that withstand climate change can save 360,000 infants every year. If we work effectively, we will be part of that humanitarian activity. Second, I appreciate the great man, Soichiro Honda, the father of the Honda manufacturer. His diamond word is, "Don't fear failure. Fear doing nothing." He said, "Success is 99 percent failure." With that, I wish all of you a happy and fruitful journey in Yokohama.

3-2 Keynote Speech 2 “Learning together towards resilient and sustainable water supply services”

Keynote speech 2 was delivered by Dr. Shigeyuki Matsumoto, JICA Global Environment Department.

Figure 3-4 Keynote speech by Dr. Shigeyuki Matsumoto

[Contents]

My keynote on behalf of JICA is about the pursuit, and purpose of the executive forum which is to learn from each other. JICA held a similar executive forum in Africa in March this year. At that time, the host of the forum from the Republic of South Africa introduced this phrase. “Each one, teach one.” According to him, this was a slogan used by the famous Nobel Prize laureate Nelson Mandela. They emphasize the importance of having a common purpose and learning from each other. The participants of the African Executive Forum repeatedly quoted this phrase, “Each one, teach one” and brought back what they learned from each other as key takeaways. Even after the forum, they continued to organize online meetings to share their actions and achievements.

And we're gathering for the 5th Asian Executive Forum. In the past Asian Forums, we have cherished the phrase “Water Family.” The Yokohama Forum Declaration, adopted at the previous fourth forum in 2017, states “All delegates committed to take action as Water Family towards the next step for universal and equitable access to safe, sustainable and affordable water for all.” This phrase, “Water Family” is commonly used by Japanese water utilities as an expression of strong solidarity. The sense of Water Family is especially strong in terms of emergency.

Japan is a disaster-prone country, so floods and earthquakes occur frequently. At that time, water utilities in Japan in surrounding areas, rushed to the affected water utilities with water trucks and tools to help with emergency water supply and restoration work. The awareness that water utilities are friends and help each other is pervasive. This executive forum is a gathering of Water Family members who help each other across national borders.

All of us in the Water Family have a common goal to provide people with safe, affordable, and stable drinking water. A better water supply will eliminate poverty and inequality, improve people's health, and enhance people's well-being. Water utilities must be resilient and sustainable able to respond to various changes and risks.

All of us gathered here today are like-minded members of the Water Family who are collectively striving to achieve our common goals here. And JICA supports learning, among the utilities, in various ways. For example, from African countries, South Sudan, the Minister of Water Resources and Irrigation and managing director of South Sudan's Urban Water Corporation visited Phnom Penh. They were very impressed by the remarkable reform of the PPWSA, as explained by His Excellency Ek Sonn Chan just before. And they also gave him the lecture by His Excellency Ek Sonn Chan, and His Excellency Long Naro. South Sudan is in the process of

reconstruction after independence and conflict, so they got a strong feeling that the difficult situation is the same as the situation of Cambodia immediately after the civil war, when PPWSA started its reforms. The delegation from South Sudan was convinced that they were capable of the same reforms as Phnom Penh. As soon as they returned to their home country, they created their own reform action agenda, and this year, a new water treatment plant was completed in the capital city of Juba with JICA's cooperation. South Sudan Urban Water Corporation is now working very hard to improve its water services in accordance with the Reform Action Plan aiming at reproducing the miracle of Phnom Penh. Let me introduce another example from Asia. Water professionals in Yangon, Myanmar studied in Phenom Penh and Bangkok with the kind help of PPWSA and Metropolitan Waterworks Authority (MWA). They were so impressed that upon their return they constructed a training center with their own funds and started training in earnest. Unfortunately, they have been facing political difficulties right now, so we couldn't invite them to this Executive Forum. But I believe they are using what they have learned from Thailand, Cambodia, and Japan to continue their efforts to improve their water services. They are also part of the Water Family and I'd like to express my solidarity with them.

As explained in the two examples, learning from utilities is highly motivating and triggers actions. As explained at the beginning, JICA held the Executive Forum in Africa. At that time, the African participants in the forum responded that the Executive Forum has the effects as below. The most common benefit was to learn insights from other utilities, followed by changing awareness and mindset. Some cited the impact on business improvement and networking.

We expect to see similar effects at this Asian Executive Forum. Each water utility faces a variety of challenges and the important thing is to discuss what the root causes of these challenges are. There are many challenges but the root causes are not so many and the same regardless of country. In the forum, we will have group discussions, and the participants are expected not only to bring up the issues but also to go into the root causes of why they are happening. Then the participants will focus on a few actions and compile them into an action plan for each country.

The purpose of this executive forum is to learn from each other, but there is a huge diversity among the water utilities participating today. Utilities that are running at the top group towards common goals are already achieving good water service and management. Those utilities continue to expand their water service by effectively utilizing private funding and loans. Figure 3-5 shows the examples of utility profile data that were submitted by the participants. The top runner utilities have achieved 24-hour continuous water supply and nearly 100% of tariff collection and non-revenue water rate lower than around 20%.

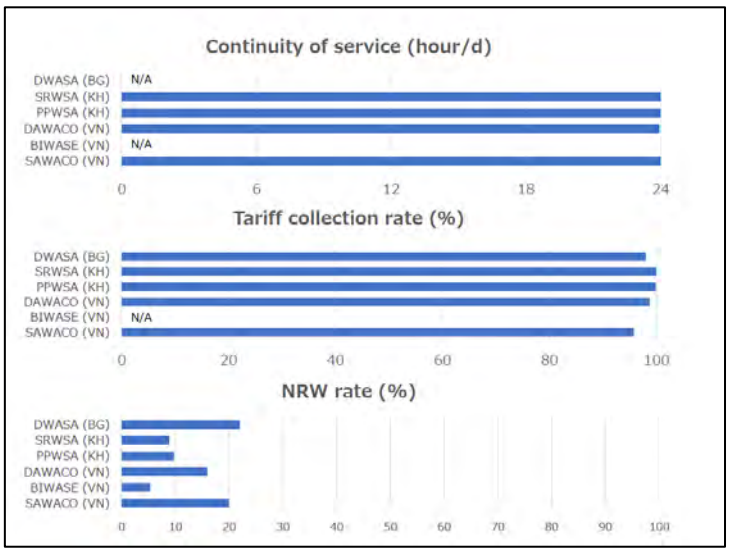


Figure 3-5 [Keynote speech 2] UP data of the top-runner utilities

On the other hand, there is a group of second runners that provide rather good water service but are not yet financially sound enough to finance themselves independently. There are also third runners that provide water on an intermittent basis or are where the water quality at the tap is not necessarily safe enough to drink. JICA believes that the key to achieving universal access to safe and affordable drinking water is to increase the number of top-runner utilities that can independently finance and expand or maintain their water services.

According to the Organization for Economic Co-operation and Development (hereinafter, "OECD"), there are only three sources of funding for utilities. They are called 3Ts; tariff, tax, and transfer. Tariffs, you know already. Tax is a subsidy paid by all citizens, regardless of whether they use the service or not. Transfer refers to the international assistance. And of these, tax and transfer are not predictable, and only tariff is a predictable and stable source of revenue. The prerequisite for mobilizing private funds or loans is that the water utility is able to make repayment from its own earnings based on the water tariff. Tariff is paid by customers and if water utilities don't supply good service, the customers don't want to pay it. Utilities often want to raise the tariff because the tariff level is too low to recover cost or investment in many cases. However, politicians and decision-makers will not approve it if the citizens are not satisfied with the quality of the service. The result is a vicious cycle of worsening financial conditions, lack of investment and poor service. JICA cooperates to develop water services in stages to turn around that vicious cycle. For the third runners, the first thing to do is to improve the quality of the service and gain customers' trust. For the second runners, since they are already able to supply rather good service, the priority issues are to improve the management to increase the availability of the funds. Reducing non-revenue water, improving energy efficiency, increasing tariff collection, and securing finance options are important.

For the top runners, JICA's cooperation approach is different. JICA is providing private sector financing to for example, Maynilad Water Services, Inc. (Maynilad) in the Philippines and Binh Duong Water Environment Joint Stock Company (BIWASE) in Vietnam here today in coordination with the private banks and Asian Development Bank (hereinafter, "ADB") respectively. Some utilities, such as PPWSA and Siem Reap Water Supply Authority (SRWSA), utilize the Japanese soft loans. In the Philippines, JICA supported the establishment of the PWRF, which is the mechanism to supply blended finance to water utilities by mixing private funds from private banks and ODA, along with long maturity and low-interest rates. With MWA in Thailand, JICA jointly conducted a demonstration test of the application of Artificial Intelligence (AI) to the risk diagnosis of pipeline failure. In this way, JICA contributes to the top runner through financing and digital transformation.

For water utilities that are trying to catch up from the third runner to the second runner, service improvement and metered tariff collection are the keys to turning around the vicious cycle to the virtuous cycle. Third runner utilities often don't have meters and charge a flat rate or many of their meters are out of order and tariff is charged based on estimate. However, this induces wasteful water use because the customers pay the same amount of tariff regardless of how much they use the water. For example, JICA provided grant assistance to a provincial town, Tajikistan, in Central Asia that was in such a situation, helping to improve the water production and network, install customer meters, and switch to a metered tariff collection. As a result, customer satisfaction rose significantly from 52% to 100% as wastage of water was reduced and the tap water was delivered to the end of the pipeline with adequate water pressure. According to the customer survey, as many as 78% of the customers responded that they accepted the metered tariff collection because the water service quality became better. This is evidence that the customers accept the meter tariff collection if the quality of the water supply service becomes better. Let me explain another example from Asia in the city of Jenning, Palestine, where the tariff collection rate was quite low. JICA supported the NRW reduction and installation of prepaid meters in this city. As a result, the tariff collection rate by prepaid meters rose to 100% and was not affected by COVID-19. Interestingly, the prepaid meters lead to more equitable water distribution.

Figure 3-6 shows a group of customers separated by the amount of water usage on the horizontal axis and the average water usage for that group on the vertical axis. The customers on the left side of the graph are large consumers. They began to use less water after the introduction of the prepaid meters. Instead, those on the right side of this graph are able to use more water. These groups of customers had previously used less water because they couldn't receive much water due to low pressure. However, the prepaid meter reduced the wastage by large consumers, so more water can be delivered to other customers. This is another example of how the introduction of the meters has improved water service and management. In this way, the customers realized the improvement of water service and this led to the improvement of tariff collection and financial condition by gaining customers' trust.

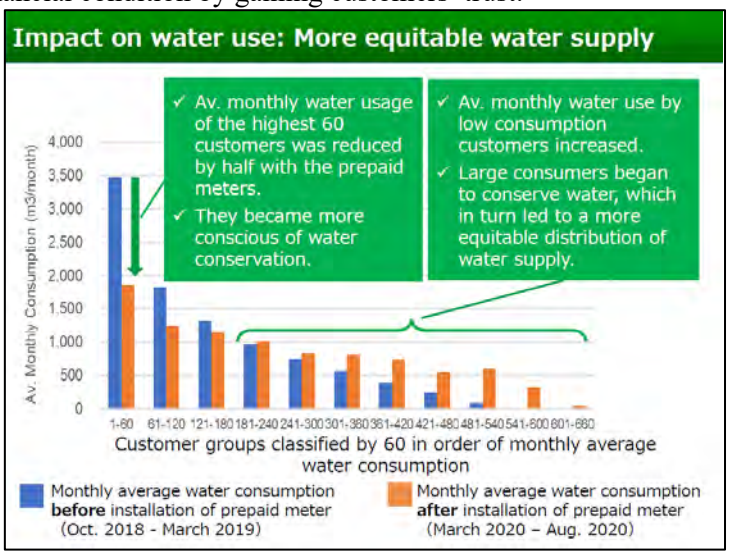


Figure 3-6 [Keynote speech 2] Impact on water use by the installation of water meters

On the other hand, top-runner utilities have already implemented metered tariff collection without problems and established a good relationship of trust with their customers. The challenges for these top runners will be different which will be to raise funds to cover investments to meet increasing water demand and changing customers' needs, and to respond to changes in the external environment, such as climate change or deterioration of low water quality, and so on. It is necessary to enhance the sustainability of water supply services while addressing various risks.

Japanese utilities are top runners, but actually, they are facing a major challenge in terms of sustainability. Back in 1950, Japan's water supply coverage was only 26%, but now it stands at about 98%. The non-revenue water rate in Yokohama city was about 70% just after World War II, but the rate now is well below 10% because of the tireless efforts since then. However, Japan's water supply is also facing unprecedented difficulties. The population of Japan peaked in 2008 and since then it has begun to decline. Accordingly, water revenue has begun to decline, so there is a concern that the financial situation is deteriorating. If the renewal of facilities is delayed, the leakage will become more frequent. The human resource is also a problem. Japanese water utilities are also facing these new challenges and seeking solutions. In this way, even among top utilities, there is much to learn from each other. In addition, I hope that the participants from the top runners will share their experience and knowledge with the second runners and third runners about the past efforts for improvement and reform.

To achieve SDGs, the utilities are required sustainability transformation. We need to expand services to people without access to water supply, maintain financial and managerial soundness, promote mitigation adaptation measures to climate change, improve our capability to cope with risks and improve governance. On behalf of the organizers of this forum, I hope that the distinguished guests will take advantage of this forum to engage in lively discussions, be inspired, and create future-oriented action plans.

3-3 Program Orientation

Program orientation was delivered by Ms. Junko Uno, JICA Global Environment Department.

[Contents] *Outline only

・ The orientation was conducted with brief content mainly on the following issues.

- Date, venue, delegates of the 5th Executive Forum
- Session theme and basic structure of the program (For Day 1 and Day 2: presentations, group discussions, and feedback session, for Day 4: preparing each country's action plan, presentation on the summary session)
- Business Sessions, Exhibitions
- Explanation of action plan and its format
- Overview of the follow up after the completion of the 5th Executive Forum
- Eating and Refreshments
- Documents and materials of the Forum
- Post Forum Questionnaire

Chapter 4 Session 1 “Towards Water Utilities Resilient to Risk and Change”

Session Theme	Aim of each Session
Session 1 “Towards Water Utilities Resilient to Risk and Change”	・ The mission of water supply services is to continue to serve citizens as an infrastructure that supports society and the economy. ・ It has always been important to increase resilience to cope with various risks, such as responding to environmental changes, including climate change and deterioration of raw water quality, and preparing for disasters. The newly experienced COVID-19 pandemic, faced with the unavailability of employees to come to work and reduced water rate revenues due to decreased tourism and water rate exemptions, has heightened the awareness of the need to ensure resilience for service continuity. ・ The session aims to provide an opportunity for participants to share their own efforts in dealing with various risks and in ensuring business continuity, and to consider actions to be taken by their own organizations against various risks, not limited to COVID-19, in the future.

An introduction was given to the theme of Session 1, “Toward Water Utilities Resilient to Risk and Change” by Session 1 Main Moderator (Dr. Asami, National Institute of Public Health).

Figure 4-1 Day 1 Main Moderator: Dr. Asami (right), Assistant Moderator: Mr. Kaiya (left)

[Contents]

we would like to discuss the Session 1 theme “Toward Water Utilities Resilient to Risk and Change.” As the keynote speeches, we are facing the very important and serious risks for the water utilities. What actions should we take in recognition of such risks for the water service management will be discussed. We have various types of risks such as climate change, infectious diseases, depopulation, etc., and in this session, we will divide it into 2 parts; Part 1 is “Dealing with risks such as infectious diseases and business continuity” and Part 2 is “Climate Change Risk.”

4-1 Presentation [Part 1]

4-1-1 Securing business continuity even in the event such as infectious disease outbreak or saltwater intrusion (Engr. A. K. M Fazlullah, CWASA, Bangladesh)

[Contents]

In the beginning, we should go for the history of the water supply of Chattogram Water Supply and Sewerage Authority (CWASA). You can see here that in Chattogram water supply was started in 1892 by Assam Bengal Railway in the British period. Later, Pourashava was established, and then it was taken over by Pourashava in 1920. In 1929, it was improved somewhat by Pourashava and Assam Bengal Railway. Later on, the full water supply in Chattogram, WASA was taken over by Chittagong Pourashava and the municipality later on. In 1963, CWASA was established and the whole water supply and sewerage authority was taken over by CWASA from 1963. Another improvement of the Water Supply and Sewerage Act was done in 1996 and has been made effective from May 4, 2008, in CWASA, while it was affected in Dhaka WASA earlier.

The objective of CWASA is the construction, improvement, expansion, operation, and maintenance of the necessary infrastructure of water supply and the construction, operation, and maintenance of sewerage system. There was a big crisis in the Chattogram for water supply before 2009, from 2000 to 2009, which was a heavy and serious crisis of water supply in Chattogram people were very much upset about this. In 2009, when Sheikh Hasina came into power, she took over the problem and the improvement in the water supply service started. This improvement was taken over at that time by JICA. In Chattogram, people say that was a lifeline for the water supply in Chattogram in 2009 when JICA took over the development of the water supply in Chattogram. We have installed now 4 water treatment plants in Chattogram. Two are Sheikh Hasina Water Supply 1 and 2. We take water from two rivers, the Halda River, and the Karnaphuli River. These two treatment plants were built near Karnaphuli River. And rest two were built beside the Halda River. Now, we have the capacity to supply 500 MLD (Million Liter per Day) of water per day. The number of service connections in 2009 was about 40,000, which has become 86,000 now. Regarding revenue generation, it was 25 million BDT in 2009, which is now 195 million BDT.

The development projects done during the last 12 years are, Karnaphuli Water Supply Project 1 by JICA, Chattogram Water Supply Improvement and Sanitation Project by World Bank (hereinafter, “WB”), Karnaphuli Water Supply Project 2 by JICA. Now we are constructing another water treatment plant on the other bank of Karnaphuli River for the industries and the huge habitation which will be built up on that side, and it is going to be completed by the end of this year. Through the Chattogram Water Supply Improvement Sanitation Project by WB, we will be able to supply 90 MLD water from there. Regarding the Karnaphuli Water Supply Project 2, we will be able to supply 143 MLD. The Bhandaljuri Water Supply project by Korea on the other side of the river, on the bank of the Karnaphuli River, will be completed by this year.

Regarding the success story of CWASA. We have the ISO 9001 certification for the quality of water of Chattogram water supply and the proper maintenance. The Key Performance Indicators (hereinafter, “KPI”) are as shown in Figure 4-2.

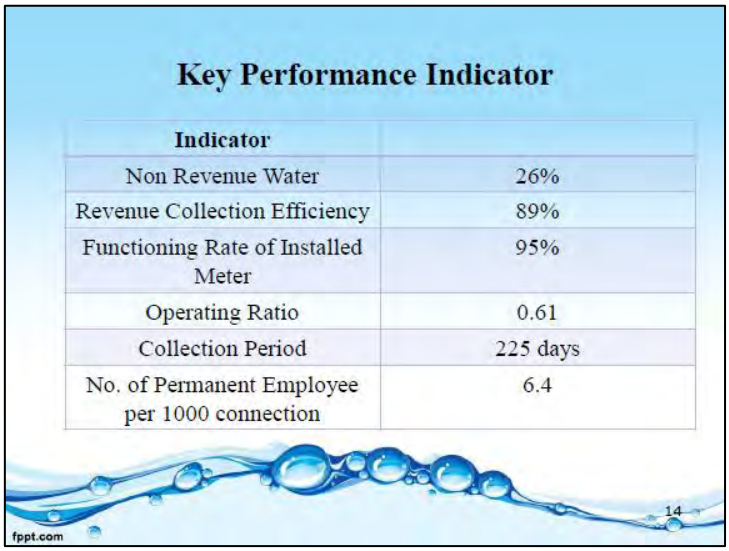


Figure 4-2 [CWASA] KPI data of CWASA

In regard to the actions taken to strengthen the financial capacity of CWASA, the first was to increase the water tariff from 5.03 BDT/m3 to 18 BDT/m3 for domestic consumers and 16 BDT/m3 to 37BDT/m3 for non-domestic consumers from 2010 to 2023. Work is going on to develop the financial model to forecast the financial position and to restructure water tariffs in order to make CWASA financially capable. The second action taken is that we have been taking JICA technical cooperation project to strengthen the financial management and planning capacity of CWASA. Formulation of a business plan and strategic plan is ongoing to make CWASA financially solvent.

The next topic is business continuity during saltwater intrusion. We have a big problem in the Halda River because it is just near the Bay of Bengal Sea. There is a dam in the upstream of Karnaphuli River in Kaptai. Every dry season, if there is no water supply from the dam to the Karnaphuli River, the flow from the Bay of Bengal, which is saline water, intrudes into the Halda River, when high tide is there. We are thinking of transferring the intake of water supply to other places where the salinity doesn't go. Particularly this year, we had a serious problem because there was no rain. The salinity has gone up to 2,500 mg/L. In this case, we take water at the time of low tide, not in the high tide because at that time the salinity is less. It is near to 500 to 700 mg/L. That could be easily maintainable for us because after the treatment plant has done the water supply, we will bring some amount of underground water from a deep well and mix it up with this to minimize the salinity. That will bring the salinity to the extent that is acceptable to the people. However, this is not a permanent solution. Therefore, we are thinking of future government solutions since global warming and other issues have become difficult for us to run in the current way. We are trying to shift the intake of the water supply from this place to another place where the Bay of Bengal's salinity or high tide doesn't go up. This is the salinity mitigation that we are considering.

And then, the topic of business continuity during COVID-19. When COVID-19 started in different places in the beginning, we could not think of what was the magnitude of COVID-19. In 2020, first, I was affected by COVID-19 and hospitalized for about 15-20 days. After this, we have taken a lot of precautions since we have to maintain the water supply for the whole day, 24 hours. The staff in the treatment plant cannot move here and there. We have stopped movement and we said that you stay there. We supplied food and everything to them and they stayed there based on the 8-hour duty shift. In this way, we could continue the water supply for 24 hours to the city. And about the maintenance of the water supply, we tried not to move farther, and when we had to move outside, we took all precautions. Thanks to these, we found that we had very little influence of COVID-19 on CWASA employees and officers. Two or three people may have been

affected by COVID-19 but not much. We could handle all those in a proper way so that everybody was safe and the water supply could be maintained for 24 hours.

The final topic is, the Internet-based services of CWASA to implement Vision 2021 and Digital Bangladesh. Consumers can download the bill from the website, consumers can pay the bill through bank and digital payment portal, execution of all tendering works are done through the e-tendering web portal E-GP, providing bills to the customers for payment of deep tube well licenses are done through online, and payment confirmation SMS is provided after the bill payment.

These are the things we have taken up, and more improvements are going on day by day in CWASA. We hope that in the future, we can try to improve more learning from this session and the forum discussing with all our partners, with those who are working here.

4-1-2 Response to infectious diseases in water supply (Ms. Tomoko Ishimoto, Osaka Municipal Waterworks Bureau, Japan)

[Contents]

Regarding the response to infectious diseases in the water supply system, I will introduce initiatives by Osaka City.

About the outline of water supply in Osaka City. Osaka City is located in the central part of Japan and is the central city of the Kansai economic zone. Water is supplied to all areas of Osaka from three water treatment plants that use the Yodo River as their water source. The facility has a daily capacity of 2.4 million tons and water distribution pipes of approximately 5,200 km. Water is distributed from three water treatment plants sourced from the Yodo River to 9 water distribution plants, pump stations, and water towers in the city to supply water throughout Osaka.

As for the present water treatment flow in Osaka City, Osaka City introduced advanced water treatment by adding ozone treatment and granular activated carbon adsorption to the conventional treatment in order to supply safer and better-quality water in response to the deteriorated source of the Yodo River. Since 2000, advanced purification treatment water has been supplied to the whole city.

I will explain infectious diseases that pose a threat to water supply. There are two major infectious diseases that pose a threat to water supply. One is a waterborne disease transmitted by drinking tap water, and the other is an infectious disease that affects personnel and prevents the continuation of water supply operations. I will introduce examples of efforts by Osaka City against these two infectious diseases.

Let me explain the response to waterborne diseases. Osaka City's water supply system was established in 1895, about 130 years ago. Before then, people used water from wells or bought water from merchants called Mizuya, who sold water from rivers and used it for domestic use and drinking water. Such water was not properly treated, and thus cholera often broke out in Osaka, killing many people. These repeated outbreaks of cholera, coupled with massive fires, increased the demand for the establishment of a water supply system, and Osaka City’s water supply was established as the fourth modern water supply system in Japan. The water treatment flow at that time was normal sedimentation and slow sand filtration, and chlorination was not conducted. Looking at the numbers of cases of and deaths from waterborne diseases in Osaka City before and after the establishment of the water supply system, both numbers decreased due to the improvement of the sewerage system and strengthening of the medical system together with the establishment of the water supply system.

Subsequently, Osaka City started chlorination in 1930. In order to respond to the deterioration of water quality in water sources and to ensure the microbiological safety of tap water, breakpoint chlorination was started in 1962. In addition, additional chlorine injection equipment has been installed at water distribution sites in the city to maintain a free residual chlorine concentration of 0.2 mg/L even at the edge of the distribution area. As a result, the amount of chlorine injected at

the water treatment plants is reduced, while the residual chlorine concentration is leveled throughout the city, thereby providing safer and more delicious tap water. Water quality remote monitoring equipment has also been installed at 38 locations in the city to constantly monitor residual chlorine concentrations and to ensure a higher level of microbiological safety.

Chlorination is crucial for ensuring microbiological safety, but some microorganisms are resistant to chlorine. Cryptosporidium is one of them. In 1996, group infections occurred in Ogose town, Saitama Prefecture, in which about 70% of residents who drank tap water were infected. In response, the Ministry of Health, Labour and Welfare of Japan formulated guidelines for countermeasures against Cryptosporidium giardia, a chlorine-resistant microorganism, and urged water utilities to respond appropriately. The guidelines call for periodic inspections of raw water and the provision of treatment facilities to remove target microorganisms according to the level of contamination. If target microorganisms or the indicator bacterium E. coli are detected in raw water, filtration facilities or ultraviolet treatment facilities that can maintain the filtered water turbidity at 0.1 mg/L shall be installed. Since the publication of the guidelines, many water utilities have installed highly sensitive turbidity systems, monitored filtered water turbidity more closely, and introduced ultraviolet treatment facilities, particularly in small-scale water services. In this way, Japan has responded to waterborne diseases by introducing treatment facilities that can appropriately remove and reduce target microorganisms.

Next, I will talk about infectious diseases that affect the continuation of water supply services due to the spread of infection. The spread of COVID-19 has had a significant impact on our lives and work. In Osaka, more than 900,000 people have been infected and more than 3,000 have died. Many employees of the Osaka Municipal Waterworks Bureau were also infected, but we were able to continue our operation because we took measures based on the based on BCP for infectious diseases. In Osaka City, BCP was prepared for earthquakes and wind and flood damage. As the risk of spreading the H1N1 influenza increased in 2009, the BCP was formulated to continue the water supply even if novel influenza spread. Later, when the COVID-19 pandemic occurred in 2020, this BCP was applied mutatis mutandis, and in 2022, based on this experience, the BCP was revised to cover a wider range of infectious diseases.

Under the city's BCP for infectious disease, designated infectious diseases and new infectious diseases that may spread nationwide are covered, in addition to new influenza and novel coronavirus infections, which are infectious diseases designated by the national government under the Act on Special Measures Concerning Pandemic Influenza and New Infectious Diseases. As an estimate of damage, 25% of employees are expected to be infected sequentially during the pandemic period. During the peak period, it is assumed that approximately 40% of employees will be absent, including those absent for family nursing and for taking care of children when school is closed due to cluster formation. It is also assumed that the supply of chemicals at water treatment plants will become difficult during the pandemic period.

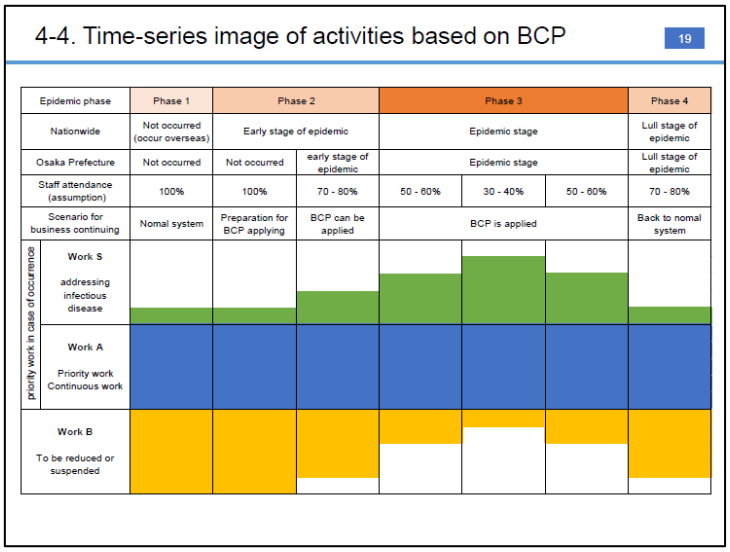


Figure 4-3 [Osaka City] Time-series image of activities based on BCP

Figure 4-3 shows a chronological image of activities based on the BCP. When there is no infectious disease in Japan, normal work A and work B are carried out, and only information is collected as a measure against infectious diseases. As the infection spreads, the work in the work B category that can be reduced or suspended will be reduced, and the personnel of reduced work will be allocated to infectious disease response. On the other hand, the operation of water treatment plants and the work that should be continued regardless of the prevalence of infectious diseases will be carried out as usual. The basic policy of the BCP for infectious disease in the city has 2 items. One is to prevent infection and the spread of infection among employees, and the other is to maintain the system to ensure the continuity of the water supply.

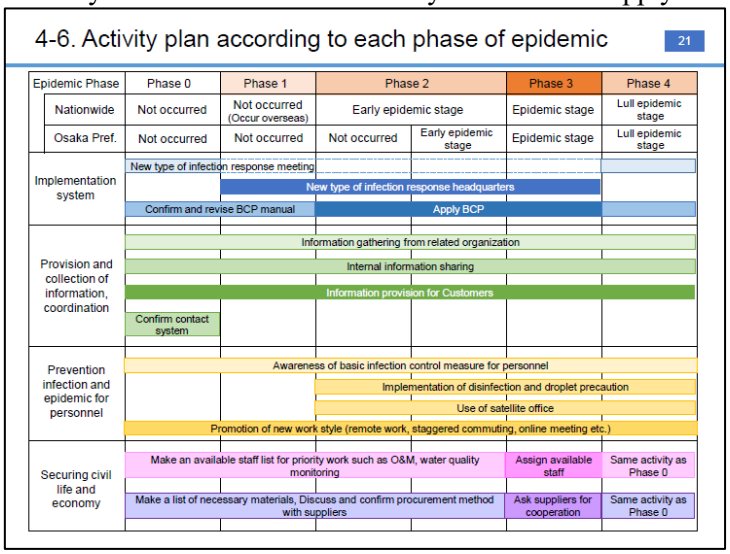


Figure 4-4 [Osaka City] Activity plan according to each phase of the epidemic

Figure 4-4 indicates the activities to be performed at each stage of infection. In normal times at the stage of Phase 0 when infection has not yet been confirmed, confirmation and review of the manual information and communication are carried out. The city will make a list of priority tasks to be continued even if the infection spreads, as well as a list of chemicals necessary for such tasks. After that, at the stage of Phase 1 when the infection is confirmed overseas, a task force will be established within the bureau to strengthen information collection, and measures to prevent infection and secure personnel will be discussed in the task force and will be informed to the employees. The BCP will be applied from Phase 2 when domestic infection is confirmed.

Infection prevention measures such as disinfection of office space, airborne droplet prevention measures, and use of satellite offices are implemented, and based on the list of personnel who can respond to priority tasks, the relevant personnel are notified that they may be asked to engage in such tasks. In Phase 3 where infection is widespread, under the assumption that the availability of personnel will become difficult, measures will be taken to change staffing as necessary in accordance with the list of personnel for priority tasks. Finally, in Phase 4, when the number of infections has decreased, the city will consider phased relaxation of measures while monitoring the status of the infectious disease. Among the measures carried out by us in response to the spread of COVID-19, I will explain the measures carried out to control the contact of employees. Various measures such as remote work and flexible use of the staggered work system were taken to prevent overcrowding of employees. As a result of efforts to control infections even at workplaces where priority work is being performed, such as water treatment plants, by using conference rooms to disperse offices, we were able to continue operations without changing the staffing based on the personnel list.

Lastly, I will summarize what we talked about today. Infectious diseases that pose a threat to water supply include waterborne diseases caused by drinking tap water and infectious diseases that affect the continuity of water supply. In order to prevent the occurrence of waterborne infectious diseases, it is important to introduce water purification facilities and equipment that can appropriately remove and reduce causative microorganisms and maintain and manage them appropriately. In Japan, appropriate treatment has been introduced according to the presence of microorganisms in water sources, and regular monitoring is carried out to control operations. With regard to infectious diseases that affect the continuation of water supply operations, it is necessary to determine in advance what operations should be continued as a priority in the event of infection and how to implement them. Osaka City formulated a BCP that defines priority tasks, infection prevention measures, and how to secure personnel and supplies, and responded to COVID-19 infection based on the BCP. Based on this experience and future trends in global infection control, we will revise the manual as necessary to ensure a stable supply of safe and high-quality tap water.

4-1-3 Responses to the COVID-19 Pandemic by Nagoya City Waterworks & Sewerage Bureau (Mr. Toru Tsujie, Nagoya City Waterworks & Sewerage Bureau, Japan)

[Contents]

Today, let me present the efforts we implemented related to water tariffs as emergency support measures for residents during the COVID-19 pandemic. The first is a grace period for payment of the water tariff, and the second is a waiver of the water tariff.

Before moving on to the main topic, let me introduce Nagoya City. Nagoya City, Aichi, is about 90 minutes away from Tokyo by the Shinkansen bullet train. The population is about 2.3 million, the third largest among ordinance-designated cities, following the City of Yokohama and Osaka City. For 2026, the Asian Games are scheduled to be held in Aichi, including Nagoya City. We would really like everyone to come.

The Nagoya City Waterworks & Sewerage Bureau supplies tap water to Nagoya City and neighboring municipalities, and the population covered by the water supply system is 2.45 million. The Kiso River, which is the source of water for Nagoya City, has so abundant and quality water that good and delicious tap water can be supplied. In the questionnaire of residents, the answer “The tap water is delicious” is ranked among the top every year. Thus, the tap water is evaluated highly. In order for tourists to realize the deliciousness of the tap water, water coolers have been installed at tourist spots such as Nagoya Castle. In Nagoya City, in 2000, the Waterworks Bureau and the Sewerage Bureau were merged to establish the Waterworks and Sewerage Bureau, which operates the two businesses of waterworks and sewerage. The population covered by the sewerage system is about 2.3 million. Approx. 1 million tons of sewage in Nagoya City is treated per day.

I will talk about the water tariff system. A water tariff consists of a basic rate and a volumetric

rate. The basic rate is set according to the purpose of using water and the diameter of the water pipes. The volumetric rate is based on water consumption. The more water used, the higher the unit price. A sewer tariff also consists of a basic usage rate and excess usage rate just like a water tariff. Based on this tariff system, we read water meters and calculate water tariffs once every two months to charge customers the combined water and sewer tariffs.

Then, I will move on to the main topic and explain the grace period for water and sewer tariff payments. In Nagoya City, the first person infected with COVID-19 was confirmed in February 2020, and at the peak, more than 6,000 people a day were newly infected. At the beginning of 2023, the number of infected people in Japan as a whole began to decrease, and in May 2023, the legal position of COVID-19 was changed to 5th class, the same level as seasonal flu. During about three years preceding the change to the 5th class, with the declaration of a state of emergency, etc., economic and social activities were restricted and an unprecedented situation continued in Nagoya City.

The background of the grace period was the national government's request of relevant organizations to postpone the payment of public utility tariffs in March 2020, since the COVID-19 infection spread all over the country and started to have a significant impact in 2020. Based on the government's request, the Nagoya City Waterworks & Sewerage Bureau set up a payment grace system in May 2020, with the aim of supporting households and businesses having difficulty in payment due to COVID-19. This system is to end this month with the change of COVID-19 to the 5th class.

Next, I will explain the mechanism of the system. Normally, we read water meters and charge customers bills about 15 days after reading the meters. If a customer has not paid the tariff or has not promised to pay, we stop the water supply about 90 days after reading the meter in principle. On the other hand, if a customer has applied for a grace period for payment, the payment can be postponed up to the end of six months after reading the meter. This system, to be implemented as an emergency support measure, was needed to support customers having difficulty with payment as soon and as widely as possible. Therefore, items in the application form were simplified as far as possible. In addition, we made it unnecessary to submit documents proving that income or sales had decreased due to COVID-19. We also made our screening unnecessary to allow all applicants to use the system. As a result, a lot of customers have used this system. The number of applications per month is currently 1,000-1,200, and the amount of payments postponed per month is currently 24-26 million yen. From the start of the system to May 2023, the number of applications was 9,700, and the amount of payment postponed was about 273 million yen. It can be said that certain policy effects could be realized in terms of emergency support for resident life and business continuity (Figure 4-5).

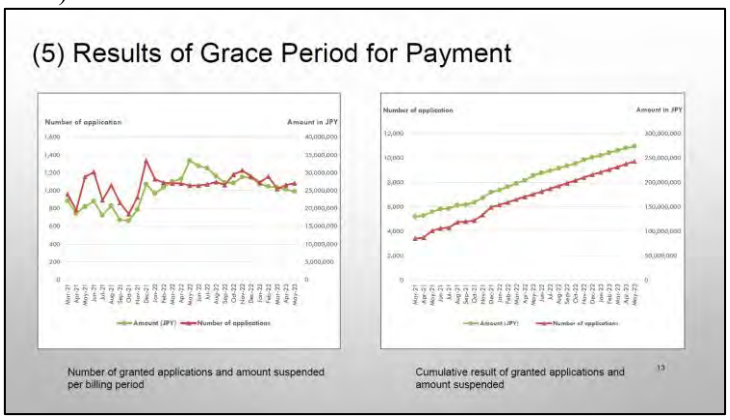


Figure 4-5 [Nagoya City] Results of the grace period for payment

Next, I will explain the waiver of the water tariff. A reduction involves financial burden and business judgment is required, so not my department but the management department is in charge of it. In response to the government's request in 2020, municipalities making a waiver in tariffs,

in addition to the grace period of payment, increased in Japan. In response to this increase, there were a lot of voices calling for waiver of the tariffs also in Nagoya city. As a result of consideration, the city government decided to reduce the water basic tariff for one billing period starting with the tariff charged by reading meters in August 2020. This waiver covered all customers and amounted to about 2.2 billion yen. The waiver was made for the water basic rate. That was because the basic rate is to be paid regardless of water consumption, so we thought that fairness could be ensured.

For making the waiver, we considered whether the waiver meets the purpose of water supply services. The purpose of water supply services in our country is to "promote public welfare" and "contribute to the enhancement of public health and improvement of living environment." Since the COVID-19 pandemic, hand washing and gargling have been nationally recommended as a preventive measure against infection. We thought that making the waiver would let customers positively use water in hand washing and gargling for the enhancement of public health, with as little concern as possible for water tariffs, which could also meet the purpose of water supply services. On the other hand, the duty of water suppliers is to conduct proper and efficient business operations and supply tap water stably. In order to do that, they must conduct sound management. It is impermissible to fail in the business itself due to a waiver in tariffs. Therefore, it was a requirement to make a waiver in a way that would avoid interference with the planned business operation.

For the judgment, we gave consideration in terms of the net profit in the fiscal year 2019 financial statements, the revenue and expenditure plan in the management planning, interference with the renewal plans of facilities, etc. As a result of this consideration, we decided to make a waiver in the water basic rate for one billing period or two months as a measure that could be implemented without interfering with business operations as a water supplier. As a result of making the waiver, the fiscal year 2020 financial statements of the water supply services recorded a net loss of over 689 million yen. This loss was compensated by the retained earnings carried forward from the previous fiscal year, so the business planned for fiscal year 2020 was not affected.

Finally, I will explain the waiver and reduction of the water tariff made by the Nagoya City Waterworks & Sewerage Bureau. The social welfare reduction is made as part of the city government's welfare measures, so the financial resources are transferred from the general account. The disaster relief reduction, to help persons suffering damage from a typhoon or heavy rain that had caused significant damage, was made in the affected consumers' water tariffs for a certain amount of water. With regard to making a waiver against COVID-19 by using independent revenue sources, there are opinions even in Japan that transfer from the general account should be premised if the purpose is to support resident life, and that covering the loss with independent revenue sources may adversely affect renovation or renewal projects. If a reduction by using independent revenue sources is made with a quick judgment, it can lead directly to a decrease in revenue, make it difficult to secure facility renewal costs, and eventually shift the burden to future water users. As explained this time, in Nagoya City, the reduction was made based on the water utility's judgment. However, even if a COVID-19 pandemic breaks out once again and results in similar social and economic circumstances, a careful decision to make a reduction should be made in each case after considering the reduction from the two perspectives of the "duty" of water utilities and "management."

Nagoya City's water supply and sewer services have a history of 110 years. In order to pass on the technologies and know-how that have been developed to people in many countries, the "Non-Revenue Water Management" course is provided as a JICA Knowledge Co-Creation Program, in which persons from many countries participate every year. I hope to see your colleagues who will participate in this course.

4-2 Business Session

The three presentations were given as business sessions by TOKYO KEIKI INC., Maezawa Industries, Inc. A summary of each presentation is as follows.

Table 4-1 Overview of the Day 1 business session

Company name	Presentation title / Presenter	Presentation overview
TOKYO KEIKI INC.	"Water measurement solutions against NRW, Water disasters" Mr. Sakai	・Company overview explanation and product introduction related to NRW reduction and flood control measurements ・Clamp-on type Flowmeter: It has features such as no bypass required, non-stop operation, and least maintenance. Introduction of overview and case studies of portable/stationary ultrasonic flowmeter. Contributes to the identification of leakage points and reduction of NRW. ・Calibration facility: Capable of calibrating flow meters. ・Level gauge: Introduction of overview and case studies of non-contacting radar level gauge and hybrid level gauge. Capable of monitoring the water level in case of tsunami and torrential rains.
Maezawa Industries, Inc.	"Product Showcase for Emergency Shut Down and Flow Control" Mr. Mitsuma	・Company overview explanation and product introduction related to disaster prevention. ・Emergency Shut-Off Valve: Installed in water distribution reservoirs to prevent water outflow and secondary disasters caused by pipe or valve breakage in the event of earthquakes etc. ・Quick Closing Gate: The automatic quick closing feature will shut off the waterway in case of emergency by its own weight. Installed at pumping stations, and water distribution reservoirs. ・Products introduction of adjustable flanged valves (butterfly valves, gate valves, etc.), control valves with cavitation countermeasures, air valves, etc.

4-3 Presentation [Part 2]

4-3-1 Efforts to secure and adjust water resources (Mr. Pornsak Samornkraisorakit, MWA, Thailand)

[Contents]

Today I would like to present on the topic of the efforts to secure and adjust water resources. Metropolitan Waterworks Authority (MWA) uses the raw water from the water source on both sides. The eastern side is from the Chao Phraya River basin. The water source is dam upstream including Bhumipol Dam, Sirikit Dam, Khwae Noi Dam, and Pasakjolasid Dam. The West Coast is from the Meaklong River basin, consisting of the Srinakarin Dam and Vachiralongkorn Dam. The water treatment plants of MWA consist of 4 water treatment plants, namely Bangkhen Water Treatment Plant with a maximum capacity of 4.4 million m3/d, Samsen Water Treatment Plant with a maximum capacity of 550 thousand m3/d, Thonburi Water Treatment Plant with a

maximum capacity of 170 thousand m3/d, and Mahasawat Water Treatment Plant with a maximum capacity of 1.6 million m3/d.

This year, the water from the Mekong River basin has a maximum capacity of 1.6 million m3/d. The drought crisis in Thailand in the past was caused by climate change, with the El Nino phenomenon causing the water to be less than normal. During the drought crisis, amount of the water in the dam is really low. It is not enough for our activity, and we need to limit the water consumption.

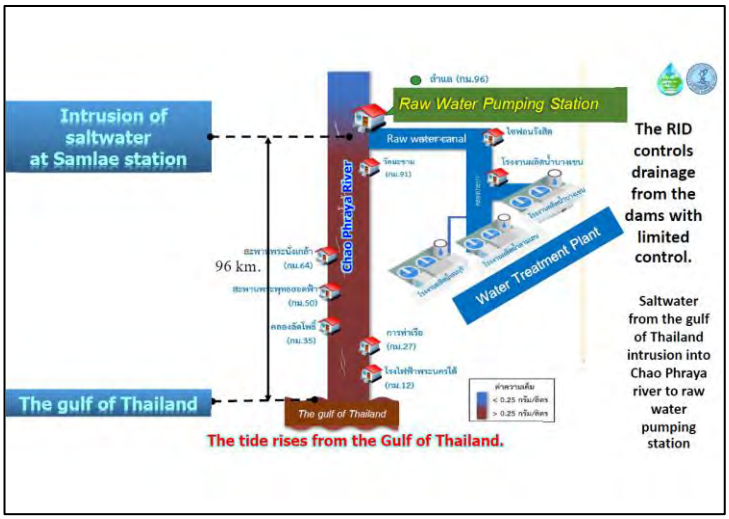


Figure 4-6 [MWA] Overview of the saltwater intrusion at Samlae Pumping Station

Figure 4-6 shows that the Royal Irrigation Department (RID) controls drainage from the dam with limited control. The saltwater from the Gulf of Thailand intrudes into the Chao Phraya River up to the raw water pumping station. Chao Phraya River supplies the raw water for the water treatment plant. The gulf is far from Samlae Water Pumping Station, 96 kilometers. We have a conventional treatment technology (in our treatment plant), so it cannot remove saline from the raw water. Therefore, we develop tools and methods for the problem because we cannot change the raw water resource.

In the past, the pump at Samlae Water Pumping Station was controlled by the water level forecast at the Royal Thai Navy Headquarters which is 50 km away from Samlae Pumping Station. When the water level at the Royal Thai Navy Headquarters is at its highest, the operator at Samlae Pumping Station will reduce the intake of the raw water pump for 4 hours later because the water is estimated to take 4 hours to arrive at Samlae Water Pumping Station.

MWA installs measurement instruments in the Chao Phraya River and the raw water canal for the water quality, flow, and water level upstream and downstream. The data obtained from within the MWA and from the external agency are used for monitoring and developing a system to predict the salinity situation that's occurred in the Chao Phraya River. The data from the Hydrographic Department provides forecasting of the water level in the Chao Phraya River in front of the raw water pumping station, which will be used in the analysis of the salinity situation to get the risk out of the data. The base model called Rak Nam, developed by Thailand's National Electronic and Computer Technology Center (NECTEC) is applied for the forecast of the salinity in the Chao Phraya River in front of the raw water pumping station 7 days in advance.

We developed anti salinity platform called AnSaT. The main thing is to bring the real-time information from MWA, combined with the level data from the Hydrographic Department and the salinity forecast data from the Rak Nam model. It is used for pumping management and to advise saltwater situations. Figure 4-7 shows the real-time salinity, real-time water level, forecasted water level, and forecasted salinity. It displays three parts, history data of one day before, current data of that day, and the forecasted data for tomorrow.

The raw water pumping station reduces the water pumping in order to avoid raw water in the

high salinity. The raw water pumping station can avoid pumping salinity into the raw water canal by reducing the pumping of the raw water into the raw water canal if the salinity is high in the raw water. AnSaT reduces the impact on the tap water quality.

Figure 4-7 [MWA] Display screen of the AnSaT tool

For example, in the case of normal conditions, the Chao Phraya Dam drains the water at a rate of approximately 70m3/s. MWA pumps raw water, in a normal case, at a rate of around 60m3/s. In this case, the rate of the remaining water to push back the salt water will be around 10m3/s. In this case, the limit of the salinity is more than 0.25 g/l.

By the control based on AnSaT, MWA reduces the pumping of the raw water at the right time. This will allow us to reduce the saltwater amount. This will reduce the impact caused by the high tide. In the crisis situation, MWA and the Royal Irrigation Department do the water hammer operation together. In 2020 we made water hammer about 14 times, 14 times in 2021, and 7 times in 2022. This is to reduce the impact of the problem of high seawater when the salinity value exceeds the standard. It can reduce the impact of the problem that the salinity of tap water exceeds the standards on the east side of the Chao Phraya River, which contributes to approximately 8 million water users. The west coast does not get affected because the Mahasawat Water Treatment Plant does not get impacted by the saline intrusion. Customers can check the water quality status via the website anytime.

4-3-2 ENSURING SAFE WATER SUPPLY DURING NATURAL DISASTER AND INFECTIOUS DISEASES (Mr. Cao Huy Tuong Minh, HueWACO, Vietnam) *Presented by the accompanying person

[Contents]

Thua Thien Hue Water Supply Joint Stock Company (HueWACO) was established in 1909. Our first water treatment plant was built in 1909, and at that time the capacity was about 2500m3/d, and the total length of the water pipeline was about 15km. We supplied water for the public agency, the French and their family, the Vietnamese cadres, and the rich in the city. Currently, we have been supplying safe water, since 2018, for all the rural and urban areas in the Thua Thien Hue Province, to about 96% of the population, equivalent to more than 300,000 households and more than 1 million people, with the service area of around 5000km2. The capacity in Thua Thien Hue Province at present is more than 240 thousand m3/d, with the pipeline length being 5370km and non-revenue water being 9.7%. With support from JICA since 2003, we applied safe water for the very small water treatment plant, and after 2 years, we started supplying safe water for the small pilot area. Now we are supplying safe water for more than 96% of the population of Thua Thien Hue Province and our target in 2025 is to supply water for more than 99%.

As you know the Thua Thien Hue Province is located in the middle region of Vietnam. Every year we have many storms, and hurricanes in the rainy season. It causes floods and landslides. Therefore, we apply some solutions in this case. For the summer or hot season, the upstream of the stream is dried out and it causes the cut of the water supply.

In March 2020, the first positive case of COVID-19 occurred in Hue and our government applied the Directive No.15 and 16. The cost of materials and fuel increased. The circulation of goods weakened. Higher risk to customers and employees. The water demand strongly increased because everybody stayed at home. On the other hand, the progress of investment projects has become slow.

Against this situation, our enterprise applied the solution focusing on five themes (Figure 4-8). The first is safety and sustainability. We made suitable systems and infrastructure, applied sustainable design in the pumping station pipeline or water treatment plant, secured the safety of the customers and the employees because if they contact each other very closely it's very dangerous, and raised awareness for self-protection.

The second policy is flexibility. We made a detailed plan to forecast the scenario. We set up a 24/7 team to repair or operate in the water treatment plant and to repair the leakage or the pipe breakdown. Social distancing was one solution of our government at that time. Therefore, we applied the non-cash payment for the customer.

The third is preparedness. In the water treatment plant, we prepared the water treatment chemicals in the warehouse and the material needed. We prepared the power generation and the reservoir to supply the water continuously.

The fourth is the prediction and impact reduction. The risk and hazard evaluation and the business and production forecast under that weather were done. We applied the automation process, the online meeting, timely and appropriate implementation of the investment project.

The last is the public sharing. We supplied free water for the affected area by the flood or landslide. Also, we discounted the water tariff for the people who were affected by disaster or disease. Additionally, we offered a free kit for the customer to check the water quality at home.

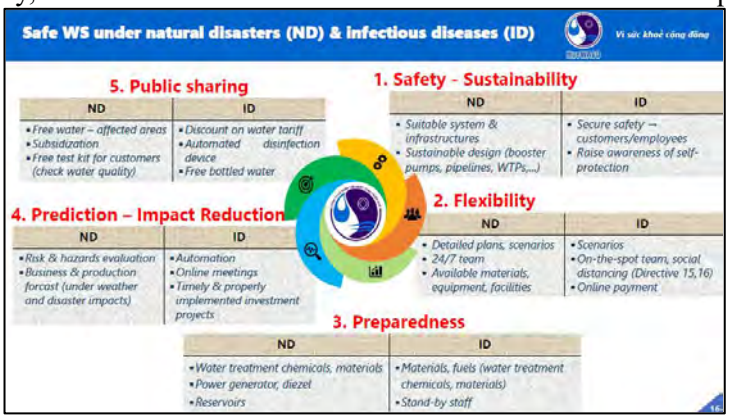


Figure 4-8 [HueWACO] 5 strategies under natural disasters and infectious diseases

And in the future, we will apply some solutions. For example, we will prepare the gas line for the power generator in case the electric power grid line is broken as well as proceeding another solution to apply the power generator. We are setting up a rapid response team who are qualified and equipped with the suitable material and facility to respond immediately. We will set up the power generator, the reservoir, chemicals, and everything. The 5K solutions of our government are also important.

The lessons learned are as below. Being proactive and flexible in responses to secure safe water supply in several conditions., having suitable material and fuel in the place, having a safe and sustainable strategy in the place, sharing experience with others, and applying initiatives and innovation in technology and science.

Referring to the experience of Japan, we have proposed the Provincial People's Committee

(PPC) to hand over the upstream river to HueWACO to let us manage well the water source. We also learned about the automation system and the capacity development of waterworks.

Based on the experience we have had up to now, we will focus on navigating our mission and fulfilling our duty for the health of the community toward 2045.

4-3-3 Challenges due to climate change and countermeasures for HCMC water supply system (Mr. Nguyen Thanh Su, SAWACO, Vietnam)

[Contents]

Saigon Water Corporation (SAWACO) has more than 140 years of history and we are supplying the clear water for about 10 million people in Ho Chi Minh City. In 2025, we'll connect more than 99% of the people directly to the network. We track about 97% of our water from the surface water and we connect directly from the river, therefore with climate change, there will be a lot of impacts on the water system in Ho Chi Minh City, e.g., flood, storm, heavy rain, and forest fire.

Since Ho Chi Minh City is a big city with a big economics, we have done some studies about how climate change impacts the Ho Chi Minh City. Figure 4-9 shows how the rise of sea level impacts to the Ho Chi Minh City until 2100. The sea level will rise at least near 30 cm and at maximum near 1m. In this case, nearly about 1.3 percent of the area of Ho Chi Minh City will be under the sea level.

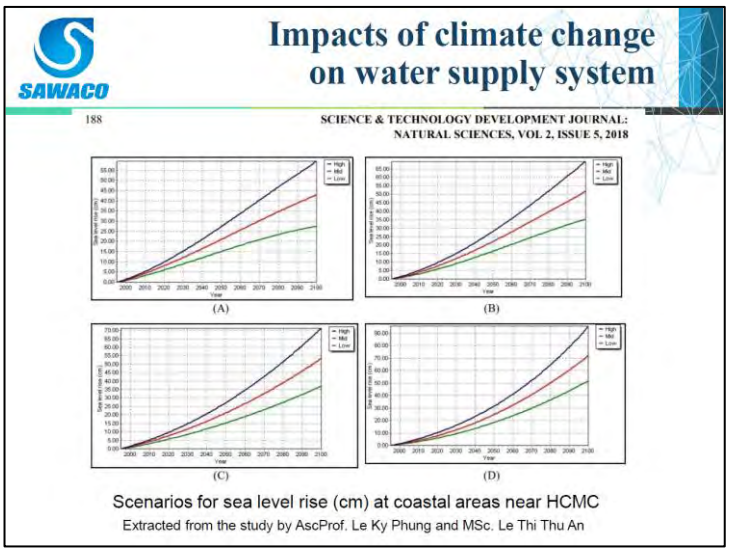


Figure 4-9 [SAWACO] Scenarios for sea level rise at coastal areas near Ho Chi Minh City

They also studied how it rains in Ho Chi Minh City. It is also a risk for the water treatment. The study shows that for the dry season, we don't have rain, which means we don't have water as long as we take water directly from the river. It also shows that for the rainy season, we will have more and heavier rain than before. In this case, increasing the volume of water all at once would be very risky.

Historically, Ho Chi Minh City has repeatedly experienced high drought, medium drought, and less drought. In 2006, we shut down the collection of water at the pumping station for 4 to 8 hours in the rainy season because of its salinity. In the future, we will have more and more salinity with the higher sea level. With the higher sea level, the water network will be under the water. We have to come up with a countermeasure for this.

We collect the water downstream of the river, while upstream there are a lot of industrial zones and also new urban cities. If they discharge a lot of wastewater, it will be a problem. Now we have this problem with the Saigon River. Against this, first of all, we must put more online monitoring in place as MWA. We have also put an alarm that finds some substances in the water in the study with Singapore. We must improve the laboratory in order to be able to collect the

sample, bring it back to the laboratory, and check which parameter's value is over, soon after the alarm. Secondly, we have made a handbook for the operator. As shown in Figure 4-10, if that value falls under the green range, that means the value is acceptable and the operator can run the system. If it is orange, they must take measures. If it is red, the operator must stop the system.

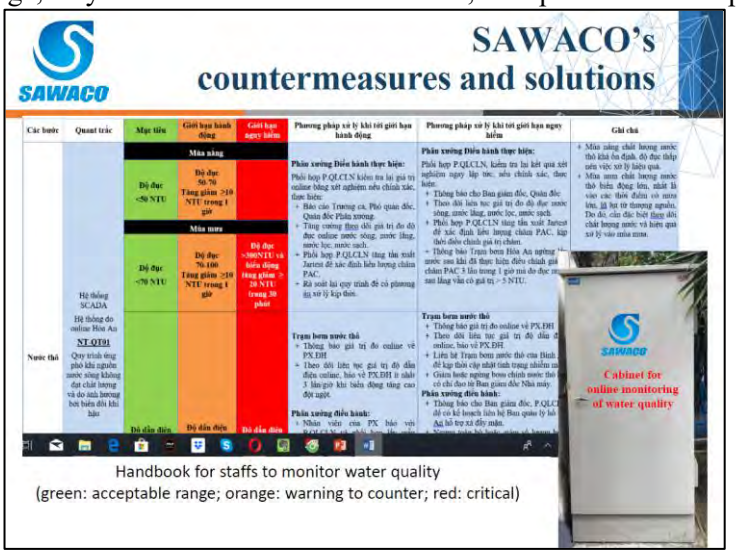


Figure 4-10 [SAWACO] Handbook for staff to monitor water quality

Also, we have an emergency water supply in SAWACO. We implement emergency water supply solutions for customers when the incident lasts more than 12 hours. We use some water tanks and supply important facilities like hospitals and schools with water. Secondly, we have water bags of 4 liters for the customers. In this way, they can use 4 liters per day.

That is some of what we do. SAWACO thinks that it is very important to think about the means against climate change since we need to secure more and more water resources if climate change gets serious. We have a study about how to build some big reservoirs upstream beside the river to keep the water. In one case study, they connected directly the water from the reservoir to the water treatment plant, which took a lot of time since it was very long about 70 km. So that is a big project. JICA supports the study of how to divide Ho Chi Minh City into five zones and to build reservoirs. We can supply safe water for the whole of Ho Chi Minh City. We must learn about how to deal with climate change and we offer the practice for the staff to help understand very clearly about the project, and how to prepare for it. We want to work together because climate change is a very big issue. We also want to learn some experiences from all of you, and also, we can share some small experiences about us.

[Q&A throughout the session]

- Dr. Asami: We'd like to recall our theme today. In the morning, we had a presentation on risk management from CWASA, which includes securing business continuity even in the event of infectious diseases and natural disasters such as saltwater intrusion, and the next presentation was from Osaka City in response to infectious diseases, in which BCP was conducted as planned, actually. It was conducted as the planned BCP. The third presentation was from Nagoya City Waterworks and Sewage Bureau, about the conduct of the water supply and management in the COVID-19 epidemic situation. In the afternoon we had presentations, one from Thailand and two from Vietnam. We have common issues of natural disasters, infectious disease issues, and climate change. Climate change is affecting many countries and we have got ideas from your presentations for its solutions.
- Prof. Takizawa: Regarding the MWA presentation. What level of salinity is a problem in practice? I know that you have a guideline and it is very important to meet the guideline throughout the year. However, in case of an emergency, of course, we have to consider a long-

term solution, but for the time being, many people do not directly drink from the tap and they drink bottled water. So, in practice, slightly increased salinity will not cause a very serious problem in water use. What about the situation in Bangkok?

- MWA (Thailand): In the guideline, the salinity is allowed up to 250 mg/L. We convert this to our team as a limit to keep the salinity.
- Dr. Asami: Actually, after the Great East Japan Earthquake, the salinity was a big issue in the Tohoku area, in the northeast area of Japan and actually it was difficult to lower the value down to the guideline so the waterworks issued notifications saying “This water is not for drinking.” This kind of thing is a very common issue in an emergency.
- CWASA (Bangladesh): Actually, the saline intrusion is a special problem. What do you see when high tide is there, if there is no flow from the Kaptai Dam, the saline water intrusion comes into one or two of our projects. The salinity goes up from 1,000 to 1,500 mg/L. WHO’s limit is about 400 mg/L. In this case, we do not take water at the time of high tide. We take water when they have low tide with a salinity of nearly 500 or 550. Then, we take water from other treatment plants or underground water tunnels and blend it to bring the salinity level below 400mg/L. Although people still feel that it is saline, it is accepted because the WHO accepts it. That's what we try to do there all the time.
- MWA (Thailand): We have a reverse osmosis mobile plant and in the emergency case, we supply our customers with the drinking water.
- Dr. Asami: Reverse osmosis is very expensive so it is difficult to afford the whole population.
- Prof. Takizawa: Saltwater intrusion is a common problem in Asian cities and Asian countries. This is because there are so many big cities on the coastlines including Yokohama, Tokyo, Osaka, and Nagoya in Japan and also in your country that are taking so much water from limited water resources and this causes salt water to come up. In addition to that, we have a climate change problem and sea level rise. We have to consider what could be the solution. The really important suggestion about the tentative measure is to take fresh water during low tide and stop taking it during high tide. And also, you suggested that dilution is one solution to the saltwater problem as well. These are tentative countermeasures, so we have to think longer term solutions as well.

4-4 Group Discussion

The group discussions in Session 1 were conducted as shown in the table below. The same groupings were used for the group discussions for Session 1 through Session 3. For detailed minutes of the group discussions, please refer to "11-5 Records of Group Discussions."

Table 4-2 Session 1 group discussion overview

	Group A	Group B	Group C
Meeting room	Special Meeting Room (8F)	Room 805 (8F) Simultaneous interpretation available	Room 801 (8F)
Facilitator (Main / Assistant)	・ Mr. Sherwin Mendoza (Maynilad) ・ Mr. Itaya (Yokohama Waterworks Bureau)	・ H.E. Chan Sengla (SRWSA) ・ Mr. Hirowatari (Kitakyushu Water Service Co., ltd.)	・ Mr. Waruna Samaradiwakara (MWSEID) ・ Dr. Ogata (JICA)
Accelerator	・ Mr. Nguyen Thanh Su (SAWACO)	・ Mr. PHILAVONG Ladda (NPLP, Laos) *Changed from Mr. Arief Nasrudin (Perumda PAM JAYA)	・ Engr. A. K. M Fazlullah (CWASA)
Members	・ Ms. Sarah Monica E. Bergado (Manila Water, Philippines) ・ Mr. Sherwin Mendoza (Maynilad, Philippines) ・ Mr. Edgar H. Donoso (MCWD, Philippines) ・ Mr. Pornsak Samornkraisorakit (MWA, Thailand) ・ Mr. Nithit Thongsa-ard (PWA, Thailand) ・ Mr. Nguyen Thanh Su (SAWACO, Vietnam) ・ Mr. Nguyen Van Thien (BIWASE, Vietnam) ・ Mr. Le Quang Minh (HueWACO, Vietnam) ・ Mr. Ho Huong (DAWACO, Vietnam)	・ Mr. Ade Syaiful Rachman (PU (Cipta Karya), Indonesia) ・ Mr. Arief Nasrudin (Perumda PAM JAYA, Indonesia) ・ Mr. Kabir Bedi (Perumda Tirtanadi, Indonesia) ・ Mr. Dwike Riantara (Perumda Jambi, Indonesia) ・ H.E. Sreng Sokvung (MISTI, Cambodia) ・ H.E. Long Naro (PPWSA, Cambodia) ・ H.E. Chan Sengla (SRWSA, Cambodia) ・ Mr. Khamphouvong Sikholom (DWS, Laos) ・ Mr. Siphanh Inmouangxay (NPNL, Laos) ・ Mr. Philavong Ladda (NPLP, Laos) ・ Mr. Sinthepphavong Khampasith (NPKM, Laos)	・ Engr. Taqsem A Khan (DWASA, Bangladesh) ・ Engr. A. K. M Fazlullah (CWASA, Bangladesh) ・ Mr. Tiresh Prasad Khatri (MoWS, Nepal) ・ Mr. Gyanendra Bahadur Karki (KUKL, Nepal) ・ Mr. Zeeshan Bilal (WASA-L, Pakistan) ・ Dr. Usman Latif (WASA-F, Pakistan) ・ Mr. Waruna Samaradiwakara (MWSEID, Sri Lanka) ・ Dr. Wasantha Kumari Illangasinghe (NWSDB, Sri Lanka)

Figure 4-11 Session 1 Group A Facilitator (Left: Main Facilitator Mr. Sherwin Mendoza, Right: Assistant Facilitator Mr. Itaya)

Figure 4-12 Session 1 Group A Group Discussion Scene

Figure 4-13 Session 1 Group B Facilitator (Left: Main Facilitator H.E. Chan Sengla, Right: Assistant Facilitator Mr. Hirowatari)

Figure 4-14 Session 1 Group B Group Discussion Scene

Figure 4-15 Session 1 Group C Facilitator (Left: Main Facilitator Mr. Waruna Samaradiwakara, Right: Assistant Facilitator Dr. Ogata)

Figure 4-16 Session 1 Group C Group Discussion Scene

4-5 Feedback

4-5-1 Presentation from Group A on the results of the group discussion

Mr. Sherwin Mendoza, main facilitator of Group A, presented the results of the group discussion.

Figure 4-17 Presentation from Group A on the results of the group discussion (Day 1)

[Contents]

Our key takeaway from the discussion is that everyone agreed that developing sustainable water sources is essential to be able to become more resilient in facing our current problem of climate change. We can also minimize the effect of climate change by reusing our wastewater. Also, the NRW recovery would be an additional water source.

Also, one of our members discussed that minimizing carbon use by establishing renewable energy can also help us to minimize the impact of climate change.

Also, everyone agreed that we need to influence our decision-makers to think in the long term. For the private sector, to the top management, and for the public sector, to the government.

All participants or delegates also presented that each of us has long-term solutions to all the problems in facing climate change. But the real problem is to source the funding for this program.

I think those are the four key takeaways that our group has discussed.

[Supplementary comment from group member] (from SAWACO, Vietnam)

As you know, climate change is a very big issue not only for one country but also for every country in the world. As a water supply company, we should have our plan, even if it is a short-term plan, intermediate plan, or long-term plan, and we have to put the plan in place right away from now.

One of the issues that we discussed in the group discussion of Group A is that we should have coordinating policies among the water companies. Each water supply company will face different difficulties and challenges. However, we strongly believe that in this forum all of the country may have similar solutions for the problems that we are facing.

The main problem is that we need to have good finance. How can we get good finance, and sustainable finance to adapt to climate change? For example, about the water tariff, about the funding, how the government should interfere, and how the water supply companies should deal with it. Most of the delegates agreed that we should have good training for the staff because the human resource development is a very important part.

4-5-2 Presentation from Group B on the results of the group discussion

H.E. Chan Sengla, main facilitator of Group B, presented the results of the group discussion.

Figure 4-18 Presentation from Group B on the results of the group discussion (Day 1)

[Contents]

The main topic today we discussed today was the climate change effect on the water utility. We found that the effect of climate change is mostly on the source of the water, including the quality of the water and quantity of the water. This has become the cause of the water production cost.

Also, we talked about the impact of COVID-19. We found that to prevent this impact each utility should have an action plan such as preparing a social fund. Also, the support from the government to subsidize is needed to support the utility for the sustainable supply of water. During the crisis, during disasters, each utility should have a social fund or fund subsidy from the government to support the utility.

We also talked about the water tariff because if climate change happens, the water source will be scarce by drought and the water quality will be bad, which will make the production cost very high.

To solve this problem with the prices based on the production cost, our group discussed that there should be a commitment between the water operator and the government. If the utility cannot operate because the production cost cannot be reflected in the water tariff, the users cannot access the water. The government and utilities should understand each other and make a win-win policy. In Cambodia, we provide the water with quality, sustainability, and affordable. Affordable means that the price is affordable to the customer.

4-5-3 Presentation from Group C on the results of the group discussion

Mr. Waruna Samaradiwakara, main facilitator of Group C, presented the results of the group discussion.

Figure 4-19 Presentation from Group C on the results of the group discussion (Day 1)

[Contents]

We discussed the risks and how we can mitigate those risks. We all agreed that climate change directly affects the supply of water. Severe drought and floods are directly affecting the water supply, and with severe drought, it is common that we have saltwater intrusion. The inadequate revenue due to the lack of a proper pricing mechanism is also an issue in all of our countries since the water tariff is really low when compared with the cost of production. The economic crisis is another issue because it directly affects the improvement of water supply projects. In Sri Lanka, most of our projects are standing still because of the economic crisis. Another issue is diseases, not only waterborne diseases, but also some other diseases like chronic kidney disease are very common in Sri Lanka. We are suffering from chronic kidney disease for 1-2 decades. And aging infrastructure. It has caused an increase in NRW. The population growth topic was suggested by Bangladesh. Population growth itself is not an issue, it's a challenge. We have to manage the population growth and supply pure drinking water for them. And the capacity building of human resources is another issue. And lack of water resource policies. It is very common in our countries that we don't have a strong policy for the water sector.

Those are the issues and we discussed how we could mitigate those issues. The first thing is to introduce an effective tariff mechanism. Actually, it should be the cost-reflective tariff mechanism, but in most of our countries, we are subsidized our water supply by the government and we are unable to run without that kind of subsidy. It is necessary to introduce an effective cost-reflective tariff mechanism. And, another thing is to introduce digital systems for effective measuring of water uses, such as the digital metering and SCADA systems. Those are very helpful to improve the quality of water supply or water business. And capacity building as well as awareness programs. It is helpful to improve the knowledge of people who are involved in the water business as well as the consumers. And we need a proper water resource policy. And the last one is the emergency response plan. We need an emergency response plan because most of the time in emergency situations we react on an ad hoc basis. It is necessary to prepare for emergency situations.

4-5-4 Comments from Prof. Takizawa

After the presentation from each group, Prof. Takizawa offered comments for feedback.

[Contents]

Listening to today's discussion, there were two risk factors, which are climate change and COVID-19. These two are very important issues for us.

However, whether it is a natural or man-made process, climate change is mostly a natural or physical process. When we have more carbon dioxide in the air, the globe warms up and it causes such things as sea level rise, which is a problem because we're going to have a saltwater intrusion. Also, people say that the rainfall pattern is changing because of climate change. Sometimes we have a lot of water and floods in some cities, but in other years we have droughts. However, I would like to say this is a natural or physical process.

On the other hand, COVID-19 is a public health problem. In many countries including Japan, the government told citizens to stay home without going out because they're spreading the coronavirus. Therefore, we stayed home, trying to cope with the situation. You had difficulty in managing your water supply plant because staff could not come as usual. We had to cope with a few staff. I believe you did wonderful work in many cities including your cities in managing to supply water. It's normal, but amazing work. You did it really well. It is said that the water consumption pattern has slightly changed because people stayed home without going to the business centers. However, this is not a big issue because you can adjust the water supply volumes.

What is very difficult is the climate change-related problems because this is a natural process. Even with many COP meetings, there is no progress. It is very difficult to stop climate change in the short term, so we have to think of how we should cope with it.

We have had drought and water shortages. The top right photo of Figure 4-20 is Cape Town in South Africa back in 2018. The top left is Manila in 2019, and the bottom is Chennai, India in 2020. This is a problem in many cities. We're going to have a lot of shortages like this. Did you notice something? In many cases, ladies are there, running out to get water. My question is whether this is a natural process or a human process. Maybe this is both; a natural process and also human process.

Figure 4-20 [Day 1 Feedback by Prof. Takizawa] Fetching water in water scarcity

This is a very important point in water supply systems. The cause may be a natural or physical process. We cannot control rainfall patterns and sometimes we have very little rainfall. However, it is a management issue whether we can equally supply the residents or not with the limited amount of water resources. Therefore, this is a combination of natural and human processes. This

is the point that I would like to discuss with you in the following days.

There are many factors involved in water shortages. However, the most important thing, firstly, is water resource management. This is very important but not quite easy because water utility is just one of the water users. You have to discuss with agriculture sectors and other sectors who want to get more water, and also, you have to discuss with your ministry for water resource development. In the long run, water resource management is very important and we have to continue discussing how to cope with the water shortages in the coming years.

The second factor is water demand. Do you think the amount of water your customers and your residents consume every day is too small or too much? This is the point we need to ask because if we can curtail or cut the water demand, or water consumption, we might be able to make better use of limited water resources. We have to go back to the basics, that is, water demand management.

The third element is the reduction of water losses. I do not use “non-revenue water” but “water losses.” Non-revenue water is a very good concept that is governed by the idea of specialist group but sometimes it is misleading because they focus on the money which your customers pay to you and not on the water resources and water losses. Then, how do you measure water losses when you have many water meters that are not working? You can calculate NRW with your bills, but it is not the actual water losses. That is a very important point.

And the last point. Do you know how water demand and network pressure influence water losses? Many consultants and experts say that you should decrease the pressure to control water losses. However, for example, in Phnom Penh, they have increased the pressure and at the same time decreased water losses. There's something very important in our understanding of the relationship between water losses and pressure. This is the basics of water management in the network. But we have a very limited data set. I did some case studies in Colombo, Sri Lanka, and other cities. However, we had very limited data sets to understand the relationship between these two factors.

I hope that we can have some time to discuss more in detail about these three factors.

4-5-5 Comments from H.E. Ek Sonn Chan

Following the comments from Prof. Takizawa, H.E. Ek Sonn Chan offered comments for feedback.

[Contents]

I would like to bring three important points and to share my own perspective on those three points.

The first is about the pandemic. Luckily, in Cambodia, we were affected by COVID-19 but the impact was not very serious. However, through today’s learning, I noticed that many of you have gone through a very difficult time to make the water flow as usual. It also affected your financials whether the water demand increased or decreased. In Cambodia, water demand decreased because all the commercials were closed. No restaurants, no supermarkets, and people stayed home. Even so, it was not very serious. The water utility must have been financially strong.

The second point is about disaster. Cambodia is not prone to disaster. However, we learned one thing before. During 1997, there was a local conflict. Because of our experience of the Khmer Rouge, people were really afraid of it. Everybody thought that it was going to be a civil war and they got out of the city. Just one night, the city got empty. Electricity company staff also ran away. No electricity would be no water. But some people still stayed at home and needed water. Therefore, I stayed 4 days at the office just to convince our operator to stay there. I called the operator to come back. Then they came back, and finally, the city returned to supply water and electricity as usual. You can see leadership is very important.

The third point is financial strength. Whenever people talk about financial strength, they first

think about water tariffs. Our water tariff is too low compared to Japan. $3 or $5 in Japan, but $0.5 in our utility. That is the first reaction of many water utilities. However, not only developing countries but also Japan, developed countries, have difficulty changing the water tariff. Increasing the water tariff is a worldwide issue.

Then, how do we solve this problem? When you walk in the rain, what do you do not to be wet? Do you wish the rain to stop or do you take the umbrella and protect yourself? Changing others is very difficult. Look into ourselves first to change ourselves. How do we look into ourselves? When I was appointed as the head of PPWSA in 1993, I experienced the same issue. The water loss rate at that time was as high as 70%. It was hard to believe. My first reaction was "Make up the number." Whenever we talk with the politicians, they say that our cost is high because our performance is low. So, we think about marking up the performance, e.g., report the water loss rate as 20% while the real figure is 70%. We never look into our reality. Many water utilities do this. The water tariff is linked with the performances, especially water losses and collection ratio. If it cannot be solved by ourselves, in my case, I came to my big boss, the former Minister of Finance. I told him that if I could not increase the water tariff then I would resign. But luckily, he was my professor. That is the first lesson.

The second lesson is that, even if we go to the official meetings, we cannot solve the problems. I went to the government's general meeting. There were 6 or 7 agendas for the meeting, but they spent the whole morning only talking about the water tariff. After the meeting, the Prime Minister said that water tariffs cannot be increased. He said that our people were so poor that they could not afford to pay for the water. There was a minister who said that he would not be able to pay the bill if we increased the water tariff. But he had 6 condominiums. He was so selfish. Everyone is so selfish, so am I. That is normal. Later, the water was scarce and they had to rely on private pumping water with no treatment with 10 times more expensive than our proposed water tariff. Immediately, the water tariff was approved. There should be different ways depending on the country but you still cannot find that way. I hope that you can make it. To be financially strong, you must be autonomous. I would say you must be fully autonomous. Let the water operator do their job. If you become a minister, do not interfere with the operation of the water utility. Let them do it and just see the outcomes.

I'm happy to say that we are on the first day with great results, with great success. Tomorrow, I wish you work harder than today.

Chapter 5 Session 2 “Towards Achieving SDGs Goal 6”

Session Theme	Aim of each Session
Session 2 “Towards Achieving SDGs Goal 6”	・ The realization of a positive cycle of improving water supply services -> increasing customer satisfaction -> getting the support of citizens and politicians to keep prices at a proper level -> creating more room for investment or mobilizing more funds, is the key to water utilities being able to meet the diversity and inclusiveness which Sustainable Development Goals aims for, and to meet the social and economic needs. ・ The session aims to provide an opportunity for executives to learn about the initiatives of other countries and draw a viable future plan with application to their own countries.

5-1 Summary of Day 1

A Summary of Day 1 was given by Session 2 Main Moderator (Ms. Yariuchi, TEC International Co., Ltd.).

Figure 5-1 Day 2 Main Moderator: Ms. Yariuchi (right), Assistant Moderator: Mr. Osawa (left)

[Contents]

Yesterday, we had the session theme that is “Towards Water Utilities Resilient to Risk and Change.” The presentations were given followed by the short Q&A session and Prof. Takizawa raised some comments about the saltwater intrusion of the water source due to climate change. The discussion was there on how to cope with the current issues and the importance of thinking about a longer perspective. In the group discussion, it seemed that all groups shared a common understanding of the impact of climate change in the way of the water source problems. The issues related to climate change are caused by too much water, including floods, deterioration of water quality, or increasing of operation costs due to the dosage of chemicals. On the other hand, issues related to too little water, many members motioned about drought, salinity intrusion, and water resource management with the stakeholders. In group discussions, various mitigation measures were shared such as emergency supply, backup system, water loss management, necessity of BCP, and the commitment of the government. Also, in order to materialize these initiatives, all the groups came to the same understanding of the importance and difficulties of securing the budget and water tariff adjustments, since any solutions need funds. It will come to today's session theme “Towards Achieving SDGs Goal 6.” I hope the session yesterday and today will be linked mutually.

5-2 Presentation [Part 1]

An introduction was given to the theme of Session 2, “Towards Achieving SDGs Goal 6” by Session 2 Main Moderator.

[Contents]

Today’s session theme is “Towards Achieving SDGs Goal 6.” We would like to discuss how to improve the water supply services, increase customer satisfaction, etc. to be able to respond to the diversity and inclusiveness, and social and economic demands of SDGs. This involves the improvement of the water service, improvement of customer satisfaction, sharing appropriate water tariffs that will get support from citizens and politicians, and securing funds for investments, thereby creating a virtuous cycle. Session 2 will be divided into 2 parts; Part 1 will focus on improvement of services, improvement of communication with customers, tariff revision, and Part 2 will focus on fundraising.

5-2-1 Efforts to make F-WASA Self sustainable by improving services and taking concrete steps (Dr. Usman Latif, WASA-F, Pakistan)

[Contents]

Today, my topic of presentation is “Efforts to make WASA Faisalabad self-sustainable by improving services and taking concrete steps.”

First of all, I would like to start with a brief introduction of my city and my organization, Water and Sanitation Agency, Faisalabad (WASA-F). Faisalabad is the second largest city in the province with an estimated population of 3.4 million and a growth rate of 2.37%. WASA-F was established in 1978 to provide water supply, drainage and sewage facilities to the residents of Faisalabad. The groundwater of WASA-F is highly brackish, so we have to bring water to provide the water supply to the citizens from a distant source that is located 30 to 35 km away from the city. Multiple pumping is involved due to flat terrain. The coverage area of Faisalabad is 225 km2 and the agency is providing 72% with sewerage services and 70% with water supply services. Recently, JICA and WASA-F have completed a master plan for 20 years. On the basis of this master plan, WASA-F will design its infrastructure. Total sewage generation is 310 million gal/day out of which 20 million gallon is treated right now. The rest goes to the water body directly.

In Figure 5-2, you can see the three different lines which are showing different boundaries. The outermost boundary marked with red shows the Peri Urban boundary which is the jurisdiction of Faisalabad Development Authority. WASA-F is serving to the area which is highlighted with green color and it's about 225 km2. And according to the JICA master plan, up to 2038, WASA-F will extend its services to the next level and the area will become 422 km2.

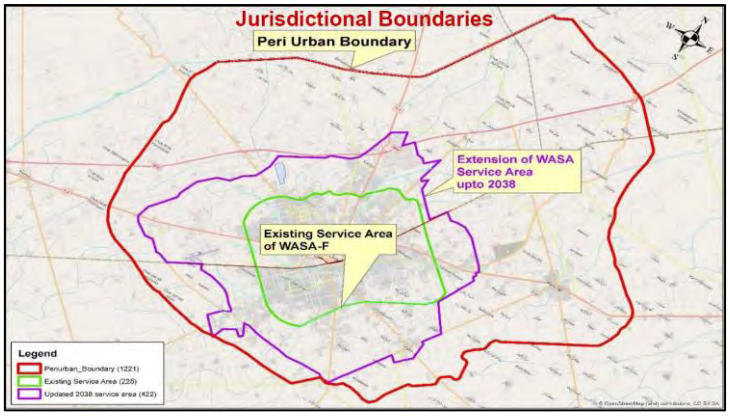


Figure 5-2 [WASA-F] Jurisdictional boundaries of Faisalabad

On the upper side (northwest side), we have installed 29 tube wells having a capacity of 4 cusecs (cubic foot per second) each and these sources contribute to almost 50% of the water supply. These were developed through an ADB grant in 1992. With the help of JICA, we installed 25 tube wells with 2 cusecs capacity each in 2015 and its share is 20%. There are some other sources available inside the city, such as some tube wells that are installed along the Rakh Branch Canal and we are extracting groundwater from them. WASA-F is shifting from groundwater to surface water treatment and we have a couple of water treatment plants as well, such as the Gulfishan Water Works and the Millat Town Water Works. One more key thing is the Jhal Khanuana Surface Water Treatment Plant. Right now, JICA is modifying this and shifting its technology from slow sand filtration to rapid sand filtration. With this, drinking water supply generation capacity will also be enhanced significantly.

The Next topic is about the budget of WASA-F. Right now, WASA-F is facing a problem. There are two major components on which we are spending a lot of money. The first one is electricity charges and the second one is salaries and pensions. At this moment, we are facing a deficit of around 2,612 million PKR. The reasons for the budgetary deficit are as follows; tariff has been frozen since 2006 and we get only a small amount of subsidy which also has been frozen since 2012, and prices of electricity are rising day by day. Due to the multiple-stage pumping, we are also paying extra money in the form of electricity. And then the fourth point is the increase in non-development expenditures such as operation and maintenance (hereinafter, "O&M"), pension, salary from time to time., and the increasing number of pensioners.

Next, I will explain the overview of the Project for Improvement of the Management Capacity of Water Supply Sector in Faisalabad. This project is being conducted by JICA with the help of the Yokohama Waterworks Bureau. This project was initially designed and was to be conducted in two phases. The first phase has already been completed. Now the second phase is going on and the JICA experts are present in WASA-F to improve our capacity. The goal of this project is to improve WASA-F business management. Through this business model, they are trying to set different KPIs to improve our services and improve customer satisfaction so that we could get increased revenue in terms of billing amount. The project outputs are: 1) The ability to formulate and execute a water supply service improvement plan will be enhanced. 2) The ability to improve business operations, customer relationships, operational revenue, financial and management. 3) The project shall be monitored and evaluated using the "Project Design Matrix." The input from the donor side is that the donor has sent their experts over there to guide us and monitor and evaluate the current business model and highlight how we can increase the performance. JICA is also arranging training for our staff for capacity building of the human resources. In December 2022, JICA has arranged training for five practitioners. In December 2023, five more staff members are coming over here for training. Similarly, the third batch will come in December 2024. JICA will also provide equipment in the form of meters and pipes, etc. Input by the Pakistan side is that we will provide counterpart officials and bear project expenses in terms of local training, the expense of the utilities, expense of installation for improvement in the selected areas.

WASA-F and JICA have defined the district monitoring zones and district monitoring areas to improve our services. Whatever installation in those areas such as water meters or anything else, expenditures for which will be borne by WASA-F itself. The total project cost is 400 million PKR.

The next topic is the steps to make WASA-F self-sustainable with the help of JICA experts. Since 2017, 50,000 consumers have been added to the network due to which we have observed a significant increase in revenue as well. Since 2022 onwards, around 17,000 consumers have been added to the network. Efforts made during the last six months are more than 3,000 detections of illegal connections, 1,548 new connection registrations, 856 tariff corrections, and convergences. We observed the overall impact is 10.15 million PKR. We also have taken some measures to enhance our revenue and to reduce the expenditures so that we can make our agency self-sustainable. The overall impact we observed by taking these measurements is 831 million PKR per year (Figure 5-3).

Measures to Enhance Revenue & Reduce Expenditure

Enhancement in Revenues

Sr.#	Description / Activity	Enhancement in Revenue *(Million Rs.)*
1.	Detection of Illegal Connections	152.00
2.	Detection of Misuse Connections	15.00
3.	Improvement in Collection Efficiency	119.00
4.	Bottling Plant, Metering, NRW Reduction etc.	25.20
	Total Impact	**311.20**

Reduction in Expenditures

Sr.#	Description / Activity	Enhancement in Revenue *(Million Rs.)*
1.	Curtailment of Electricity Expenditures	60.00
2.	Application of Solar Systems	Planned for future years.
3.	Reduction in POL Expenditures	64.11
4.	Outsourcing, HR rationalization etc.	396.00
	Total Impact	**520.11**

Deficit in absence of Reforms:	**Rs. 2767.17 Million**
Deficit with Reforms:	**Rs. 1935.86 Million**
Impact of Reforms:	**Rs. 831.31 Million**

Figure 5-3 [WASA-F] Measures to improve business management and its outcomes

JICA conducted a survey in 2015 while making the master plan and they identified that we can easily add 58,408 connections, and by adding these connections, we can enhance our revenue by around 10 million PKR even with the existing tariff level. With the help of JICA, we prepared a report and sent it to the Chief Minister. The Chief Minister entertained it, reviewed the proposal enhancement, and directed the adoption of the uniform tariff along with the subsidy to the low-income groups. With this increase in tariff, a couple of Water and Sanitation Agencies like Multan & Rawalpindi will become self-sustainable, while WASA-F, WASA-L, and Gujranwala will still require some subsidy from the government. Variations of the electricity and POL rates will be incorporated within indexation bi-annually.

The other initiatives and future plans. WASA-F has automized its business processes such as billing, record keeping, pension, payrolls, etc. We are trying to install a Supervisory Control and Data Acquisition (hereinafter, "SCADA") system over key sources. We also introduced the consumer facilitation. Now consumers can pay their utility bills while staying at their homes by using mobile apps and ATM machines. We also introduced the pre-cast slab and cover to rectify the complaints at the earliest regarding broken manhole slabs and missing manhole covers. Solarization of WASA-F is under process. The feasibility study has been done and we are now looking for a donor to execute this project in PPP mode. Geo-tagging of the consumer is also in progress. We are also tracking our vehicles by installing a tracker to avoid their misuse. We are also heading towards the installation of metering and we have set some plans and some targets we will achieve in a couple of years. We are also working on reducing the NRW by creating some distinct monitoring areas and zones. WASA-F with the support of JICA is also arranging training and other activities for the staff so that we can make capacity building of those formations.

5-2-2 Framing the Sustainability Agenda: Delivering on the SDGs (Ms. Sarah Monica E. Bergado, Manila Water, Philippines)

[Contents]

I organized the presentation in two parts; One is to first contextualize how Manila Water and sustainability go together, how it has helped in the decision-making and planning for the company, and how it has moved the transformation of a company from a public-owned institution to a private corporation. The second is how do we actually operationalize those sustainability goals as well as your business targets.

Manila Water is a publicly listed company. We have our main base of operations in Metro Manila, the capital of the Philippines. In 1997, the water service of the capital of the Philippines was that water service was privatized. The capital was split into two, and we got half of it, the east zone of Metro Manila for 26 years. We just had our anniversary on August 1st. We have been operating this concession for 26 years already. We have seen that the business model can be highly replicated. To cater to the rest of the Filipino people, we have had our subsidiaries. We expanded

our services to key cities and municipalities within the Philippines. We also have O&M and some investments outside of the country. Overall, we have an impact on approximately 12 million people. We have 1.3 million water service connections consolidating all our subsidiaries, but the majority is still from the east zone concession business where we help serve 7 million people.

In the Philippines as well, rampant illegal connections, poor water service, and water leaks were frequent, and we did not have a 24/7 supply. When I was young, water supply was only for 4 hours a day, so it was rationed to our place. I had to run back home from school because it was time to get our water. But now when you turn on your faucets, water flows. I'm proud of being part of this company because it has completely changed our lives.

The served population has increased from 3 million people of pre-privatization to the current 7 million. We're also expanding to some provinces near Metro Manila, with water availability improving from 26% to 100%. That is mainly because of our NRW reduction program. We have very limited sources. The water source is actually handled by the government, and we partner with them. But we were able to bring water to customers because we were able to reduce our NRW or water losses, our leaks, and also the commercial losses. In our 2022 integrated report, we disclosed the NRW rate as 13%, but still, of course, it's not enough. Our aspiration is to become like Japan and other countries to reduce it to a single-digit NRW. Leadership was discussed by His Excellency Ek Sonn Chan yesterday. I do tend to agree that leadership, aside from business management and innovation, is really setting the direction and way forward. It's the tone of the top that dictates and it's good that we started off having sustainability as well in mind. We frame our sustainability aspirations and our sustainability goals in partnership with our business goals. As a water utility, our main contribution is to SDGs Goal 6, but it does not stop there. By doing that we are able to impact the environment and the economy as well by our investments in the water and water infrastructure.

Whenever we make a decision, we link this to Environmental, Social, and Governance (hereinafter, “ESG”) standpoints. These are indicators that investors in the financial community look at us as a publicly listed company. Every year we publish the sustainability report that covers metrics that are beyond the business goals. For instance, we are mandated to report on our GHG emissions scope 1, 2, and 3, water abstraction, diversity figures, and male-female ratios. We have to report on everything that is beyond what the regulators are looking for. We also try to report on that as a sign of our corporate responsibility.

Our sustainability commitments and targets to 2025. We have recently disclosed targets and we try to track of course our progress. Manila Water is obsessed with the measurements so that we can know that we are moving and paving our way forward. We have targets on water security because that is our social impact to be able to ensure that our customers for the present generation and for the future generation enjoy the water and wastewater services. Of course, we have a target on greenhouse gas emission reduction which is an interim target and we will contribute to the nationally determined contributions aligned to the Paris Agreement and of course, helping the economy by investing in the infrastructure. Additionally, we've disclosed some new targets for 2025. These are short-term targets and we would like to have mid-term and long-term ESG targets as well for the company.

Now I would go on to the performances and practices that we do in line with our business goals and our sustainability goals. Regarding water security, which was heavily discussed yesterday, it's our social obligation to provide continuous water service, not just now but for the future as well. We've decided our water network to have 4 water sources. Currently, the limitation in Metro Manila is that we are heavily reliant on the Angat-La Mesa surface water system, from which we get more than 90% of our water. Right now, in partnership with the government, we are developing other water sources. In 2019, we encountered a water crisis. We've had an incident that taught us that we need to continuously improve and assess our risk not just short term but mid and long-term as well. All the other water sources such as the Laguna Lake water system, the Antipolo, and the East water sources are in various stages of development and construction. The

sustainability target that we have set for the operation group is that we should have a 15% raw water buffer so that the crisis that we experienced in 2019 will not happen again.

The next topic is NRW. NRW reduction has many benefits. First is the reduction of operating expenses. When we started the concession, it was viewed from an operating expenses efficiency because funding was so little and we had to save on our resources. Second, it benefited operations because saving the water meant that you could sell more water or give it to the customers. And also, it is a resource efficiency measure in line with our sustainability goal of protecting the environment.

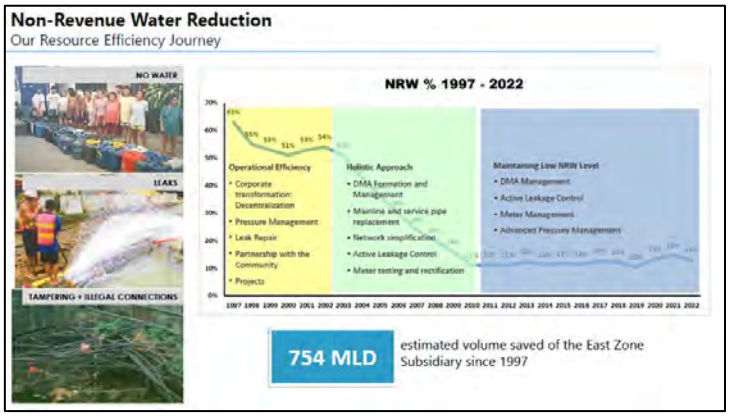


Figure 5-4 [Manila Water] Journey of NRW reduction

Figure 5-4 is our journey of NRW reduction since 1997. We could see that there are a few phases. The first phase was focusing on operational efficiency. There was a corporate transformation starting with the people giving them clear goals that you have to reduce NRW in your specific territory. Money was scarce during this time, so we only did pressure management and point repair. But from 2003 onwards, this is where we experienced a drastic reduction in NRW because we had a certain amount of funding at that time already. Instead of point repair, we did strategic pipe replacement and did our District Metered Area (hereinafter, "DMA") formation. Our leakage control has become more sophisticated than the previous years. Additionally, in terms of meter management, this is when we had our meter testing and calibration at our laboratory. Of course, the more difficult part is to maintain your NRW rate to date. We have been able to save 754 million liters since 1997.

What were the strategies? The first and the last tactic is related to the people. Giving and empowering your employees, capacitating them, and giving them very clear goals that NRW aside from bill volume or your water sales is your responsibility. Also, stakeholder management; dealing with the regulators, the customers themselves, and the homeowners associations in our area is important as well. We do public consultation when we do our tariff increases.

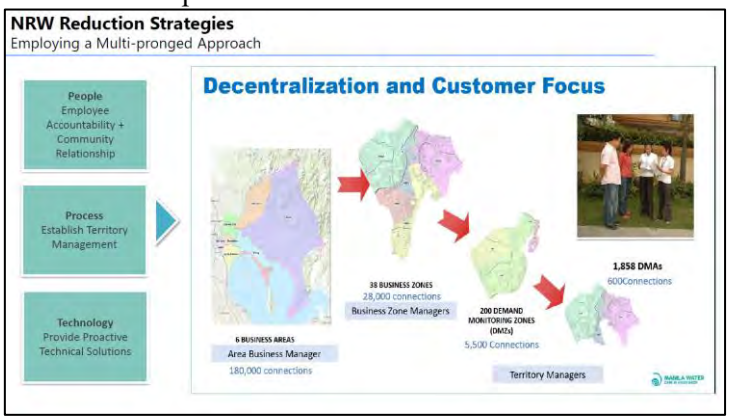


Figure 5-5 [Manila Water] One of NRW reduction strategies: Decentralization

The next strategy is our secret sauce, decentralization (Figure 5-5). We have broken down the

territories from service areas to business zones until you can really measure the NRW rate. The basic principle is that you cannot manage what you cannot measure. We've isolated areas putting in meters in all locations so that you can really measure your NRW and have given it to the owners or the territory teams in that area. To have the target of NRW holistically, you have to have a single-digit NRW rate at your DMA level as well.

And of course, investing in technology as mentioned is necessary; we have a meter laboratory where we test and calibrate our meters, which is ISO certified. Every seven years, we replace the customer meters, and every 10 years the line meters as well. We also do pressure management. Some parts of it are automated so when demand is low, the valves automatically adjust so that we can lessen NRW. Whenever we have breakages, it is displayed in our operation control center. The screen blinks and we are able to deploy the service crew that should do the leak repair and maintenance work. We also invest in the appropriate technology as much as funds are available and approved by the regulator.

Lastly, in the long term, we are pushing the boundaries because we envision not just providing water at present but in the future as well. Water sustainability and the impact of climate change is very important. We look at it in two ways. The first one is on adaptation, being able to deploy and have a rescue operation in times of flooding. We also invest in our facilities to be able to adapt to climate change. We built our facility on stilts because this location experienced 2 meters of flooding. To keep our equipment safe, we have to secure the structure as well. We also have our foundation that partners with the government to help those even beyond our concession area. And the second is net zero transition. It is very difficult. Lots of greenhouse gas accountings are put into play. We don't have much renewable energy yet in the market, so we're trying to pull in funds so that we can also install solar panels and other alternative renewable energy to power our facilities. Of course, we do not forget that we also have an obligation to protect our watershed areas because it will affect the quality and availability of raw water sources.

5-2-3 Toward the Realization of Reliable Waterworks in Connection with Customers (Mr. Yoshinori Sakurada, Bureau of Waterworks, Tokyo Metropolitan Government, Japan)

[Contents]

Today, I will present Tokyo’s efforts under the title of “Toward the Realization of Reliable Waterworks in Connection with Customers.”

First, I will present the waterworks in Tokyo. The Bureau of Waterworks, Tokyo Metropolitan Government supplies tap water to almost the entire area of Tokyo from the center of the capital Tokyo to the suburban mountain area, excluding the islands and some municipalities. The population covered by the water supply system is about 14 million, accounting for 10% of the population of Japan. The length of distribution pipes is approx. 27,000km, equal to about two-thirds of the circumference of the earth. This is the largest in Japan and among the largest in the world. The scope of work is so extensive as to cover water source management, water purification treatment, and water supply to customers. In other words, it extends “from sources to taps.” The Bureau of Waterworks, Tokyo Metropolitan Government is an essential utility provider, that supports activities in the capital Tokyo. We have a mission to supply safe, delicious, and quality tap water ceaselessly 24 hours a day, 365 days a year.

Next, I will present three of our excellent technologies. The first is a technology called “advanced water treatment” to realize “safe, delicious, and quality tap water.” This “advanced water treatment” combines the strong oxidizing power of ozone and the adsorption function of biological activated carbon. This can almost decompose and remove the chlorine smell generated through disinfection by chlorine and organic matter including pesticide residues, which has made it possible to deliver safer and more delicious water. In a blind test of bottled water and tap water produced through the advanced water treatment, approx. 60% of the testers evaluated the tap water highly, saying “The tap water tastes better” or “The bottled water and tap water taste just

as good" This advanced water treatment technology is applied to all water in the Tone River water system, which accounts for 70% of Tokyo's water sources.

The second is a technology to create an "earthquake-resistant waterworks system" which is indispensable for Tokyo, the capital of Japan, prone to earthquakes. In order to minimize damage to water facilities caused by earthquakes, the Tokyo Metropolitan Government promotes seismic retrofitting of water purification plants and water pipelines. In particular, for water pipelines, earthquake-resistant joint pipes are used to prevent water pipes from coming off and stopping the supply of water even in the event of an earthquake. It is estimated that even in the event of an inland earthquake of magnitude 7.3 in the southern part of the center of Tokyo, the rate of water suspension in Tokyo could be only 26.4%, by replacing water pipes with these earthquake-resistant joint pipes one by one.

The third is a technology to prevent water leakage. The water leakage rate of the Bureau of Waterworks, Tokyo Metropolitan Government is suppressed within the 3% range, which is the lowest and best level in the world. In the present day when climate change is progressing, water leakage is not only a loss of precious water resources but also a risk of accidents including cave-ins of a road, particularly in big cities. Some decades ago, most water leakages were caused by lead water supply pipes that were easy to construct. The Tokyo Metropolitan Government stopped using these pipes and instead developed "corrugated stainless steel pipes" superior in strength, resistance to corrosion, and workability. In addition, water leakages hidden underground are detected and repaired in a planned way through patrol survey work, etc. Through these efforts, the water leakage rate, which was around 30% about 70 years ago, has been dramatically reduced to remain at the 3% range, the lowest in the world.

Now I will explain the communication with customers made by the Bureau of Waterworks, Tokyo Metropolitan Government. The fundamental of water services is to always stably supply safe and delicious water, while enhancement of daily services is also one of the important measures. Communication with customers is indispensable for realizing reliable water services by connecting with customers. We conduct an online questionnaire every year, but it is not enough to accurately grasp customers' needs. Accordingly, we actively develop public relations activities by incorporating direct communication with customers. Today, as that effort, I will explain the following three measures: 1) holding exchange meetings (waterworks supporter system), 2) the school waterworks class, and 3) the notification function of the Tokyo Water App.

The first is holding exchange meetings with customers. The purpose of this measure is to promote customers' understanding of the waterworks business and to reflect customers' needs identified in the waterworks business by staff explaining the efforts of the Bureau of Waterworks directly to customers and exchanging opinions with customers. At an exchange meeting under the theme of earthquake countermeasures, we presented the efforts of the Bureau of Waterworks, such as seismic retrofitting of water pipes and how to supply water when water is cut off, and exchanged opinions directly with participants. There was a voice that at the time of water suspension in the event of a disaster, residents must come to a water supply base and get water, so residents should experience the weight of an actual water bag. In response to the voice, we got the participants to shoulder a water bag. We received feedback from the participants who experienced it, such as, "Thanks to my actual experience in emergency water supply, I've got an overview. If a disaster occurs, I would be able to respond remembering this experience;" and "I had never carried three liters of water, so it's been nice having a valuable experience."

The second is the school waterworks class. The purpose of this measure is to help children who will be responsible for the next generation to recognize that there are various facilities and people's hardships before tap water can be produced and to understand the feeling of conserving water. Mainly for ten-year-old children, we visit schools and give a class to present the efforts of water supply services, through videos and short plays. The water purification experiment in which a flocculant is added to murky water and the water is stirred to become clean is so popular that children shout their pleasure. In fiscal year 2022, the school waterworks class was given to about

1,200 schools, which account for approx. 90% of all the elementary schools in Tokyo. A total of over 1.3 million children have experienced the class since the project started. Among the evaluations of the waterworks class, “very well” accounts for approx. 78%, and “well” accounts for approx. 22%. Most children and teachers evaluate and support the class. We have received feedback from children, such as, “I wanted to take care of the clean water we use,” and “It's amazing to be able to drink safe and delicious water directly from the faucet.” In fiscal year 2021, the special website “Home Waterworks Class” was also launched to allow more customers including children reviewing the school waterworks class, their families, and persons who have not had the chance to experience the waterworks class to deepen their understanding of waterworks and make themselves familiar with waterworks anytime and anywhere. A lot of lesson videos and interesting videos are also posted on this website.

The third is the notification function of the Tokyo Water App. In order to further enhance customer services, the Bureau introduced the “Tokyo Water App” in October 2022. This app has the functions of taking the procedures to start or stop using water by smartphone, paying water charges by credit card or through a payment app, and viewing the water consumptions or charges in the past. Today, I will explain the function of sending various notifications from the Bureau of Waterworks to customers. The past transmission through our website and Twitter could not individually notify specific customers, while the introduction of this app has made it possible to send notifications on water charges, event information, etc., directly to customers. The app can also notify doubts about water leakage, such as leaving a tap running, by e-mail, although it is limited to customers with a smart meter installed. We have confirmed the effect of increasing the number of applicants for events or the number of views of our website with a notification through the app. We hope that this function can play a key role as a communication tool with customers. For your information, in Tokyo, there are about 900 “Tokyowater Drinking Stations,” at which you can drink cool tap water by using your own bottle while on the go. In response to the heatwave, we notified these drinking stations through the app on July 12 (Figure 5-6), when the number of views of the drinking station webpage increased significantly to over 5,000, although it had usually been around 600-1,000 a week.

Figure 5-6 [Tokyo Metropolitan Government] Notification function screen of Tokyo Water App

As measures for communication with customers, I have presented three efforts of the Tokyo Metropolitan Government. The Bureau of Waterworks, Tokyo Metropolitan Government will continue to make various communication efforts to directly connect with customers, aiming to realize water services trusted by customers. We will also promote the enhancement of customer services by focusing on services that meet the needs of the times, using the latest information and communication technology. Finally, I will present the efforts of the Tokyo Metropolitan Government as a whole. The Tokyo Metropolitan Government transmits to the world the “Sustainable High City-Tech Tokyo: SusHi Tech Tokyo” to create “sustainable new value” to overcome urban issues common to the world by using cutting-edge technologies and various ideas. Next year, the international conference “SusHi Tech Tokyo 2024” will be held. In May, city

leaders and startups from all over the world will meet together, aiming to solve urban issues common to the world.

5-2-4 Creating Corporate Plan and Revising Water Rate 2020-2025 (Mr. Philavong Ladda, NPLP, Laos)

[Contents]

The main objective of the presentation is to share how we revised our tariff and also prepared our corporate plan. The establishment of the first corporate plan was done under the support of JICA. We are continuing the capacity building project called Capacity Development Project for Improvement of Management Ability of Water Supply Authorities (hereinafter, "MaWaSU"). I have been a member since MaWaSU phase 1 and now we are in phase 2. The good news is that JICA signed for phase 3 yesterday. It's a good chance for Laos water supply to have the pioneers to support us.

I will start with an overview of my utility. We supply water in Luang Prabang Province. It is in the northern parts of Laos, and we are sharing the border with Vietnam and also not far from China. We can go to China via the electricity railway only for one hour and some minutes. Luang Prabang was the former capital of Laos during the 15th century. We are also a World Heritage Site, based on UNESCO's announcement in 1995. The area is 16,875 km2, and the population is 477,193. The GDP per capita is around 1,900 USD.

Luang Prabang Water Supply State Enterprise (NPLP) was working with JICA experts from Yokohama City, Saitama Prefecture, Saitama City, and Kawasaki City, to make the corporate plan. We determined the service areas of 35. Although our population is small, they are living separately in the area. This is why we divided the area into 35 service areas. Now we have water supply services in 8 areas, while 23 areas don't have water supply. They consume water directly from streams and springs in these areas. NPLP belongs 100% to the government. The covered ratio in Luang Prabang is only 24%, which is far away from the SDGs target. In terms of our business, the current water tariff is 0.2 USD/m3, and staff per 1,000 connections is 6.7.

We have tried to talk to the government to improve our water tariff several times. The corporate plan for 2013 to 2015 became a successful one, but after that, the water tariff revision had not been approved from 2015 to 2020. The corporate plan submitted in 2020 was approved by the provincial governor in 2021. In Laos, if we would like to update our water tariff, there are 5 steps needed. Starting from us, we need to prepare a corporate plan by ourselves. After that, we apply for the Department of Public Works and Transport of Provincial, and later on Department of Water Supply in the central government need to check both of us. If it's OK, the process continues to the boss of the provincial board of management of NPLP. The next step is to go to the governors. After reviewing, the Governor submits it to the provincial assembly. If the provincial assembly agrees with it, governors will approve it. If one of the processes is not OK, we have to come back again. It takes time and is not easy.

Why do we need to adjust our water tariff? Because we cannot survive since our net income is negative. Because we have the project to support. For example, we have a very good opportunity from JICA to give us a grant to expand the water supply in Luang Prabang City. I'm the project manager. It is under construction and it is planned to finish on July 2024. There are 5 service areas in which construction will be done with ADB funds and loans. We need the money to pay back for interest and loan.

The aim of making a corporate plan is to help NPLP manage its operations effectively and efficiently, to help stakeholders understand our business, to set targets with which NPLP can assess its performance transparently and objectively, to set out the corporate strategies to be adopted, and activities undertaken to achieve the goals and to identify the resource required.

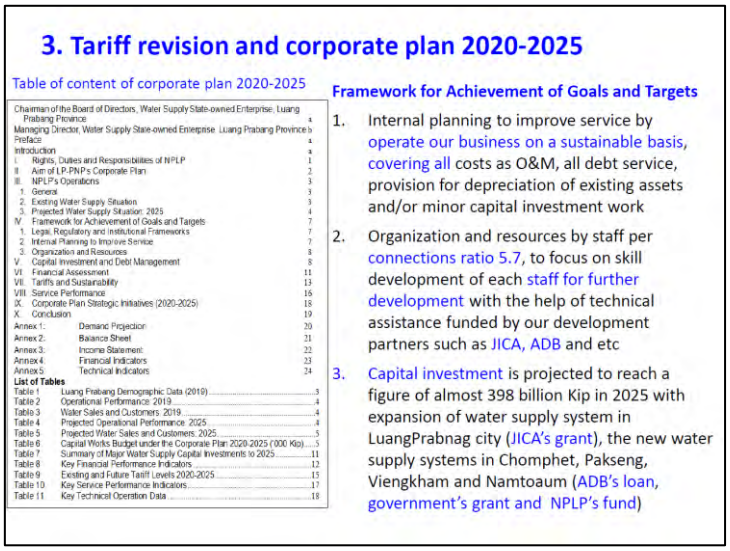


Figure 5-7 [NPLP] Framework for the achievement of goals and targets

Figure 5-7 is the framework for achieving the goals and targets. We need internal planning to improve service by operating our business on a sustainable basis, covering all costs of O&M, all debt service, provision for depreciation of existing assets, and/or minor capital investment work. Further staff development with the help of technical assistance funded by our development partners such as JICA, ADB, etc. is important. And also, we need to pay back the loan.

The basic idea of setting the water tariff is that all the customers in our province are applied to the same level and pay the same water rate. We have 3 customer categories; domestic, government, and commercial. For domestic, we introduce the block system, with the lower one being for the poor people and increasing step by step to subsidize the poor ones.

Compared to the tariff planning, we could not meet the plan in actuality. This is because of COVID-19. We made the plan in 2020 before the COVID-19 pandemic. In Luang Prabang, we depend on the tourism. During the COVID-19 pandemic, the tourists could not come to Laos. Before, we had the income mainly from non-households. Households composed 60% of the water consumption, but income from them composed only 52% of the total. For non-households, their consumption composed 40%, but income from them composed 48% of the total. Our water sales have dropped around 20% compared to 2019. This is why we could not meet the plan. For the last few years, the tourists have come back but still, the sales are smaller than before COVID-19.

The challenges of NPLP are, in terms of external factors, inflation. This affects NPLP very seriously because we import everything and we need to pay for them, e.g., electricity, fuels, and materials. The second challenge is the reform of our organization. The government have a plan to reform state-owned enterprise. We are also one of them and we need to try to update and reform ourselves. For internal factors, we are asking the central government to let us review our water tariff and our corporate plan because we already know it is difficult to meet the current plan. Additionally, we try to improve our efficiency and transparency. Regarding the index of the number of staff per 1,000 connections, we aim to reduce it to 5.7. And NRW rate, the current value is 27%, but we would like to reduce it to 23% by 2025.

5-2-5 Unification of water tariff in the water business integration (Mr. Takichi Obara, Iwate Chubu Water Supply, Japan)

[Contents]

Today, I will deliver a presentation on the theme of "Unification of water tariff in the water business integration." I will first give you a presentation on the issues of the water tariff system before integration, then move on to the topic about the Water tariff review committee, and water

tariff after the integration. Lastly, I will wrap up my presentation with the summary after the end of the tariff calculation period.

First, I will give you an overview of our utility. Hanamaki City in Iwate Prefecture, where our utility's administration office is located, is about 500km north of Yokohama and about 3 hours away by Shinkansen. Established in April 2014, the utility marks its 10th anniversary next year. The area of the administrative district is 1,500 km2, which is about the size of Thailand's capital, Bangkok. More than half of the area is occupied by forests and farmland, so the water supply population is only 210,000. It is a medium-sized body among the water utilities in Japan. A total of 50 water utility workers in overseas countries have visited our facility 4 times as part of JICA's training program. The area has four seasons, and you can feel the original scenery of Japan.

Next, I will talk about the integration of water utilities. Before the integration, we supplied bulk water to water utilities in the neighboring towns of Kitakami, Hanamaki, and Shiwa, and each utility supplied tap water to users. After the integration, a single body, the Iwate Chubu Water Supply, has been in charge of supplying water from water sources to faucets. At the same time as the integration, the water tariffs of the three bodies were unified. Like most water utilities in Japan, our utility is operated by the government both before and after the integration. As for the organizational structure, our utility is headed by the president, vice president, director, technical manager, and 6 divisions with a staff of about 90 people.

The effects of the integration of water utilities are roughly divided into three. The first is the reduction of ordinary expenses. The second is the improvement of water tariffs and service standards. The third is the improvement of facility standards. To put it another way, utility integration enables us to eliminate disparities in water tariffs, services, and facilities for the same tap water.

Next, I will explain the outlook for water tariffs. Figure 5-8 shows the water supply cost and supply unit price in the case of integration as light blue lines, and those of each body in the case of non-integration (NI: Not Integrate) as orange, gray, and yellow lines.

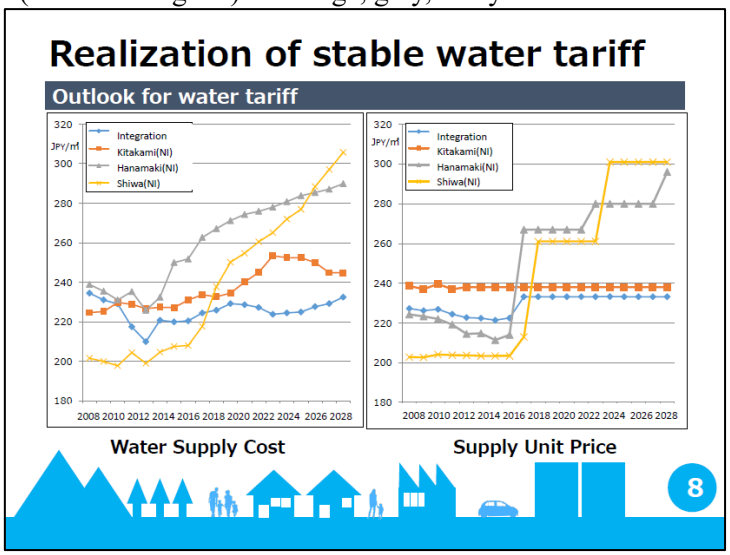


Figure 5-8 [Iwate Chubu Water Supply] Outlook for water tariff

Before the integration, the utility with low costs of water supply, which are on the yellow line, heavily restrained investment to keep the costs down. The cost increases endlessly when replacement investment is made on an appropriate scale, and it will be impossible to manage unless the water tariffs are raised to the highest in fiscal year 2024. In the case of integration, two of the three bodies need to raise the water tariffs temporarily, but the replacement costs can be reduced by government subsidies and the integration of facilities, and the water tariffs can be kept stable for a long time. With this graph, we have repeatedly explained at councils and residents' briefings that the integration would raise the water tariffs in the short term, but would keep them

cheap in the long term.

Integration also improves all services. About the improvement of facility levels. For 10 years since 2011, the Ministry of Health, Labour and Welfare has been conducting facility improvement and renewal under its subsidiary project. An integration-related project with a scale of 29.8 billion yen in total was carried out, including 14 billion yen for the maintenance of water purification plants and 15.8 billion yen for the renewal of facilities. The funds for the project were broken down to 9.9 billion yen of state subsidies, 5.5 billion yen of capital investment from the authority's affiliated municipalities, and the remaining 14.3 billion yen through debt and own funds, which are, in other words, the water tariffs paid by users. If facilities are not renewed, depreciation will be eliminated, which will provide financial stability but increase the risk of accidents. In a water pipe accident that occurred in 2010, a water pipe that had not passed the legal service life of 40 years broke. 10,000 households were without water for 4 days, and it took a long time to excavate and restore the pipe, due to the pipeline crossing under the railway line. It took 6 months to fully restore the pipeline, and during that period, temporary piping was installed on the road. Rust had accumulated in the cast iron pipe taken out in the renewal construction.

The issues of the water tariffs before integration. In 2002, we began examining the unification of the water tariffs after receiving a proposal from the public corporate council. In 2011, a memorandum stated that "the water tariffs should be unified at the time of integration." Before each major event, we have briefings with the heads of the affiliated municipalities and the councils. The water tariff systems before the integration were divided into two systems: a charge system based on the diameter of the service pipe, which was adopted by 1 utility, and a charge system based on use, which was adopted by 2 utilities. The difference in the unit price of water supply was more than 30 yen/m3 at the maximum. As for the difference in the basic water tariff, the use-based charge system is characterized in that the household use tariff is lower than the business use tariff. However, the determination as to whether a household combined with a store such as a small restaurant or a barbershop, and a company dormitory under the name of a corporation are handled as business use or household use differed depending on each utility. From a viewpoint of fairness, I think it was very good that it was changed from a use-based charge system to a diameter-based charge system in association with the integration. The volume tariffs were separated into two systems: a progressive unit price system, in which the unit price increases as the user uses more water, and a fixed unit price system, in which the unit price does not change no matter how much water the user uses.

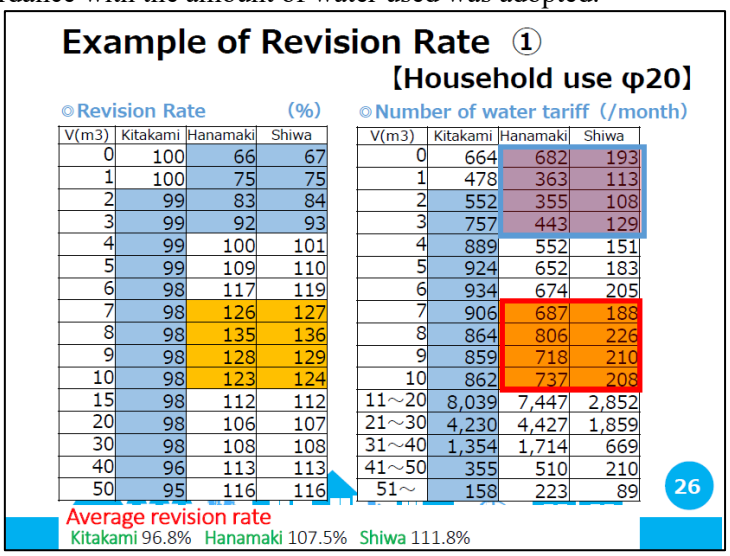
There were five problems in the unification of the water tariffs. The first was the difference in the supply unit prices, and the second was the difference in the tariff structure. The unification of tariff systems would increase the water tariffs of some users much more than the average revision tariff. The third was the handling of the minimum usage. Whether it is set or not makes a big difference for many users. The fourth was the basic tariff for large-diameter users. The fifth was the handling of tariffs for public baths. In Japan, from the viewpoint of public health, the water tariffs for public baths are set at a low price, but in the first place, the charging system of the three utilities was very different, and there were also differences among the bodies in the kinds of facilities to which they applied the cheap water tariff.

Next, I will explain about the water tariff review committee. Based on the previous issues, the water tariff review committee consisting of six water users and academic experts was held to review tariff systems appropriate as a unified water tariff system. As academic experts, we appointed one certified public accountant and a former water utility worker who works as an advisor in Japan. Basic concepts were discussed from four viewpoints. Firstly, it should be theoretical. Secondly, it should be easy for everyone to understand. Thirdly, domestic water should be cheap. Fourthly, it should not place an excessive burden on large-scale customers. The committee recommended that the tariff calculation period should be five years and asset maintenance costs should be included. In the deliberations of three patterns of the water tariff system, all of which were a diameter-based tariff system, the committee compared and examined

patterns with and without the minimum water usage and patterns of gradual increase and flat rate systems for the unit price of the volume tariff. Among the patterns, they considered a plan in which the domestic water tariff was kept low and the increase rates for large-scale customers were also low as appropriate.

In order to communicate with water users about business integration and the revision of the water tariffs, we held resident briefings in 58 local communities. We explained about current situations and issues of water utilities, and the benefits of integration. We provided estimates for future investment in facility renewal, population, and revenues from water tariffs on the public relations paper to share the issues with users. Before the integration, the distance of water pipes renewed by the utility in one year was 7.8km. By calculating based on the total length of 932km, the renewal rate was 0.84%. A simple calculation shows that the renewal cycle is 119 years. In other words, the new water pipe installed this year will be renewed after 119 years. The legal service life of water pipes in Japan is 40 years. I believe some of you will visit Kubota tomorrow. Kubota's latest cast iron water pipe is said to last 100 years. Even using the pipe, you will understand that the current renewal speed is not sufficient. With these easy-to-understand figures, we explained the need for integration and the revision of the water tariffs to the councils and water users.

As for the tariff system after the integration, most of the users of the utilities that dissolved the basic tariff saw a decrease in the price, but the water tariffs for the large-diameter water meter increased. As for the volume tariff, the ambiguous criterion of whether the charge was for domestic use or business use was eliminated, and a positive tariff system in which the water rate increases in accordance with the amount of water used was adopted.



V(m3)	Kitakami	Hanamaki	Shiwa
0	100	66	67
1	100	75	75
2	99	83	84
3	99	92	93
4	99	100	101
5	99	109	110
6	98	117	119
7	98	126	127
8	98	135	136
9	98	128	129
10	98	123	124
15	98	112	112
20	98	106	107
30	98	108	108
40	96	113	113
50	95	116	116

V(m3)	Kitakami	Hanamaki	Shiwa
0	664	682	193
1	478	363	113
2	552	355	108
3	757	443	129
4	889	552	151
5	924	652	183
6	934	674	205
7	906	687	188
8	864	806	226
9	859	718	210
10	862	737	208
11～20	8,039	7,447	2,852
21～30	4,230	4,427	1,859
31～40	1,354	1,714	669
41～50	355	510	210
51～	158	223	89

Figure 5-9 [Iwate Chubu Water Supply] Example of revision rate after integration

Figure 5-9 shows the revision rates for a 20mm-diameter water meter for household use. The left shows the revision rates and the right shows the number of billings of water tariff. Blue shading indicates users whose prices fell, and orange shading indicates users whose prices rose by more than 20%. Under the new system, even though the form of use does not change, some users will have to pay twice as much for water, while others will pay only half as much. Therefore, we have taken sudden change mitigation measures to reduce the difference to the unified rates over 5 years. Sales declined by more than 300 million yen in total, but we believe that there were benefits for both users and operators rather than postponing the unification of the water tariffs.

[Q&A throughout the session]

・ Perumda PAMJAYA (Indonesia): First of all, to WASA-F, has JICA given advisory support as well as refinancing, or just refinancing only? And may I also have your business model? 2nd

question is for Manila Water. I have had communication with Manila Water in my city at the time being, and they have been successful in reducing the NRW rate from 63% to 13%. I would like to know the steps that have been applied to reduce the number. And to Japan and the Bureau of Waterworks, Tokyo Metropolitan Government, since it has achieved a single number of NRW. If we look at the problems of water supply companies, it is important, firstly, the financial strength, and secondly, how to reduce water loss. Reducing NRW itself could contribute to having better and healthier finances for the water supply company. The third question is, I would like to know whether there is any country that applied a prepaid payment model for customers. If any, I would like to know the business model. In the electricity industry, there's been success. Maybe this is one solution to have a better financial model and be healthy in finance.

- Manila Water (Philippines): NRW reduction is a part of the overall strategy because our main problem then was to bring water to the customers with very little supply. That's what pushed Manila Water to pay attention to reducing the leaks and increasing the water pressure. The strategy deployed was to measure it. We are obsessed with measuring the whole system, but of course, it's a very big concession area, several cities and municipalities. Therefore, we have decentralized the management of NRW. We have 6 service areas and they are broken down further to isolate themselves to be able to detect where the leakages are. Once you've detected it, that's when the repair and maintenance come in.
  We have been doing this program since 1997, but it's only 10-15 years later that we were able to have the reduction. We start with the service pipes, the ones closer to the customers. Because it's very disruptive to repair the pipeline and you have to win the customers. When I was a territory manager, my goal was to befriend all the people in the neighborhood. Also, winning the politicians, the government officials in that area is important as well as catching the commercial losses. For example, there was an apartment building that only consumed as much water as a small household, which had some anomaly there. We had to investigate and even file the complaint and take legal action calling into our anti-pilferage laws so that you could arrest those illegal connections. We could get tips from the neighborhood since they're my friends.
  The water meter is like your cash register. Therefore, it's part of the business plan to replace all those water meters every seven years, and whenever there is a complaint, we do a site inspection. If there's something wrong with the meter, we pull it out and it's attested and calibrated at our metrology center and if it's broken, it's automatically replaced.
- WASA-F (Pakistan): Regarding my colleague's question, WASA-F is getting finance from JICA. In addition to this, JICA is also providing consultation as well. Two joint ventures are coordinating with the JICA, one is Nihon Suido Consultants Co., Ltd. and the second one is Yokohama Water Co., Ltd. And regarding the business model, I'll share it with you later on.
- DWASA (Bangladesh): About the prepaid payment, in the power sector in Bangladesh, we have a very successful story, and we have been asked to introduce the prepaid system in the water sector, but we didn't go since it has enormous challenges.

5-3 Presentation [Part 2]

5-3-1 SUSTAINABLE DEVELOPMENT GOALS – SDGS (Mr. Nguyen Van Thien, BIWASE, Vietnam)

[Contents]

We are very happy to be here today and share with all of you guys about our experience, how we transferred from a state-owned company to a private company, and how we started the ODA fund from JICA as the private sector.

Binh Duong is one of 63 provinces of Vietnam which is located in the South of Vietnam, and we are about 30 km away from Ho Chi Minh City. Recently we have three main business areas, one in water supply, the second is waste treatment and the third is wastewater treatment. In 2016,

we went on the procedure of equitization with a charter capital of about 75 million USD at the beginning and a market capitalization of about 106.5 million USD, and a year after that, we were listed in the Ho Chi Minh City Stock Exchange with the code BWE.

Starting from 2000 until 2013, we started applying for the ODA loan and we would like to share with you the difficulties and how we managed to get solutions. The first application submission was in 2003 but we were not able to get approval because we had no experience. Later on, we got the first approval in 2010. And in 2013, we started to apply for the second project. After accumulating experience, we got it quicker. Recently we have total of 2 wastewater projects and 4 water supply projects which are funded by JICA.

Through the experience from the ODA process, we understand that we need to persevere in pursuit of goals. This means that you need to set your own goal and then you need to be persistent and never give up. When you're facing difficulties, it's very necessary to humbly learn to know and to carry out. And the second thing is that the financial agency wants to invest and finance to a potential and effective investment project. And the third one is about the donor. They have a lot of experience in the water sector and they are very carefully assessing the feasibility and the efficiency of the investment project, including the business efficiency and the management of the company, reduction of NRW and water losses.

The following are the ways Binh Duong Water-Environment Corporation- Joint Stock Company (BIWASE) grows its water service. Firstly, we want to focus on the quantity and the quality which is on the customer service. Customer service is very important. The second one is that we focus on the area service, which includes the rural area, urban area, and the countryside. For some areas, there is less population, but BIWASE still wants to invest in these areas because we learned that whenever the water passes through, there will be households that need it. And lastly, we want to raise our prices.

After passing through several ODA loans, we think these factors helped BIWASE to receive the funds not only from JICA but also from other international banks (Figure 5-10). First of all, in the water supply service, you need to satisfy your customers, including household, industrial, and other users. The second point is our NRW rate is reducing, recently it's been about 5%. The third point is the diversity and comprehensiveness of the product and service. And the next is good financial management. You need to publish your financial report and ensure transparency and clarity. The fifth one is to organize scientific production, caring for the interest of the community with green and safe product criteria. The last one is to be dynamic, innovative, and scientific in business.

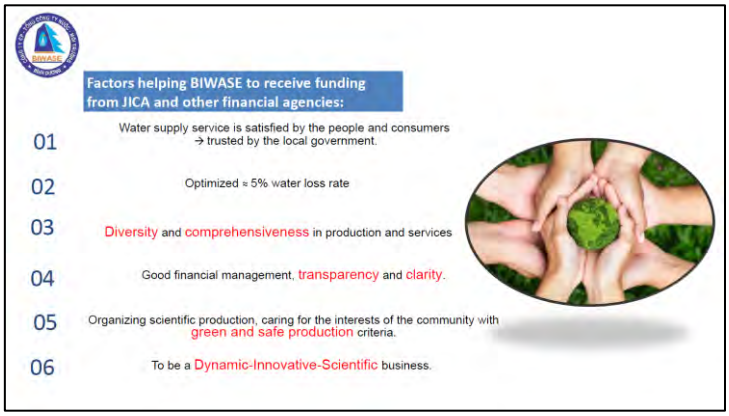


Figure 5-10 [BIWASE] Factors helping BIWASE to receive funding

Around 2019 we faced the COVID-19 crisis, and at that time we were discussing with JICA and ADB to transfer to the private loan. After several months of discussion, BIWASE is very proud to make the first corporation loan signed in 2020 with the total amount of 16 million USD for our Tan Hiep Water Treatment Plant expansion of about 100,000 m3/d. Not only one, but the second one also came in two years later. This project is focused on waste power generation and

treatment, which is also sponsored by ADB and JICA. Regarding this project, we have made the first disbursement already at the beginning of this year. During the COVID-19 period, we also did some community activities. We sponsored the ambulance to the hospital for the patient who got COVID-19, and we also donated water and transferred it to the area with high salinity of water.

We would like to make a short summary from 2016 to 2022. The reason why we chose 2016 is that it is the year BIWASE was equitized from state state-owned company. The state still owns about 15%. The charter capital is about 82 million USD, the market capitalization is about 378 million USD, and the share price has risen from about 7 USD per share in 2016 to about 20 USD per share.

5-3-2 PPWSA: Sustainable Water Service in Phnom Penh (H.E. Long Naro, PPWSA, Cambodia)

[Contents]

I will present firstly about background, secondly about performance improvement, that is, how we continue to keep the performance, thirdly about the result, and fourthly about our action plan for the future to meet the SDGs Goal 6 by the year 2030.

Cambodia is located surrounded by Thailand, Vietnam, Laos, and the sea. We have a population of around 17 million, population in Cambodia. The city area of Phnom Penh is 692 km2, which is equivalent to Singapore. We have a population in Phnom Penh around 2.6 million. We are going to achieve 100% coverage area by the year 2030.

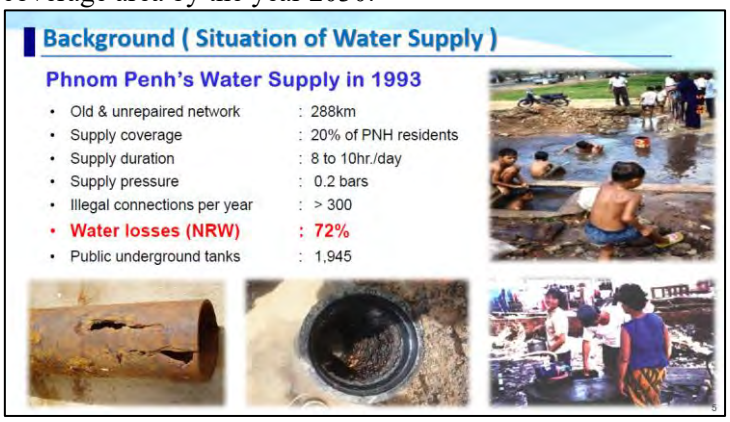


Figure 5-11 [PPWSA] Water supply in Phnom Penh in 1993

Figure 5-11 shows the situation during 1993. We were in a very bad situation with the water supply through the city of Phnom Penh after the Civil War. The NRW rate was 72%, and there were illegal connections. Also, because of the low pressure, people tried to break the pipe to use water directly. Since 1997, based on the support of the Government of Cambodia, we have moved from a subsidized utility to an autonomous utility. In April 2012, we became a listing company. Currently, we are already in the 8th term of Board Director. Our Board Director consists of the Ministry of Industry, Ministry of Economy and Finance, and Private Participation including our staff representative and myself.

Our visions and our missions. For visions, we have two elements, which are sustainable development of water, and participation in other water supply by international sharing of our experience. Our missions are to get a 24/7 water supply and to share our experience with some provincial water work in Cambodia as well as in the region and the rest of the world.

We have developed several master plans with support from JICA. The revised version of the third master plan was completed in February 2023 and has been submitted to the Government of Cambodia. With these three master plans, we can make a very perfect achievement. Without a master plan, doing business in the water sector might be difficult, especially to make customers satisfied with the water production and supply. From 1993 until today, we have spent around 183

million USD in grants and around 700 million USD in loans for the improvement of the water supply system. After spending the money, we have to make improvements to make the performance to be continuous.

What we did. We looked first into the management of water production because we had to optimize as much as possible in order to have a low cost of production. Regarding the chemical dosing system, we have changed it from using alum sulfate and lime to Poly Aluminum Chloride (PAC). We also changed from gas chlorine to liquid chlorine, which also helped us reduce the cost. Since the city of Phnom Penh is flat, we should pump 24 hours to deliver water to the city. It means that we need to find a way to apply the new technology, including energy saving by introducing solar systems. Our investment guideline states that every treatment plant should introduce solar panels to 20% of the total energy consumption per plant. In the new plant, Bakheng Water Treatment Plant, we have a total energy consumption of around 10.7 megawatts and we have solar panels for around 6.7 megawatts to operate our system. That can help to reduce the carbon dioxide. On the other hand, we have introduced variable speed pumps in order to control pressure and flow with respect to the demand, which helps us to cut off electricity consumption. We introduced this system in 2008 when our energy expense was around 40% of total expenditure. Now, the number is around 20% of total expenditure on energy consumption. And we're using a SCADA system. We're using a lot of software in order to manage our operation in time of production and distribution.

We are managing the water quality as well. We have set up our laboratory in all the treatment plants. We have 80 points around the city to collect water and to test the water quality. We received the certificate from our Ministry in terms of water quality standards. We also set up the measurement calibration equipment in the laboratory, which receives ISO standard 17025. That is also a part that guarantees water quality. Additionally, we send the water every year to another independent laboratory to check 150 items. Also, we sent our water to Yokohama Waterworks Bureau in 2001 and 2002 to check our water quality and to prove that the quality satisfies the customer.

In terms of both improvement of performance and network, we started to replace our pipes completely. It is important for NRW because if you do not, you will get higher water losses and it will cost more to repair it than to replace it. We have started our replacement since 1994, and we have expanded our network until now. Another point of view is about the material. You have to have a good material to be used and also have construction to be done with high quality. We do all our network extension work on our own. Water losses are a big problem as well. We have been strengthening our measures by introducing DMA, quick repairing of water leakage, and establishing our SCADA system to monitor all of the water losses through DMA. Maintenance is also important to our water system, so we have done maintenance of the facilities every year based on our schedule to maintain our facility to be reliable for the operation.

Through the IT revolution, we have set up several systems for our system, including an asset management system, SCADA system, and billing system.

Not only look into the improvement of water production or water distribution, but we should also look into human resources. We have five systems to evaluate, including detect, recruit, train, motivate, and replace. We set criteria that we check to improve our human resources.

On the other hand, for social responsibility, I would like to tell you that we have established “Water for All” in 1999 which has been helping the poor to get direct access to water. We have four elements that are inside our social responsibility, and we are working every day in order to offer people direct access to water.

Result. The results of PPWSA are shown in Figure 3-3. Our production capacity is around 800 thousand m3/d with the new expansion of the water treatment plant. The number of connections now reaches 450,000 and we have a pipeline of around 4,200 kilometers. NRW rate started to have a single digit since 2005. It is 8.5% in 2022. We are working with JICA in terms of backing up our provincial water supply and other utilities abroad to help them by sharing our experiences

with them.

Current and future plan. In order to meet the SDGs by 2030, we have to increase our water production capacity from 1 million to 1.8 million m3/d. We have to expand our network. The yellow, green, and pink area of Figure 5-12 lacks the service. The rest of our coverage area will be covered by the year 2030 based on our plan.

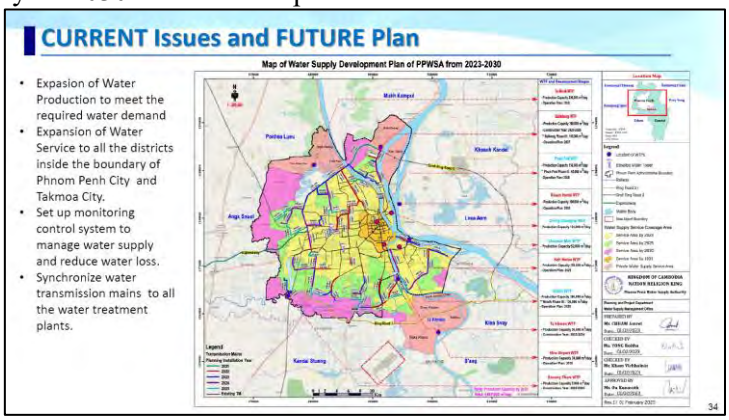


Figure 5-12 [PPWSA] Plan for water supply expansion

The most important thing is that we have support from the government of Japan to look into digital transformation (hereinafter, "DX") for the next generation. Including the operation of water production and water distribution management, we will have full automation for the management of the water supply system. We have two projects which will be financed by the Ministry of Foreign Affairs of Japan and Korea. Through these DX, we will manage the water losses, manage the operation of water production, and achieve reliable water supply including the domestic smart water meter set by 2024.

All the projects until the year 2030, have been prepared and supported by JICA and French Development Agency (hereinafter, "AFD"). All the road map has been designed already, and most of them are under the feasibility study. The loan appraisals will start next year by JICA and AFD. Until today, these projects are on the road and we believe that we can achieve these projects on time to meet the SDGs Goal 6. On the other hand, I would like to tell you that our water tariff needs to be reviewed every five years. Our water tariff should be approved by the Prime Minister. We need assistance from our ministry and Ministry of Economy and Finance and the Board of Directors. We will review our master plan and we need to review our water tariff around 2027 or 2028.

The achievement we have here is through the cooperation of the Water Family, with support from JICA and other donors. The most important thing, which I would like to add is leadership. Thanks to the commitment of the staff, of our supporters such as consultants and contractors, and support from the government and donors, we could achieve our current water supply.

5-3-3 Reform towards a Bankable Water Utility: "Dhaka WASA Turnaround Program" (Engr. Taqsem A Khan, DWASA, Bangladesh)

[Contents]

The topic of today will be securing funds, what we call "bankability." Bankability means that you will have the organization built in such a way that the banks, those who are lending money, will be interested in lending money to you. When the bank is sure that they can get back their money with their interest, only then they will come to invest in your organization. Therefore, bankability is the first and prime for achieving anything and everything, because without money, nothing can take place.

Dhaka is a city consisting of 22 million people, having 400 km2 of area, and 40,000 people/km2, so itself is a challenge. Dhaka Water Supply and Sewerage Authority (DWASA) is probably the

largest water utility in the public sector. Other than San Paulo, no other public utility serves one city having a population of 22 million people.

We started our turnaround program in 2009. The turnaround program was implemented to have 24/7 water and to have 100% coverage of our jurisdiction. DWASA is government-owned, but interestingly fully autonomous. We have a corporate culture of a commercial organization. We fixed our vision in 2009 and our vision was to become the best water utility in the public sector of South Asia. It means an environment-friendly organization, a sustainable organization, and a pro-people organization.

In 2009, the scenario was that a severe water crisis happened, there was a leakage problem everywhere, and there were a lot of illegal connections and informal settlements. Almost 20% of the people of the city are living in informal settlements where you cannot give legal water, and that's the barrier we have to break. Now, we are giving legal water to all the slum areas of Dhaka city. In the scenario, we took a holistic approach and that's what we call the "DWASA turnaround program."

The turnaround program meant to change the mindset of the people, which was the biggest challenge. And obviously, transparency, accountability, cost-effectiveness, etc. are all our things.

The reason why we made the turnaround program is to ensure water for all the poor people and everybody since in SDGs it is stated that nobody should get behind. We started our journey in 2009 saying that nobody should be kept behind and that the slum areas will get legal water.

There were 5 big challenges. One was a mindset change. The second was a bureaucratic complication. The third was the lack of transparency. The fourth was the trade unionism. The fifth was vested interested people.

Strategically, we have done two master plans which have been approved by the government and the honorable Prime Minister, which are the "Water Master Plan" and "Sewerage Master Plan."

(Video showed: DWASA turnaround program initiatives including water and sewerage master planning, strengthening of water treatment capacity through the development of water treatment plants, reducing NRW using DMA, sewerage projects, etc. DWASA is recognized as a role model for public utilities and has established a network with overseas water utilities to share their experiences and knowledge).

We have already converted ourselves into digital, what we call smart water, and that means out of all the functions, almost 70 to 80% are digitalized. We have a water operator partnership now with the Bureau of Waterworks and the Bureau of Sewerage, Tokyo Metropolitan Government. Last October, we signed a Memorandum of Understanding (hereinafter, "MoU") with them and we have a wonderful cooperation. When we say water partners, it doesn't mean consultant or contractor. It is water utilities like us. We are paying for our business, and they are paying for their business, and we are having a mutual contract to share knowledge with each other.

We have a lot of development partners. The development banks that have supported us are almost all the development banks, including ADB, WB, JICA, Asian Infrastructure Investment Bank, etc.

Regarding the NRW rate, we have been able to reduce it from normally 40% to 20%, and in our DMA, it is as little as a single digit (Figure 5-13).

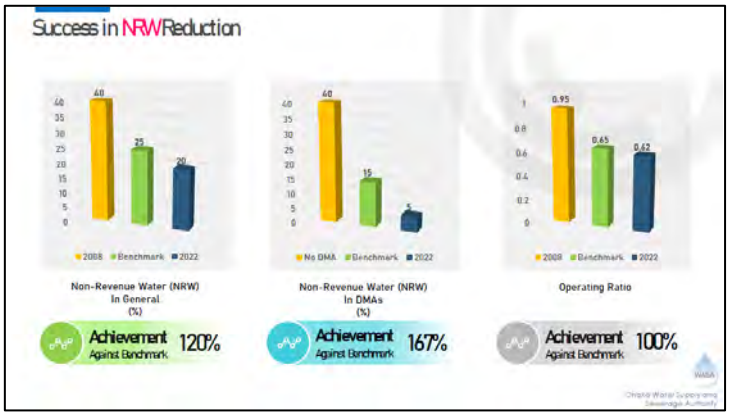


Figure 5-13 [DWASA] Success in NRW reduction

One of the other good things that we have done is that we have set up water ATM machines. With this water ATM, you can push your card and you can get water. It has been very popular. Very recently, we got an award from the Secretary of State of the USA. We have made this arrangement with Drinkwell in our partnership.

By that, we have already made ourselves a bankable organization and now we have almost $2.656 billion in investment. One of the best things that we have done is that we are no more beggars, and we are choosers. We define in which project we will invite which development bank. That's the change we made, and that's our turnaround program. We have a big knowledge hub and we are constructing an international training and research institute. We are converting ourselves into a knowledge hub.

5-3-4 Case Study: Philippine Water Revolving Fund (PWRF) (Mr. Rustico Noli Cruz, DBP, Philippines)

[Contents] *The presentation was presented in the form of a pre-recorded video broadcast. The presenter himself participated online from the time of his presentation to afterward for the Q&A session.

My presentation today will be on the Development Bank of the Philippines (DBP) experience with the Philippine Water Revolving Fund (PWRF). Please allow me to provide you with a brief profile of DBP, and discuss PWRF, including background, overview, our challenges and opportunities, lessons learned, and contributions of the projects.

DBP is 100% owned by the Philippine government and is one of the premier development financial institutions in the Philippines. It has more than 76 years of history in supporting countrywide development and remains steadfast in its commitment to support the government's various development initiatives. As a key player in nation-building, DBP supports the development of the economy through the provision of much-needed financing resources or the identification of priority sectors for sustainable growth. DBP is the 8th largest bank in the Philippines in terms of asset size with 975 billion pesos or 17.74 billion USD. Our strength as the development bank is in providing medium to long-term financing. Today DBP has a nationwide network of 132 branches, 14 branch-lite offices, 5 provincial lending groups, and 32 lending centers. Our development priorities focus on 4 major areas, namely infrastructure (in the districts), small and medium enterprises, environment, and social services and community development. As the country’s designated infrastructure bank, DBP helps in the country's economic growth by financing projects that are aligned with the country's infrastructure development initiatives. DBP provides financing assistance to small and medium enterprises, which have been credited as the backbone of the Philippine economy. We adhere to sustainable development and that's why we support projects that advance environmental protection. Believing that sustainable growth is firmly hinged on total human development, DBP is also a staunch advocate of projects that

promote the well-being of Filipinos across the nation.

Regarding the overview of the Philippine water supply and sanitation sector in 2015, which is the period of the PWRF. On average, 44% of families are with Level 3 connections, 11% with Level 2, and 45% with Level 1 connections. For the water sanitation subsector, the 2015 data shows that approximately 25% of the population does not have access to safely managed sanitary toilets, with 4% still practicing open defecation. On the regional scenario, the Autonomous Region in Muslim Mindanao (A-R-M-M), registered the bleakest picture, with 80% of the population having no access to piped sewer systems or septic tanks and half of the population having no access to basic sanitation facilities. Based on the International Economic Development Authority, Philippine Water Supply and Sanitation Master Plan, the water supply sanitation sector requires about 1,069 billion pesos over 11 years or up to 2030 to achieve the target set by the Philippine Development Plan and the SDGs. This figure also includes non-physical investment totaling 1.13 billion pesos, which would cover the implementation of the master plan reform programs. For the water supply subsector, the 511 billion pesos investment requirement is needed to meet the target of 95% access to safe water by 2022 and 100% universal access by 2030. Said cost of infrastructure investment was derived from anticipated demand based on projected population, and economic growth, and factored in investments. This is to ensure the continuous delivery of the water supply and sanitation services of existing systems. The computation included the anticipated upgrade of existing service levels.

Now let me go through the PWRF. The PWRF was the component of the 24.84 billion yen or 244 million USD environmental development project funded by JICA. It is an ODA loan signed by DBP on September 30, 2008, which was made available for seven years. The original project closing was in January 2016 but was extended until January 2017 due to delayed project disbursements and issues on project implementation that were mostly on the regulatory side and competitiveness of the ODA facility during that time. There are key components of the environmental development project, namely water, or the PWRF, which covers water supply and sanitation projects. The second is the non-water, covering industrial pollution control, renewable energy, etc. And finally, the third component is the technical assistance amounting to 2.4 million USD. The original allocation of PWRF was 1.5 billion yen only, which was later increased to 5 billion yen and subsequently increased further to 7.6 billion or 75 million USD due to an increase in demand.

Now let me provide you the PWRF context on why it was conceptualized. PWRF was conceptualized when the Philippine government committed to achieving the MDGs targets of providing access to water supply and sanitation services to 10 and 15 million people, respectively. The required investment at the time was estimated at 3 billion USD, but public resources available were at 1 billion USD only. Because of the huge funding gap, the government adopted the financing policy to steer creditworthy utilities toward market-based sources, especially private banks. However, private banks and investors perceive public water utilities to be politicized and risky, so this was one constraint that had to be addressed if private sources were to be mobilized. Fortunately, the Philippine financial market at that time was very liquid and banks were looking for new opportunities. With the assistance of the United States Agency for International Development (hereinafter, “USAID”) and JICA, the Philippine government looked at international examples of leveraging of private resources such as the US State Revolving Fund and bond financing in India. Unfortunately, the enabling conditions for either model were not present in the Philippines. Hence it had to look for other opportunities and the immediate available resource was concessional ODA funding that could be used to co-finance private bank loans.

There are two critical considerations in the design of PWRF (Figure 5-14). It should have little impact on the fiscal space and the loan should have a long tenure, affordable rates, and collateral requirements. Hence the PWRF structure as you will see in the diagram, though the loan to the government bank did not require full budget appropriation but rather provisioning for the contingent liability only, so less impact on fiscal space. The long ODA lease period of 10 or 30

years enabled the liquidity cover for private bank loans. At that time, loans only had 7 to 10 years of tenure for private banks. With PWRF, if the private banks agreed to amortize loans over a 15-to-20-year period, they were assured of bullet payment should they opt out on the 7th or 10th year. The guarantee from LGU Guarantee Corporation, a domestic private corporation, and USAID co-guarantee enabled the relaxing of hard collateral requirements for the assignment of revenues.

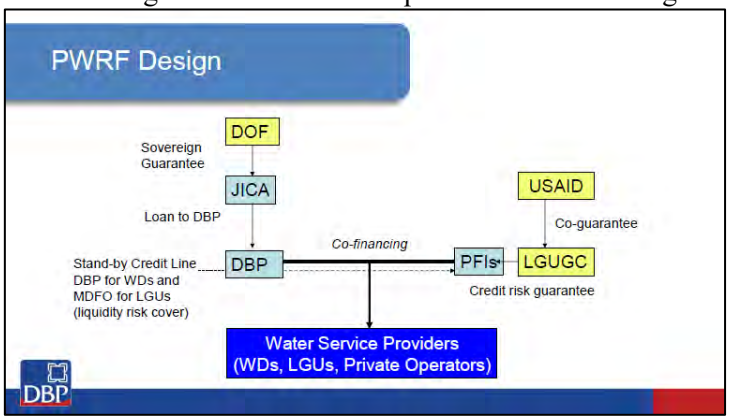


Figure 5-14 [DBP] Design concept of PWRF

Now let me go through the 4 PWRF modalities. The first modality was DBP and private financial institutions co-financing the debt portion of the water project. 75% of the debt portion is covered by DBP, while the balance of 25% is funded by private financial institutions. The second was the participation by a private financial institution debt and PWRF loan under the co-financing modality. Here DBP lends on wholesaling using the PWRF facility. The third PWRF modality was the participation by private financing institutions using a standby credit line from DBP or the Municipal Development Fund Office (MDFO). Private financial institutions may opt to have their loan outstanding principal balance taken out by DBP on the 7th or 10th year period, hence allowing the private financial institutions to extend long-tenured loans to the water sector. The last modality is the private sector participation by direct equity. DBP finances up to 75% of the water project debt.

These are the projects funded; Water abstraction or extraction for water supply, water supply transmission and distribution, water supply treatment, NRW reduction, expansion, improvement/rehabilitation of existing water supply systems, development of sanitations, services/facilities, collection, treatment, and disposal of wastewater. As of the end of 2022, the following are the aggregate developmental impacts for the 16 funded projects under PWRF. In terms of increased water production, we have already achieved 118 million m3/y. The pipe network rehabilitated/improved/replaced is at 1.87 million meters. Increased service connection, we achieved 324,560. Reduction on the NRW, we're now down an average of 26% and we're still targeting to further reduce it to 17%. Water conserved in terms of volume, is already at 9.6 million m3.

There are 3 main challenges encountered during project implementation. Trust-building partnerships with private financing institutions were a challenge at the start of PWRF. We also encountered competition with our fellow government financial institutions in terms of interest rate offerings. There are also regulatory issues encountered related to the Local Water Utilities Administration (LWUA). In terms of the opportunity, PWRF was able to encourage private financial institutions or private financing institutions to invest in the water supply and sanitation sector. In fact, water service providers are now tapping private financing institutions in the financing of their Capital Expenditure (hereinafter, “CAPEX”) and Operating Expenses (hereinafter, “OPEX”) requirements. During the PWRF period, the financial industry was very liquid, and thus funding was not a problem. Water is a basic need and had high market demand, considering the sector's challenges.

These are the lessons learned that we have. One is that access to finance and affordability is

very important for water service providers as they have to deal with regulation on water tariffs which requires consideration and affordability of low-income families. The second is that co-financing of projects with private financial institutions requires scale and thus it is more practicable for big-ticket projects. And as we realized early on that it was not enough to put up the fund and investments for the project to materialize. We had to address the challenges and enablers of the fund. Our efforts included training utilities on strategic business planning, preparation of business cases, full-scale feasibility studies, and commercial loan applications. We also trained banks on water supply and sanitation project appraisal and familiarized them with regulation and institutional setup so they can assess risk and mitigants better. We also have established a credit assessment system for utilities in the LGU Guarantee Corporation and we conducted marketing forums with private banks and utilities. These efforts contributed to demand generation among utilities and fostered confidence among banks to lend. Later, private banks progressed to sole loan origination and offered more competitive interest rates and terms. For example, private banks offered variable interest rates with a one-time option to fix the rate. This allowed the utilities to enjoy the prevailing low-interest rate regime, at the same time having a safeguard to fix their rate once the market rates go on an upswing.

For PWRF contribution, I believe the big contributions to the sector are as follows. One: Improved investment appetite in the water supply and sanitation sector by private financial institutions and Water Service Providers. Second: Private banks now lend directly to credit-worthy utilities without co-financing from the government financing institution. Now, private banks are offering long-tenure loans at a more competitive rate. Lastly, the private developers for bulk water supply and concession agreements source financing from the market. These are contributions that improved the water supply and sanitation sector market.

[Q&A throughout the session]

- Perumda Tirtanadi (Indonesia): I have some questions for DWASA, Bangladesh. We understand that you have worked together with several international banks such as WB, Danish International Development Agency (DANIDA), Korea, etc. Did you directly get the loan from that institution, or did the government intermediated the loan? Regarding the loan payments, is it in your country's currency or in USD? Additionally, we would like to know the figure of the Weighted Average Cost of Capital (WACC) regarding your effort taken for this (Responses were later handled on an individual basis.).

5-4 Business Session

The three presentations were given as business sessions by Aichi Tokei Denki Co., Ltd., NIHON GENRYO Co., Ltd., and Marubeni Corporation. A summary of each presentation is as follows.

Table 5-1 Overview of the Day 2 business session

Company name	Presentation title / Presenter	Presentation overview
Aichi Tokei Denki Co., Ltd.	"Aichi Tokei's Smart Meter Presentation, Battery powered Electromagnetic Water Meter" Mr. Kawazoe	・Company overview explanation and product introduction related to NRW reduction ・Electromagnetic water meter: Usable as a smart meter by combining with other systems. It has features such as a sealed body, high water resistance due to data transmission by optical communication, and high accuracy and 10-year operation due to both low battery consumption and high-frequency sampling. This can contribute to reducing NRW.
NIHON GENRYO Co., Ltd.	"Providing Safe and Clean Water to All Life on the Earth" Mr. Ejima	・Company overview explanation and product introduction of filtration system applicable to raw water with high turbidity after typhoons and torrential rains. ・Siphon tank: It costs less because it does not require the replacement of filter media, saves back-wash water for filter media, etc., and has high performance with high purification capability even in water with high turbidity. ・Mobile Siphon tank: Easy to transport and assemble onsite. Applicable for small to medium-scaled water purification. Introduction of case studies in the Philippines and Laos.
Marubeni Corporation	"Marubeni's Water Business" Mr. Yoshimoto, Mr. Okazaki	・Company overview explanation, introduction of water sector projects, and case studies. Introduction of AGS (Subsidiary) overview and service outline. ・Project implementation in the water sector: Implemented projects of BOT and concession in the Philippines, Bangladesh, and Saudi Arabia. ・Engineering and consultation: Offer software for NRW reduction, software for planning and decision-making for pipe network investments, technical support for effective asset management, etc.

5-5 Group Discussion

The group discussions in Session 2 were conducted as shown in the table below. The same groupings were used for the group discussions for Session 1 through Session 3. For detailed minutes of the group discussions, please refer to "11-5 Records of Group Discussions."

Table 5-2 Session 2 group discussion overview

	Group A	Group B	Group C
Meeting room	Special Meeting Room (8F)	Room 805 (8F) Simultaneous interpretation available	Room 804 (8F)
Facilitator (Main / Assistant)	・ Mr. Edgar H. Donoso (MCWD) ・ Mr. Suzuki (Japan Water Works Association)	・ Mr. Dwike Riantara (Perumda Jambi) ・ Mr. Yokota (JICA)	・ Engr. Taqsem A Khan (DWASA) ・ Mr. Dairaku (Nihon Suido Consultants Co., Ltd.)
Accelerator	・ Mr. Nguyen Van Thien (BIWASE)	・ Mr. Sinthepphavong Khampasith (NPKM)	・ Mr. Zeeshan Bilal (WASA-L)
Members	・ Ms. Sarah Monica E. Bergado (Manila Water, Philippines) ・ Mr. Sherwin Mendoza (Maynilad, Philippines) ・ Mr. Edgar H. Donoso (MCWD, Philippines) ・ Mr. Pornsak Samornkraisorakit (MWA, Thailand) ・ Mr. Nithit Thongsa-ard (PWA, Thailand) ・ Mr. Nguyen Thanh Su (SAWACO Vietnam) ・ Mr. Nguyen Van Thien (BIWASE, Vietnam) ・ Mr. Le Quang Minh (HueWACO, Vietnam) ・ Mr. Ho Huong (DAWACO, Vietnam)	・ Mr. Ade Syaiful Rachman (PU (Cipta Karya), Indonesia) ・ Mr. Arief Nasrudin (Perumda PAM JAYA, Indonesia) ・ Mr. Kabir Bedi (Perumda Tirtanadi, Indonesia) ・ Mr. Dwike Riantara (Perumda Jambi, Indonesia) ・ H.E. Sreng Sokvung (MISTI, Cambodia) ・ H.E. Long Naro (PPWSA, Cambodia) ・ H.E. Chan Sengla (SRWSA, Cambodia) ・ Mr. Khamphouvong Sikholom (DWS, Laos) ・ Mr. Siphanh Inmouangxay (NPNL, Laos) ・ Mr. Philavong Ladda (NPLP, Laos) ・ Mr. Sinthepphavong Khampasith (NPKM, Laos)	・ Engr. Taqsem A Khan (DWASA, Bangladesh) ・ Engr. A. K. M Fazlullah (CWASA, Bangladesh) ・ Mr. Tiresh Prasad Khatri (MoWS, Nepal) ・ Mr. Gyanendra Bahadur Karki (KUKL, Nepal) ・ Mr. Zeeshan Bilal (WASA-L, Pakistan) ・ Dr. Usman Latif (WASA-F, Pakistan) ・ Mr. Waruna Samaradiwakara (MWSEID, Sri Lanka) ・ Dr. Wasantha Kumari Illangasinghe (NWSDB, Sri Lanka)

Figure 5-15 Session 2 Group A Facilitator (Left: Main Facilitator Mr. Edgar H. Donoso, Right: Assistant Facilitator Mr. Suzuki)

Figure 5-16 Session 2 Group A Group Discussion Scene

Figure 5-17 Session 2 Group B Facilitator (Left: Main Facilitator Mr. Dwike Riantara, Right: Assistant Facilitator Mr. Yokota)

Figure 5-18 Session 2 Group B Group Discussion Scene

Figure 5-19 Session 2 Group C Facilitator (Left: Main Facilitator Engr. Taqsem A Khan, Right: Assistant Facilitator Mr. Dairaku)

Figure 5-20 Session 2 Group C Group Discussion Scene

5-6 Feedback

5-6-1 Presentation from Group A on the results of the group discussion

Mr. Edgar H. Donoso, main facilitator of Group A, presented the results of the group discussion.

Figure 5-21 Presentation from Group A on the results of the group discussion (Day 2)

[Contents]

SDGs Goal 6 aims to ensure the availability and sustainable management of water and sanitation for all. This goal is essential for human health, food security, economic development, and environmental sustainability.

In this afternoon session, we focused more on the NRW, the water rates adjustments, the improvement of communications, and raising funds outside of water rates revenue.

Listening to this morning's presentation, I was very sad to hear that my colleagues within our group had a very good figure for the NRW rate. In fact, some of them had single digits, while MCWD currently is at 32%. We are trying to improve this to 20% by 2030 and we have some programs for that. Other utilities had a very low figure. For example, Manila Water's NRW rate is 13% and they are trying to reduce it to less than 10% in the future. On the other hand, Maynilad's NRW rate is higher than ours. Other countries from Group A are Vietnam and Thailand. I think BIWASE has a 5% NRW rate and they are trying to keep the figure. HueWACO has a 10% NRW rate and they are trying to improve it to 8.5% in the years to come.

We also discussed water tariff adjustment where the issue is the social and political acceptance of all water adjustments in order for us to sustain the operation of the water utilities. There is an issue of how to raise the water rates while our NRW rate is high. That's why this is an issue of social and political acceptability of the water tariff adjustments.

Another topic was what other options are that the water utilities can avail outside the water rate revenue if we cannot have the water rate adjustment. We have to either borrow money from the banks or receive grants from other international cooperation agencies. Issuing bonds could be an option if they are capable. However, for government-related organizations such as MCWD, we are restricted in securing funds outside of the water tariff revenue. For some colleagues in Group A, since they are private entities, financing to sustain the development of operations of the water system might not be a problem.

Regarding the NRW, I think there was a question in our discussion about its benefits or the cost-benefit analysis in reducing it further, that is, whether or not the benefit of reducing NRW is more than the cost that you are going to spend by reducing the revenue. In fact, there was one member who calculated their best NRW rate to achieve, which was only up to 8.5%. Trying to improve the NRW rate to less than that will be no longer an economically efficient endeavor.

And then, another consideration may be to improve the communication with customers because if we can really inform them, even the politicians, of our projects, programs, and activities, they will understand that we're in a serious situation and that the water rates should be increased to sustain the operations of the water utility.

My frustration was that issues such as NRW and financing are very critical for us, but we had only 10 or 15 minutes to discuss these topics.

5-6-2 Presentation from Group B on the results of the group discussion

Mr. Dwike Riantara, main facilitator of Group B, presented the results of the group discussion.

Figure 5-22 Presentation from Group B on the results of the group discussion (Day 2)

[Contents]

We discussed about how to achieve the SDGs, especially Goal 6, water and sanitation. The keywords are, improving water services, full cost recovery tariff, communication with customers, and raising funds for water service development.

When we talk about improving water services to supply water to the customers 24/7 with good quality drinking water from the tap, we need to discuss quantity, quality, continuity, and affordability. Indonesia, Cambodia, and Laos are struggling to achieve SDGs, especially Goal 6.

The challenges are to improve water services by having a full-cost recovery water tariff in order to enable investment for development. It is important to have water tariffs regulated by the government in a form that allows water utilities to set up full cost recovery tariffs. As an example, the Indonesian government gives authority to the governor in each province to decide the highest and the lowest tariff. Therefore, water utilities will be able to set up their own tariffs within the range, and in this way, the tariff will not be too low. A master plan including a mid and long-term plan should be in place as the guidance to convince the government, politicians, and funding provider agencies to support the improvement of services.

In terms of communication with customers, we are working on establishing a platform for better communication with customers as a pillar of services. Indonesia, Cambodia, and Laos are working to establish the platform core for communication with customers by utilizing social media and mobile applications.

The third topic is to have options for funding. We discussed a number of projects going on in Indonesia, Cambodia, and Laos supported by JICA and other development agencies such as ADB, USAID, the Australian Agency for International Development (AusAID), and also Korea International Cooperation Agency (KOIKA).

We know there is always a lack of funding to develop water supply infrastructure in developing countries. Full cost recovery is the key to ensuring the sustainability of water services. The role

of the central government is very important to regulate the water tariff at the provincial and local levels. PPP has been introduced as an option for water service development since the 1990s, but the success of PPP is still debatable. Based on our experience, there are still some bad sides or bad impacts of privatization. For example, the water tariff becomes very high, technology is transferred, and the value of sound management decreases. It is interesting to understand how the government regulates private involvement in the water sector. Now, especially in Indonesia, the participation of private parties is strictly regulated according to the new regulation. In Cambodia and Laos, they are establishing water development funds.

5-6-3 Presentation from Group C on the results of the group discussion

Engr. Taqsem A Khan, main facilitator of Group C, presented the results of the group discussion.

Figure 5-23 Presentation from Group C on the results of the group discussion (Day 2)

[Contents]

We had a wonderful discussion first of all. We come to the conclusion that the autonomy of the organization is the basis for customer service, the NRW reduction, or the sustainability of the organization. The organization should be an autonomous body, not a government agency. In our group, Sri Lanka's utility is autonomous. Bangladesh's utility also has semi-autonomy. For Pakistan, not yet but do have some autonomy. As for Nepal, I think it's already autonomous. Therefore, autonomy is the first precondition for the sustainability of the organization, in order to fulfill the SDGs Target 6.1 and 6.2.

Secondly, we should have a water resource policy. We agreed that every country or every organization should pursue to have their water resource policy.

And regarding the tariff, an economic tariff cannot be established unless you have your autonomy or you have your water policy. Water tariff should be an economic tariff, break-even tariff, or rational tariff. Tariff adjustment is one of the preconditions for the sustainability of the organization and for the fulfillment of the SDGs.

Then it was discussed that among the OPEX and CAPEX, at least the OPEX should be maintained or covered by the water utility. Maybe the CAPEX can be given by the government, depending on what the terms and conditions are, or by the government and the utility. When both OPEX and CAPEX are covered by the utility, the debt should be the target, but it is a government issue and a political issue. However, we all felt that OPEX and CAPEX should be covered by the utility.

NRW also depends on how your tariff system is and how much autonomy you have. NRW is a technical issue, not a political issue. Of course, there are some political parts, but mostly it is a technical and commercial issue. It could be reduced and it should be reduced. Some of the

countries of Group C have good tariffs, and some of them have good NRW rates, while some of them have not yet reached that. In order to reduce NRW, the tariff should be adjusted and autonomy should be given.

It was discussed that PPP is one of the good options. All the governments of all these countries are encouraging PPP and there are a lot of PPP projects coming up in those countries. Basically, it's mainly in the transport sector and railway sector. In the water sector, we have experimented with it but couldn't go through because of some reasons. PPP is also encouraged to have a sustainable water utility.

These are the main points that we have discussed and we all have the same opinion that these are the preconditions for fulfilling the SDGs Target 6.1 and 6.2. Most of us think that there are still ambitious programs, especially in the sanitation sector, and it is still under question whether we will be able to achieve safely managed sanitation by 2030. But, as for the water sector, it may be possible to achieve.

5-6-4 Comments from Prof. Takizawa

After the presentation from each group, Prof. Takizawa offered comments for feedback.

[Contents]

It's not easy to wrap up today's talk. We had a discussion about many things related to SDGs Goal 6. Everybody knows what is SDGs Goal 6, but let me explain a little. Goal 6 is to "Ensure access to water and sanitation for all." The last word, "for all" is very important. According to the JMP Report, 2.6 billion people have gained access to improved drinking water sources since 1990. This is not the SDGs but the MDGs. And 663 million people are still left out without access to improved water sources. What's important is the red highlighted part in Figure 5-24. Out of 2.6 billion people, 1.9 billion gained access to piped water supply systems. Water utilities cannot do all the work but still, we understand that piped water, which you're responsible for, is the major driving force to achieve SDGs goal 6. 71% of the world population can use safely managed water, but there is wide variation between countries and regions, and it also means 29% lacks access to safely managed water sources.

Figure 5-24 [Day 2 Feedback by Prof. Takizawa] Contents of SDGs Goal 6

Toward the achievement of SDGs Goal 6, we heard a lot about the financial sources such as JICA, ADB, and WB, and we also have a new scheme like PWRF.

But besides these financial sources, we have different kinds of sources. What is very important is good utility management. I heard outsourcing can reduce the cost, and human resource

management is an important issue to improve your management. I heard a lot about NRW reduction in different ways like water metering by Manila Water. Managing your meter is critical. Also, pipe replacement and reducing illegal and false connections, are very important, too. We also have different ways, but also difficulty in tariff revisions and corporate plans. We do agree that even if you think it is time to increase the water tariff, someone above you does not like it. And also, we talked about a bankable water utility. Bankable means that the private banks are very much willing to make a deal with you because your management is sound and you will certainly pay back the money with some interest. Bankable means a good state of management. But we also do know that there is a long way to go because of some difficulties such as tariff revisions, which is not easy. I also agree that every water company or water utility needs to think about whether your company is bankable, whether you are in a good, sound state of finance that private banks would come and make a deal with us. If we cannot get the state of water utility management, there will be no financial sources. Then, the deficit will increase like a snowball every year, because no financial sources are available, which is a vicious cycle. We would have a loss, not only water loss but also financial loss. It accumulates every year. Therefore, transforming the water utility management is a basis for getting access to good financial sources. I understood that this is what PPWSA and Manila Water did. If you decrease NRW, people will look at you and will be willing to work with you, and then, you can get easier access to financial sources every year.

Again, I confirm from your talk that improving water utility management is the first step and basis for getting access to different types of financial sources. That's what I learned today.

5-6-5 Comments from H.E. Ek Sonn Chan

Following the comments from Prof. Takizawa, H.E. Ek Sonn Chan offered comments for feedback.

[Contents]

Today’s topic was SDGs. I think that SDGs are the best topic for us as water men/women to bring and show to the politicians. Because the head of the state, the politician endorsed the SDGs and they need to fulfill it.

We are going to look back at the current situation of water supply and sanitation in Asian countries except Singapore, Malaysia, and Japan. The way to the end of the line is very far. Do not forget that if you want to walk fast, you should walk alone, but if you want to walk far, you have to walk together. That is probably the spirit of our session today and the forum.

I will bring you 4 hot topics. First, there was an explanation about SDGs Goal 6, and it's a very big job that we need to perform. Only achieving Target 6.1 is difficult enough, and the other 5 components are also very difficult to perform. Because it is related to many different institutions, and organizations from the governments. But looking into ourselves, two concerns were raised.

The first concern is NRW. That was a big topic today, and we learned a lot about it. BIWASE, the 100% listed company, reached 5%. I don’t know the definition but if the figure means the system loss, we can call it amazing. Before, PPWSA and BIWASE were twinning. We put a lot of effort in order to improve the management of BIWASE, and now they have overtaken us. But on the other side, some of the other waterworks are still far behind. Therefore, my first concept is how to learn from each other. The proverb says, “You hear 100 times is not as good as you see one time.” But you see one time is not as good as you do it one time by yourself. Now, you're just staying here, and not seeing. Therefore, it is my proposal for JICA to be the organizer of such twinning between utilities. If we have our colleagues struggling with water losses, they can come to learn how they can do that.

The second concern, which is also my second hot topic, is tariff revisions. Many waterworks need to revise water tariffs. By asking the water operator, you have the first impression that the

water tariff is not enough. But you need to go into a benchmark to see the cost exactly based on some indicators like Manila Water, e.g., spare 15% as the margin for the cost calculation, as well as PPWSA does. Different conditions and situations create different costs. One utility makes the investment to reduce the water losses, while it is not beneficial anymore for another utility to try to make it below 8.5%. In the case of Japan, they reduce the NRW rate to as low as 3%. In Tokyo, they have stainless steel pipes, which we all cannot afford. In Tokyo, the water cost is so high that it is beneficial to reduce NRW as low as 3%. On the other hand, in Melbourne or Penang Malaysia, the cost of water is very low, so achieving the NRW rate of below 10% is not beneficial anymore. It depends on the situation. Revising water tariffs also depends on each country. I believe that everyone in this room understands exactly what they need to do for the revision of the water tariff. If you have a good leader, you can realize it.

The third hot topic is financials. A lot of banks are looking for a good water utility. In Cambodia, we have achieved the SDGs Target 6.1 only 29% as of today. Because the rest of the country (except Phnom Penh) under the private water operators does not perform well. They have plenty of reasons why they cannot perform well. Cambodia and Laos are very much behind regarding SDGs. And we are very happy to hear that JICA is taking the opportunity to provide the master plan nationwide for water supply. It is a very important topic and very complicated as well.

Chapter 6 Session 3 “Collaboration and Co-Creation”

Session Theme	Aim of each Session
Session 3 “Collaboration and Co-Creation”	・ The session aims to share the concept* that it is important to implement what was discussed in Session 1 and 2 not solely by the water utilities themselves but also through collaboration with a variety of partners. *This concept is not limited to international cooperation but also includes collaboration between urban and rural areas in the same country. Furthermore, it also includes the concept of collective mobilization of funds (private and public funds).

6-1 Summary of Day 2, 3

A Summary of Day 2, and 3 was given by Session 3 Main Moderator (Mr. Ono, Yokohama Waterworks Bureau).

Figure 6-1 Day 4 Main Moderator: Mr. Ono (right), Assistant Moderator: Ms. Shoji (left)

[Contents]

We discussed a lot of topics in Session 1 and Session 2. Regarding Session 1, the theme was “Towards Water Utilities Resilient to Risk and Change,” and we discussed infectious diseases like COVID-19, climate change, aging infrastructure, BCP, and human resource development. In Session 2 “Towards Achieving SDGs Goal 6,” we discussed service improvement, improvement of communication, funding, tariff revision, and consideration for low-income households, etc. The theme was broad and it was not an easy topic. It seemed that we shared a common understanding about the importance of full cost recovery, the difficulty of tariff revision, the necessity of mid-term and long-term masterplan including water resource policy, the importance of NRW management, importance and difficulty of attracting funds. It was shared that the first and best step for funding is to improve the management of water utility, which will lead to the achievement of SDGs. On Day 3, the technical tours were given, dividing the participants into 2 groups. One group visited KUBOTA Corporation and the other group visited Yokogawa Solution Service Corporation.

6-2 Presentation

An introduction was given to the theme of Session 3, “Collaboration and Co-Creation” by Session 3 Main Moderator.

[Contents]

Session 3 is titled “Collaboration and Co-Creation.” We will cover the topics discussed in Session 1 and Session 2, from the perspective of collaboration and cooperation with diverse partners rather than just doing it by our own utility. Through this forum, it was mentioned “Water Family.” I think it is a good keyword. Then, who is the member of the “Water Family”? I think we can understand this question through this session.

6-2-1 “Center of Excellence for Water” Initiative (Dr. Wasantha Kumari Illangasinghe, NWSDB, Sri Lanka)

[Contents]

I will briefly introduce my organization, key indicators, major challenges, and the way forward. Thereafter, I would like to take a few minutes on the new initiative of the National Water Supply and Drainage Board (NWSDB), to collaborate and co-create, to learn from each other, and to find new ways to tackle some of the problems we have discussed in detail during last two days.

NWSDB is the premier organization supplying water and sanitation services to the entire country. Presently, we cover 48% of the population with piped water and 2.2% with piped sanitation facilities. The consumer base of our organization is 2.9 million, and we have a production capacity for purified water of 2.2 million m3/d. With our corporate plan 2020-2030, we plan to increase piped coverage to 78% by 2030 to meet the SDGs Goal 6. The NRW rate island-wide is 25%, and out of our operational cost, 25% is for energy pumping. We have 3.3 employees per 1,000 connections.

What are the major challenges and what is the way forward? With the percentages I have presented, we all understand that the topmost challenge is to increase the coverage of water supply and sanitation services. To achieve this, currently, our main topic is PPP. For that, we need to have a good balance sheet which requires a cost-reflective water tariff. These things are what we have discussed for the last two days. The second challenge is to respond to the climate change impacts. During the 20th century in Sri Lanka, the temperature has risen by 0.8 degrees and the average rainfall has decreased by 7%. The number of consecutive dry days has increased, while wet days have decreased, and the frequency of extreme events, such as floods and droughts has increased. The first thing to do is that we have to have a national water resource policy to share the limited water resources among the different uses. Another important thing is to improve the efficiency and productivity of the organization. Digitalization is important. Also, we have to put a lot of attention on managing our assets. NWSDB has a huge asset base, therefore, we have to find initiatives to manage our asset base. Those are the few topics on challenges and the way forward.

Next, I would like to move to the new initiative of the organization, the Centre of Excellence for Water and Sanitation (hereinafter, “CEWAS”), an autonomous business unit of the organization.

(Video showed: Overview of the CEWAS initiative. CEWAS was established to utilize the expertise, experience, and enthusiasm of NWSDB. It consists of three key divisions: Center for Knowledge (providing a variety of training programs within and outside the NWSDB), Center for Innovation (conducting research and development in cooperation with universities, tertiary education institutes, the industry sector, and private organizations, etc.), and Centre for Quality (providing laboratory services to verify and guarantee the quality of domestic water and wastewater services). The goal is to create value for those involved in the water supply and sanitation sector.)

We established CEWAS in 2021, and what we have done in the past two years is capacity development and collaboration. We have a lot of local collaborations as well as some international collaborations already (Figure 6-2).

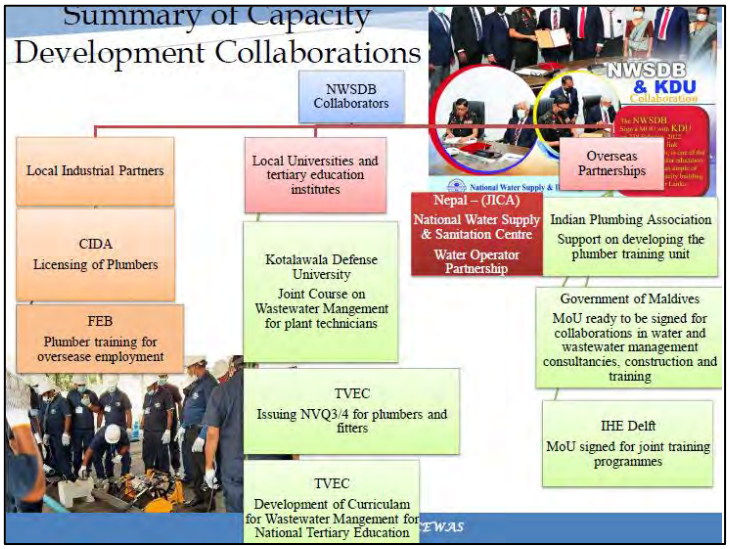


Figure 6-2 [NWSDB] Summary of capacity development collaborations

As an example of local collaborations, we have started a plumbing and pipe fitting training course which is very much needed for the country, because many unskilled laborers were doing this activity but there was no certified course or training arrangement. That's why we have established it. We are very much thankful to JICA for giving us the pipe training yard. Many people have been trained by us now, and they are getting a license certificate. They are following our training courses along with the Foreign Employment Bureau and finding overseas employment opportunities. The second example is the wastewater management course for plant technicians. There are a lot of private sector wastewater plants in the industries and hotel areas, but there was no course for them to learn. Therefore, we established this course with the local university, Kotelawala Defense University. We have conducted two programs, and we are also developing a curriculum for this course with the Tertiary and Vocational Education Commission.

Regarding foreign collaborations, we have the Indian Plumbing Association having helped us to establish our plumbing lab. The government of Maldives will soon sign an agreement for collaboration. IHE Delft and we have already signed an agreement, and we are ready to start a research and development program for asset management. Currently, thankful to the JICA Nepal office, we are planning to have a joint program with the National Water Supply and Sanitation Center in Nepal for water operator partnership, which will benchmark the two organizations and which will help both organizations develop their functions.

When it comes to research and development, our main aim is to do applied research and development to find innovative solutions to general problems in the water and wastewater industry. And here also, there are a lot of collaborations with industry as well as universities.

I would like to show a few examples. The first one is about sodium hypochlorite. Most of these research needs came out of our day-to-day requirements. During the COVID-19 period, it was very difficult for us to import bleaching powder and calcium hypochlorite, but there was abundant sodium chlorite around the country. Therefore, with the industry, we did the research and we have already installed sodium hypochlorite for disinfection in half of our small-scaled and medium-scaled plants. The second example is about hydrothermal treatment of sewage sludge. The research was done by one of our engineers at Tokyo University, and she presented a paper in our research symposium in which we got the idea. In our laboratory, now we are ready to provide biofuel and liquid fertilizer from sewage sludge. Thereafter, we want to do a pilot study. JICA funded the Kandy City wastewater development project. Therefore, we want to do a pilot study to see whether we can put it properly in the field. The third example is about introducing smart water meters. We have already installed 300 water meters with different types; volumetric, electromagnetic, ultrasonic, and different data transmission mechanisms and different methods.

And then finally, alkaline water for health. We have done research to produce it, and we have already produced it, and we would like to see the health benefits with the medical faculty. We have our symposium for research presentations.

Collaboration is important to solve current problems in the water industry and CEWAS is created for that.

I invite everybody to join us to participate in our annual Congress and our research and development and capacity development programs.

6-2-2 Lao Water Works Association (LWWA) (Mr. Siphanh Inmouangxay, NPNL, Laos)

[Contents]

I would like to inform you about the Lao Water Works Association (hereinafter, "LWWA"). LWWA is an independent association, a nonprofit organization that brings together the provincial water supply state enterprises, and private water suppliers in Laos. LWWA was officially established in January 2021 at the stakeholder meeting led by the Ministry of Public Works and Transport and the assistance of the MaWaSU Project supported by JICA. MaWaSU project has provided technical water equipment, and funding to strengthen the water supply state enterprise in Laos, particularly to create 3 provincial water supply state enterprises being the center point; (1) Vientiane Capital Water Supply State Enterprise (NPNL), (2) Luang Prabang Water Supply State Enterprise, (3) Khammouan Water Supply State Enterprise. LWWA's office is located at the head office of NPNL.

The Goal and objective of LWWA is to stimulate, promote, and develop the waterworks operation of Laos to become a strong network, connecting sub-regionally and internationally. The objective is to retain business operators related to water supply in many forms such as water producers, construction experts, researchers, suppliers of equipment, and water supply facilities to strengthen knowledge and ability in the field of water to grow strongly and sustainably. Currently, we have 36 Ordinary Members (18 Provinces Water Supply State Enterprises), Supporting Members (18 companies), and 7 Honorary Members. The Board of Executive Directors consists of the Chairman, the General Manager of NPNL, the Vice Chairman, the General Manager of NPLP, and three Standing Committee of the Board. The Board of Directors Meeting in September 2022 included an activity report for the first six months of 2022, approval of the name list of Honorary Members, an activity report related to the MaWaSU Project, and a proposal for the improvement of LWWA organization chart to suit the activity of each subcommittee of the MaWaSU Project.

LWWA is visiting Ordinary Members (Figure 6-3). Last year, we had meetings with Water Supply State Enterprise of Phongsaly, Luangprabang, Luangnamtha, Oudomxay, Bokeo, and Saiyubuli for the Northern Region, and Vientiane, Xiangkhouang, and Bolikhamsai for the Central Region, and Khammouane, Savannakhet, Champasack, Salavan, and Attapu for the Southern Region. Additionally, we have visited the Supporting Members; Lao Pipe Company, TOYO Company, and Savankham Company.

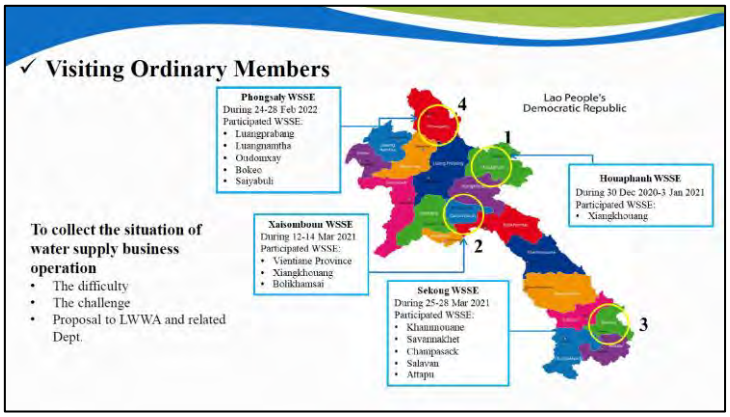


Figure 6-3 [NPNL] Activities of LWWA: visiting ordinary members

LWWA 2022 Annual Meeting included the annual activity report for 2022 and planning for 2023. We also reported the draft for the role of the Ministry of Home Affairs, Ministry of Public Works and Transport, and Department of Water Supply related to the activities of LWWA. We have given a certificate of appreciation to members who supported the activity of LWWA in 2022 as well.

LWWA is offering assistance to the members. We have held meetings to exchange lessons with LWWA Ordinary Members to provide technique, On-the-Job Training (hereinafter, "OJT"), support small funding, and water equipment as necessary to the Water State Enterprise which had an impact from natural disasters. We had a meeting to exchange lessons with the Water Supply State Enterprise of Saiyabuli, Oudumxay, and Houaphanh to exchange lessons and provide training. OJT included the management of NRW in the pipeline system, checking the stability of the water meter, and maintenance of the electric system in the water treatment plant and water pump. To Xiengkhuang Water Supply State Enterprise, we offered training about the maintenance of electrical systems and water pumps and water quality management.

For the implementation of the MaWaSU Project activity, we participated in the conference on water quality management in the Southern Region, Savannakhet Province. We also participated in the conference of the same theme in NPNL as well as the Water Classroom. Additionally, we participated in the training to become an OBE (Outcome-Based Education) trainer to be able to create a training course syllabus and create a teaching plan. Out of three classes, the first class was for the management construction planning, and designing and as-built designing, construction picture album-making. The second class was a technical course on pipeline installation, service pipe/water meter installation, and material storage management. As for other activities, we participated in a mini-workshop of planning and finance for the South Region, Attapu Province Water Supply State Enterprise, and a mini-workshop of customer relations for the Central Region, Vientiane Capital, etc.

Related to international cooperation, we attended the Indonesia Water and Wastewater Expo and Forum (IWWEF) and the Southeast Asia Water Utility Network (SEAWUN).

Some challenges we are facing are, firstly, less experience in management since LWWA has been established recently, secondly, limited access to funding sources to develop waterworks in Laos, and thirdly, human resource development, especially for LWWA management.

6-2-3 MANAGE WATER & SANITATION AND BOOST COOPERATION IN NORTH SUMATERA PROVINCE – INDONESIA (Mr. Kabir Bedi, Perumda Tirtanadi, Indonesia)

[Contents] *Since the speaker had to return to Indonesia in the middle of the forum for unavoidable reasons, the presentation was made in the form of a pre-recorded video broadcast.

My presentation is regarding the "Manage Water and Sanitation and Boost Corporations in North Sumatra Province in Indonesia."

Perumda Tirtanadi was established in 1905, and our location is in the North Sumatra Province, northwest of Indonesia, near the Banda Aceh. Our company offers water services to two zones. The first zone is Medan and its surrounding area (Medan, Deli Serdang, and Karo Regency). Inside Zone 1, we have covered the service area of drinking water of around 72% in Medan, while only 62% in Deli Serdang and Karo. On average, in 2022, our coverage rate of Zone 1 is around 69%. The second zone covers several regencies; Toba Samosir, Samosir, Tapanuli Tengah, etc. For Zone 2, our service coverage varies from around 10% to 69% since this Zone 2 includes remote areas and islands. People live there in a scattered way. Therefore, it will be difficult to increase the coverage. In addition to the drinking water, our company also manages the wastewater. For wastewater services, number of customers is already around 77,000, and the coverage rate is around 14.5% based on the population. The production capacity of water is currently around 7,200 LPS (liter per second). The number of customers in total is around 516,000. Since we are operating in the supra-regencies and municipalities, the room for growth is still very big in the number of customers. For the sanitation services, the number of customers is 77,571.

I will explain the cooperation in Permuda Tirtanadi. We have several water treatment plants in several areas. In Medan and its surrounding area, and in the other areas, we have joint operations. We do cooperate with private companies in the form of Business-to-Business, and we have new types of cooperation, which we call regional drinking water supply system.

Number one is joint operations (Figure 6-4). This is a cooperation between Perumda Tirtanadi which is owned by the province and the cities or agencies. Our company works together with some cities or some residencies. We manage upstream and downstream, while the cities or agencies own the actual assets. Water tariffs will be designed together with us and cities or agencies. The construction of the water treatment plants is mostly done by the central, provincial, or local governments. Regarding the pipeline, it will be done mostly by the local governments. For the project of the water treatment plant, Perumda Tirtanadi will usually do the preparation of the document, Feasibility Study (FS), and Detailed Engineering Design (DED), and we will submit the documents to the central and provincial governments, and then to the local governments. Central or provincial governments will do the financing for the construction of the project to the cities. When the construction is finished, the central government will hand over the assets to the local governments. We only manage their assets. Through joint operations, we speed up the service of the drinking water in the remote areas.

Figure 6-4 [Perumda Tirtanadi] Overview of joint operations

We do joint operations with Tapanuli Selatan Regency, Padang Sidempuan, Palota, Toba Regency, Samosir Regency, Tapanuli Tengah Regency, Deli Serdang Regency, Tanah Karo, Nias Selatan, and these are until 2024. Nowadays, we just entered a new cooperation with Nias Utara in 2023, which is based on the new rules with a duration of only five years until 2028. Joint operation with Nias Barat is also a new contract with a duration of five years until 2028. We already finished the signing of the contract. Also, we are going to do joint operations with Humbang Hasundutan Regency for five years, which we're still in discussion with the local

governments.

Besides the joint operation, we also do the cooperation with the private company for Business-to-Business. We work together with Veolia. Once we worked together with SUEZ, but not anymore. Additionally, we work together with the Salum Group and Adaro. The scope of the BtoB works is that we only manage the upstream in cooperation with private companies or state-owned enterprises. We have used the scheme of BOT for 25 years. Our current partners are Tirta Lyonnaise Medan (Veolia Group), Tirta Nusantara Sukses (Salim Group), Tirta Medan Johor Sukses (Salim Group), and Adaro Tirta Brayan (Adaro Water Group Company).

And then the last cooperation is the regional drinking water supply system (hereinafter, "SPAM"). This is cooperation between regions. For example, we have cooperation with Deli Serdang and the surrounding area, which we call ME-BI-DANG (Medan City, Binjai City, and Deli Serdang Regency). This project is financed by the central government and the provincial government, which will serve three cities/regencies. Regarding the financing and construction by the central government, it will be inaugurated by President Mr. Joko Widodo within a few days. This project has two stages. In the first stage, we will have a capacity of 1,100 LPS. The water will be distributed to Medan with 750 LPS, to Binjai with 100 LPS, and to Deli Serdang with around 200 LPS.

The challenges that we face. The first issue is the necessity to change the regulations. As mentioned before, the duration of joint operations used to be 25 years, but the Minister of Home Affairs has changed the regulations to make it only 5 years. The second issue is the tariff adjustment between Adaro Water Group. And the last challenge is regarding the political influence.

What we have done to handle all these challenges? The first thing was the coordination with central governments through the Ministry of Home Affairs and local governments to explain clearly that the investment in water projects lasts for long terms. We explained that it is difficult to do it with only 5 years because the payback period of the investments is normally around 7 to 10 years. Now it may be under discussion, and the Ministry of Home Affairs will change or revise the length of the joint cooperation. Regarding the issue of water tariffs, we try to encourage the central government to approach the local government. We encouraged the central government to approach the local government to monitor the implementations of Home Affairs Regulations #20 of 2021 in order to make all cities and regencies review their tariff annually. Actually, in Indonesia, we have a regulation that states every state, local government, regency, or city has to review the tariff every year. But mostly it is not done due to the political issues. Regarding the last issue, which is political influence. We coordinate with the executive and legislative to make sure all related parties are involved and seriously support the cooperation to speed up the water coverage rate in those cities and regencies. In actuality, there are only 3 companies out of 440 owned by the provincial levels in Indonesia. One is Perumda PAM JAYA, the second is Perumda Tirtanadi and the third one is in Liau province. The rest are owned by the cities or regencies.

I hope my presentations today will give new insights to all participants regarding the cooperation in Indonesia to boost the services in drinking water.

6-2-4 Human Resource Development Initiatives (Mr. Nithit Thongsa-ard, PWA, Thailand)

[Contents]

We will talk about two special things, which are "water" and "people." Water is not just crucial for us now, but also for our future. Before we discuss the topic of human resource development initiatives, I will introduce the words my King Bhumibol Adulyadej said, "Water is life." Without water, there is no life. We prioritize his word and lead the Provincial Waterworks Authority (PWA) by ensuring sufficient and fair distribution of water for all life with sustainability. Through my presentation, we aim to uncover the PWA approach to water and people. Human resource empowerment is shaping the future of water management and service.

PWA is the enterprise that takes care of waterworks in almost every province in Thailand. We

help give clean tap water to people in the area that other water organizations don't cover. Our service coverage reaches 19% of the country's population. Our vision is to become an excellent and sustainable organization in water supply service and management. Our main duty includes sourcing raw water, water production, distribution, and providing high-quality tap water. Our value includes being determined and confident for the public and toward sustainability. PWA operates through 234 branches supervised by 10 regional offices serving 74 provinces nationwide. We are committed to providing water supply service under the concept all the time. With over 5 million customers, we ensure convenient and 24/7 water to all the people, even in the COVID-19 situation.

PWA is committed to promoting sustainability in line with government policy for a self-sufficient economy. We adopt the BCG model framework and align our vision, strategy, and management practice in our journey toward sustainability. We respond against climate change, drought, flooding, NRW, and high cost of production. Despite this, we prioritize human development, which is one of the three bottom lines to lead PWA to a sustainable organization. PWA Governor has employed PED-DI to enhance, finance, and lead growth. This involves up-skill, re-skill, and implementation of new technology to enhance work process efficiency and sustainable human resource development.

A key focus of PWA is to engage and collaborate with the community as they are vital owner of water sources. We do activities such as forest conservation, preservation of aquatic life with management near water sources, and education of the community on managing small water systems. Every year PWA is engaged in CSR initiatives based on the BCG model involving all the staff to promote the public spirit and to raise awareness about the climate change crisis and the water resource crisis. We do activities such as tree planting to restore a conserved watershed area as a way to give back to the environment, and we provide clean drinking water to schools and the community to create awareness from a young age. By recruiting and training young volunteers on waterworks we aim to create a sustainable society.

In terms of human resource development, which is a crucial investment for the organization, we put a strategy called “5 Right Strategy” in implementation. 5 Right Strategy comprises of the following aspects; right strategy, right structure, right skill, right value, and right thinking. It relates to the development of the people for the sustainable growth of the organization. PWA has four training centers across Thailand, working in people’s development under the Human Resource Development and Innovation Department.

PWA employees’ development covers diverse courses such as design thinking, startup, leadership, innovation, and more. Yet, the formal learning is just 10%. To fully develop employees, we create opportunities for learning through executive membership, impactful tasks, OJT, and a supportive culture promoting active engagement in organizational activity. Regarding the development of people to adapt to the digital age, our goal includes the development of big data, data analysis, Artificial Intelligence (AI), provision of comprehensive service at all touchpoints, real-time control of water loss, implementation of smart meter, creation of customer experience and satisfaction, and engagement in related business supporting digital transformation. This will lead to forward fostering innovation within a knowledge-based society.

Another important aspect of human resource development within PWA is the development of soft skills and mindset. In the past year, managers and employees have collectively defined the organization's culture using the term “striver.” This promoted culture sharing to support resilience and adaptation of the water services.

One part of driving the organization according to the established strategy is through the “Change by Design” initiative to improve the work process. We had the re-process to change one division, one process into improvement in the current year.

We organized over 222 training programs that improve engagement, and increase customer satisfaction for water projects for local government organizations into high-quality, sustainable water supply, ensuring safe tap water to everyone (Figure 6-5).

Figure 6-5 [PWA] Human resource development for local governments

Besides these activities, PWA has a strong partnership with JICA through the "Enhancement of Human Resource Development of Waterworks in Thailand and Laos" project. Join us in the video to discover the collaborations, progress, and significant project outcomes.

(Video showed: Introduction of the cooperation with Japan on the "Enhancement of Human Resource Development of Waterworks in Thailand and Laos" project, and its progress and important outcomes)

6-2-5 Waterworks technologies and knowhow; transferred from Yokohama to the world ~Yokohama Water Company walks with water utilities domestic and overseas (Mr. Koichi Hasegawa, Yokohama Water Co., Ltd., Japan)

[Contents]

I'm honored to make the presentation on the viable occasion about waterworks technology and know-how transfer from Yokohama to the world. Firstly, I would like to introduce the organization of Yokohama Water Company, then our activities for the domestic and overseas utilities. Yokohama Water Company provides consulting and advisory services in cooperation with the City of Yokohama, which is responsible for the water supply and sewerage businesses in Yokohama City. Yokohama Water Company was established in 2010 as a wholly-owned subsidiary of Yokohama Waterworks Bureau. In 2013, Yokohama Company signed a partnership agreement with the Environment Planning Bureau, City of Yokohama, which has jurisdiction over sewerage. Why did Yokohama City establish the Yokohama Water Company? The city hoped to continuously contribute to sustainable water and sewerage services for domestic and overseas utilities using its technology and experiences. To continue supporting activities, financial sustainability is essential. However, since the city is a public entity, it cannot conduct profitable services or business. Therefore, Yokohama Water Company was established as a state-owned company. We are implementing business outsourced by Yokohama City. Not only that, we conduct water supply and sewerage transactions with local government and private companies with personnel and material support from the city. We provide the know-how and technology of water supply and sewage of Yokohama City in areas such as business management, water resources, water distribution, customer service, and so on through various business schemes. Founded in 2010, our company initially started with only three employees. One of them was Mr. Yamaoka, the current Director General of Yokohama Waterworks Bureau. I hear they made extraordinary efforts to start up and operate a new company. In the first year, the income was 70 million yen and the profit was 2 million yen. After 12 years in 2022, it has about 100 employees and revenues of 1 billion yen. As of June 2023, our company consists of three departments, eight sections, and three offices, with four directors and 100 employees. Among them, 57 veteran employees retired from the city account for 55%. 30 employees, regular, proper staff account for

29%. In addition, 13 mid-career and young staff are seconded from Yokohama City for a three-year term. By working with veteran staff with professional skills and knowledge, young and inexperienced staff can learn from them and improve their skills.

Now, I would like to talk about our domestic activities. During 13 years from 2010 to 2023, Yokohama Water Company concluded 386 contracts with 57 utilities. Figure 6-6 shows those currently under contract with us.

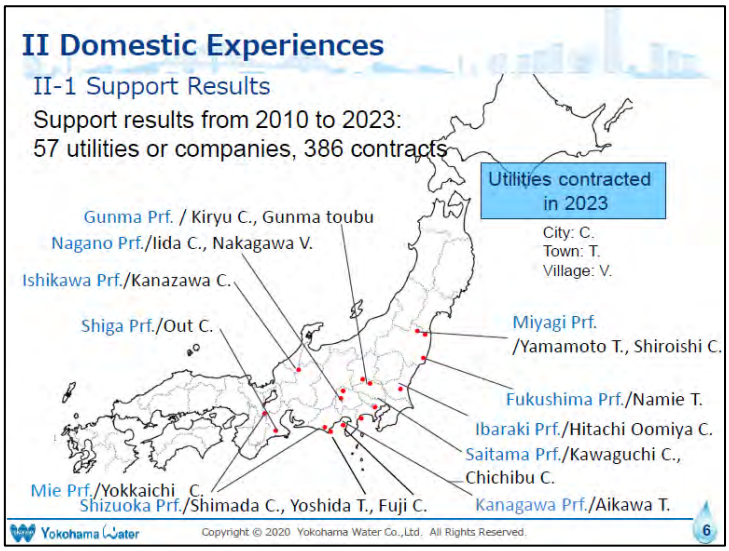


Figure 6-6 [Yokohama Water Company] Domestic support results

Yokohama Water Company's past aid activity for small and medium-sized utilities in Japan was for Yamamoto-Cho, a town in Miyagi prefecture in the northern part of Main Island Tohoku region. Yamamoto-Cho was severely damaged by the Great East Japan Earthquake on March 11, 2011 Yokohama City coordinated support activity for water supply restoration on behalf of the Kanto region to the heavily damaged areas, including Yamamoto-Cho. Yokohama City continued its support for Yamamoto-Cho. I hear that one of the reasons is that there is a town with the same name in Yokohama City. In this project, Yokohama City worked together with Yamamoto-Cho for the restoration and reconstruction of water supply and sewerage systems, while Yokohama Water Company supported them for business operation of post-rehabilitation and reconstruction. In 2013, Yamamoto-Cho, Yokohama Waterworks Bureau, and Yokohama Water Company concluded a three-party partnership agreement. Through these years, Yokohama City has continued to dispatch the staff while Yokohama Water Company has supported the formulation of finance and facility plans for business operations associated with the rehabilitation project. Ten years have passed since this agreement Waterworks Bureau and Yokohama Water Company together with Yamamoto-Cho have kept this solid partnership. The experience of support activity for Yamamoto-Cho is the base of our support businesses for the sake of some utilities. The many of our activities are increasing while horizontally expanding such activities. Many of our clients are repeat customers. It is our hope that our company becomes our clients' primary doctor.

Next, I explain about the overseas projects. Over the past 12 years, we have implemented 93 overseas projects in 25 countries in Asia and Africa in tandem with the Yokohama Waterworks Bureau. We provide variable service utilizing Yokohama's know-how in the water supply and sewerage businesses. The types of activities are training and human resource development, technical cooperation under the JICA scheme, consulting and advisory services, and technical transfer collaborating with Japanese corporations. In cooperation with the Yokohama Waterworks Bureau, we can provide a flexible curriculum that meets the needs of participants.

Figure 6-7 [Yokohama Water Company] Technical assistance in Metro Cebu

Figure 6-7 is a case of the projects for human resource development in Metro Cebu the Philippines. This JICA Technical Corporation project led the grant-aid cooperation. After this project, we submitted several proposals to further improve water treatment and distribution management for MCWD, and among them, the SCADA system was adopted by JICA. SCADA system was introduced under the JICA grant-aid project. Currently, we are conducting a construction consulting service for the sewerage sludge treatment plant in MCWD by JICA in cooperation with Yachiyo Engineering Co., Ltd.

Next, I would like to introduce the case of Faisalabad City, Pakistan, where water supplied to citizens was influenced due to the problems of the pipeline network, and so on. Therefore, under the JICA technical cooperation project started in 2016, the project team including staff from the Yokohama Water Company, set up a project site in the city to carry out improvement activities. As a result of a series of activities, finally, sufficient water was supplied to the citizens at the project site. Accordingly, the number of customers increased, and the financial balance was improved. Currently, we are implementing the Phase 2 project together with Nihon Suido Consultants Co., Ltd. and Japan Techno Co., Ltd.

We cover a lot of projects and training programs in the wide fields. We can provide consulting and advisory services not only on JICA projects but also on a contract basis. Yokohama Water Company has formulated a behavior guideline and credo for its employees. Yokohama Water Company will make every effort to stabilize and strengthen the overall water supply and service in Japan and overseas, taking advantage of our strengths in being able to provide sustainable and flexible service as a private enterprise while collaborating with Yokohama City as a public entity. Finally, our corporate philosophy: "With water for the future and beyond."

6-3 Group Discussion

The group discussions in Session 3 were conducted as shown in the table below. The same groupings were used for the group discussions for Session 1 through Session 3. For detailed minutes of the group discussions, please refer to "11-5 Records of Group Discussions."

Table 6-1 Session 3 group discussion overview

	Group A	Group B	Group C
Meeting room	Special Meeting Room (8F)	Room 805 (8F) Simultaneous interpretation available	Room804 (8F)
Facilitator (Main / Assistant)	・ Ms. Sarah Monica E. Bergado (Manila Water) ・ Mr. Yokota (JICA)	・ Mr. Ade Syaiful Rachman (PU (Cipta Karya)) ・ Mr. Sonoda (Saitama City Bureau of Waterworks)	・ Mr. Tiresh Khatri (MoWS) ・ Dr. Kamegai (CTI Engineering International Co., Ltd.)
Accelerator	・ Mr. Nithit Thongsa-ard (PWA, Thailand) *Changed from Mr. Pornsak Samornkraisorakit	・ Mr. Khamphouvong Sikholom (DWS, Laos) *Changed from Mr. Siphanh Inmouangxay (NPNL)	・ Dr. Wasantha Kumari Illangasinghe (NWSDB)
Members	・ Ms. Sarah Monica E. Bergado (Manila Water, Philippines) ・ Mr. Sherwin Mendoza (Maynilad, Philippines) ・ Mr. Edgar H. Donoso (MCWD, Philippines) ・ Mr. Pornsak Samornkraisorakit (MWA, Thailand) ・ Mr. Nithit Thongsa-ard (PWA, Thailand) ・ Mr. Nguyen Thanh Su (SAWACO Vietnam) ・ Mr. Nguyen Van Thien (BIWASE, Vietnam) ・ Mr. Le Quang Minh (HueWACO, Vietnam) ・ Mr. Ho Huong (DAWACO, Vietnam)	・ Mr. Ade Syaiful Rachman (PU (Cipta Karya), Indonesia) ・ Mr. Arief Nasrudin (Perumda PAM JAYA, Indonesia) ・ Mr. Kabir Bedi (Perumda Tirtanadi, Indonesia) *No participation due to return to Indonesia for unavoidable reasons. ・ Mr. Dwike Riantara (Perumda Jambi, Indonesia) ・ H.E. Sreng Sokvung (MISTI, Cambodia) ・ H.E. Long Naro (PPWSA, Cambodia) ・ H.E. Chan Sengla (SRWSA, Cambodia) ・ Mr. Khamphouvong Sikholom (DWS, Laos) ・ Mr. Siphanh Inmouangxay (NPNL, Laos) ・ Mr. Philavong Ladda (NPLP, Laos) ・ Mr. Sinthepphavong Khampasith (NPKM, Laos)	・ Engr. Taqsem A Khan (DWASA, Bangladesh) ・ Engr. A. K. M Fazlullah (CWASA, Bangladesh) ・ Mr. Tiresh Prasad Khatri (MoWS, Nepal) ・ Mr. Gyanendra Bahadur Karki (KUKL, Nepal) ・ Mr. Zeeshan Bilal (WASA-L, Pakistan) ・ Dr. Usman Latif (WASA-F, Pakistan) ・ Mr. Waruna Samaradiwakara (MWSEID, Sri Lanka) ・ Dr. Wasantha Kumari Illangasinghe (NWSDB, Sri Lanka)

Figure 6-8 Session 3 Group A Facilitator (Front: Main Facilitator Ms. Sarah Monica E. Bergado, Behind: Assistant Facilitator Mr. Yokota)

Figure 6-9 Session 3 Group A Group Discussion Scene

Figure 6-10 Session 3 Group B Facilitator (Left: Main Facilitator Mr. Ade Syaiful Rachman, Right: Assistant Facilitator Mr. Sonoda)

Figure 6-11 Session 3 Group B Group Discussion Scene

Figure 6-12 Session 3 Group C Facilitator (Behind left: Main Facilitator Mr. Tiresh Khatri, Behind right: Assistant Facilitator Dr. Kamegai)

Figure 6-13 Session 3 Group C Group Discussion Scene

6-4 Summarizing Each Country's Action Plan and Preparing for Presentation

Based on the results of the presentations and group discussions in Session 1 to Session 3, action plans were summarized on a country basis. Japanese resources were assigned to each meeting room as follows to assist with the action plan summarization.

- Group A: Mr. Tomioka (JICWELS), Mr. Kaiya (JICA), Mr. Osawa (JICA)
- Group B: Mr. Morimoto (JICWELS), Mr. Yokota (JICA), Ms. Kakegawa (JICA), Mr. Sonoda (Saitama City)
- Group C: Dr. Ogata (JICA), Ms. Shoji (JICA), Mr. Kubota (JICA), Dr. Kamegai (CTI Engineering International Co., Ltd.)

Figure 6-14 Bangladesh: action plan summarization

Figure 6-15 Cambodia: action plan summarization

Figure 6-16 Indonesia: action plan summarization

Figure 6-17 Laos: action plan summarization

Figure 6-18 Nepal: action plan summarization

Figure 6-19 Pakistan: action plan summarization

Figure 6-20 Philippines: action plan summarization

Figure 6-21 Sri Lanka: action plan summarization

Figure 6-22 Thailand: action plan summarization

Figure 6-23 Vietnam: action plan summarization

Chapter 7 Summary Session

7-1 Presentation of Action Plan from Each Country in Group A

7-1-1 Philippines

Mr. Sherwin Mendoza gave a presentation on the action plan of Philippines.

Figure 7-1 Presentation on the action plan of Philippines

Action Plan (Philippines)

Sub-theme	Fundamental issues, problems (Copy important items from sheets 1 and 2)	Actions (Copy from sheets 1 and 2)	With whom? (partners resources for action)
Session 1. Towards water utilities resilient to risk and change	1. Lack of long-term climate impact appreciation.	1. Climate change awareness campaign and scenario assessment.	• Climate science experts (prediction) • Institution (local and international)
	2. Funding to build resilient infrastructure and disaster response system.	2. Explore public-private partnership and collaboration with other private corporation and local/international lending.	• Private Corporations • Local/International Funding Institutions
Session 2. Towards achieving SDG Goal 6	3. Limited water source and high NRW.	3. Seek technical assistance/training for NRW reduction (thru twinning/bench marking)	• Private/public water utilities (Maynilad. Manila Water, Metro Cebu) • MWSS and LWUA • ADB/JICA
	4. Difficulty of tariff revisions and fundraising	4. (a) Engage with third party objective reviewer (b) Engage with Brgy/LGUs for public Information dissemination.	• COA, Brgy/Local Government and Business Organization
	Action As an executive of a leading utility, how can you share and use knowledge for better water services in your country?		
Session 3. Collaboration and Co-Creation	5. Initiate an inter-water utility academy (National Water Academy). Modules include: • NRW Management • Water Source Management • Water Sustainability • Climate Change and Resilience		

Where we want to be in 3 years' time (with indicators if possible)

- Meeting of NRW reduction based on Business Plan
- Meeting of average water demand (Metro Cebu)
- Creation of National Water Academy

Figure 7-2 Action plan of Philippines

[Contents]

Regarding Session 1, our fundamental issue is the lack of long-term climate change impact appreciation. Most water utility companies are more focused on water source and water quality issues, but the reality is that the water is not there forever and should be given protection. For this, we need to intensify climate change awareness campaigns, and scenario assessment. We have many initiatives that have been started but the level of appreciation and sustainability of the campaign is still very low in our country. Regarding the partner, we think of the climate science expert to make the prediction and we need to accept the reality that climate change is already here.

We also need to collaborate with the local and international institutions. An example is a school because we need to educate younger people as they are the future of our society.

The second fundamental issue is the funding to build resilience infrastructure and disaster response systems. This is more particular to our water districts such as MCWD. Similar to other water utility companies even abroad, lots of projects are programmed but there is no funding or budget. What action we need is to explore PPP and collaboration with other private corporations, and local or international lending. Some of our local water districts have been doing this, and the effectiveness could be shared by them as best practices through presentations at local conferences and summits. The partners would be the private corporations and the local and international funding institutions, and maybe we need to include the Philippine Association of Water Districts (PAWD) and the Philippine Water Works Association (PWWA) in this.

For Session 2, our fundamental issue is the limited water source and high NRW. This is the problem the majority of our water districts face in the Philippines. What action we need is to seek technical assistance or training for NRW reduction to benchmarking. We could set up a MoU between or among water utility companies or establish a twinning. Our partner resources would be the private and public water utilities such as Maynilad, Manila Water, and MCWD. We also need Metropolitan Waterworks and Sewerage System (MWSS) and Local Water Utilities Administration (LWUA), and, ADB and JICA for international support.

Another fundamental issue is the difficulty of tariff revision and fundraising, which is very particular to local water districts such as MCWD. For this, firstly, we need to engage ourselves with objective third-party reviewers in support of the tariff increase. Secondly, we need to engage with barangays or Local Government Units (hereinafter, "LGU") for public information dissemination. An example of this is roadshows in many barangays regarding the current program and projects of water utilities. We need to let them keep in mind that any development has a corresponding cost and that whenever they see any activities in their area, they have to keep in mind that they need to pay for the development. The partners would be the Commission on Audit, the barangays, LGUs, and business organizations.

For Session 3, we need to initiate an inter-water utility academy, similar to the initiative of Sri Lanka. The modules may include NRW management, water source management, water sustainability, or climate change resilience. In reality, since some of our private water companies have set up training institutions already such as Maynilad Water Academy and Manila Water's training institute, they may set up a national training academy to assist small water districts in training and continuous development. This could be part of Maynilad and Manila Water's corporate social responsibility program.

Where we want to be in the next three years. Of course, for Maynilad and MCWD specifically, we need to meet our NRW reduction target based on our business plan. As for MCWD, they will aim to meet the average water demand. If possible, we want to create a national academy, National Water Academy or Philippine Water Academy. If not, maybe just MoU amongst water districts could work.

7-1-2 Thailand

Mr. Pornsak Samornkraisorakit gave a presentation on the action plan of Thailand.

Figure 7-3 Presentation on the action plan of Thailand

Action Plan (Thailand)

Sub-theme	Fundamental issues, problems (Copy important items from sheets 1 and 2)	Action (Copy from sheets 1 and 2)	With whom? (partners resources for action)
Session 1. Towards water utilities resilient to risk and change	1. Low Water Price / Tariff / Finance/ Investment / Fund.	1. Find another source of Fund / PPP Project.	- Government. - Partnerships. - Organization.
	2. NRW.	2. - Reduce NRW - Prioritize Area to investment. - PPP Project.	- Partnerships • Public. • Private. • Communities.
	3. Drought Crisis • Salinity in Chao Phraya River.	3. • Expansion of water production capacity of Mahasawat WTP (2025) • The eastern raw water canel improvement project (To be completed in 2025) - Increase storage of raw water canel to 5 hours.	- Organization.
Session 2. Towards Achieving SDG Goal 6	4. Stakeholder / Customers Expectation	4. Creation Customer Experience for Improve Customer Satisfaction.	- Customers. - Stakeholders. - Partnerships.
	5. Digital Technology	5. Digitalize Transform • For Customers. • For improve Productivities.	- Staffs - Outsource. - Partnership.
	Action As an executive of a leading utility, how can you share and use knowledge for better water services in your country?		
Session 3. Collaboratioin and Cocreation	6. HRD Initiative >> Human Resources Development / Training. 7. Collaboration with LGOs/Communities. >> Monitor Water Quality Systems & Standards.		

Where we want to be in 3 years' time (with indicators if possible)

Short-term Plan
- Consider sources of a master plan.
- Develop technology for enhancing the efficiency of water supply service and reducing production costs.
- Prepare the procurement plan of raw water
- Create people's awareness to use every drop of water productively.
- Prepare a long-term investment plan by coordinating with local agencies.

Long-term Plan
- Drive the establishment of a national water regulator.
- Prepare a 10-year investment plan for water system development.

Figure 7-4 Action plan of Thailand

[Contents]

Regarding Session 1. First, we have the low water price and tariff, finance, investment, and funding. We need to convince politicians first of all. If politicians do not accept, we need to find another source of funding or a PPP project. The partner will be the government, partnership. The second problem is NRW. We respond to this by setting priority to the areas to invest in, and PPP project. The partner will be a partnership with the public, private, and community. The third issue is the drought crisis and salinity intrusion in the Chao Phraya River. We are going to expand the water production capacity of the Mahasawat Water Treatment Plant. We also proceed with the improvement project of the eastern raw water canal to increase storage from 2 hours to 5 hours. Additionally, we build the water supply tunnel from the west coast to the east coast with a maximum capacity of around 400,000m3/d. We will do this by our organization.

Session 2. The first issue is to meet the stakeholders and customers' expectations. For example,

it is important to make the water pressure in the distribution pipeline stable and to improve the water quality more than standard. For the tap water, the turbidity should be lower than 0.3 NTU. We will choose the new technology needed for this. Through this, we create a better customer experience and provide customer satisfaction. The next issue is to apply digital technology. We will do digital transformation for customers and to improve productivity. The partner will be our staff, outsource, and partnership.

Session 3. We will do human resource development by training, and collaboration with local government organizations and communities to monitor water quality systems and standards.

Where we want to be in 3 years' time. As for the short term, we consider the source for the master plan, develop techniques for enhancing efficiency for the water supply service and reducing production cost, prepare the procurement plan of the raw water, create people's awareness to use every drop of water and prepare a long-term investment plan by coordinating with the local agency. As for the long term, we drive the establishment of a national water regulator and prepare a 10-year investment plan for water system development.

7-1-3 Vietnam

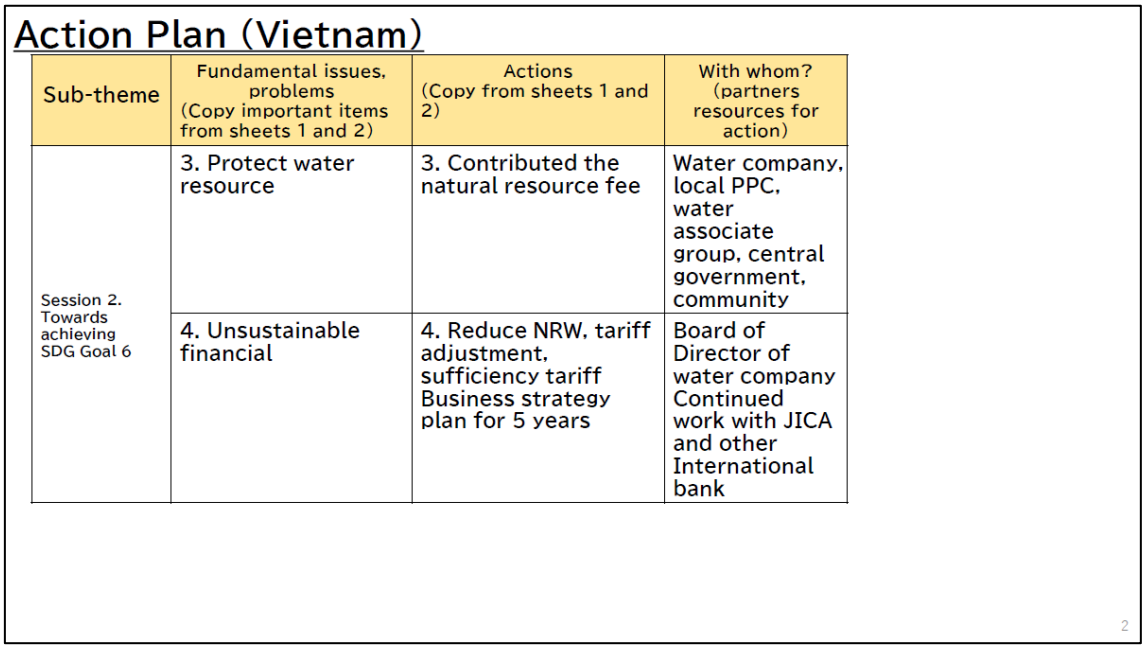
Mr. Nguyen Van Thien gave a presentation on the action plan of Vietnam.

Figure 7-5 Presentation on the action plan of Vietnam

Action Plan (Vietnam)

Sub-theme	Fundamental issues, problems (Copy important items from sheets 1 and 2)	Actions (Copy from sheets 1 and 2)	With whom? (partners resources for action)
Session 1. Towards water utilities resilient to risk and change	1. Raw water risk	1. Safety water plan	- Water company and local PPC, central government
	2. Tariff	2. Adjustment the tariff	- Water company, local PPC, central government, ending users

Figure 7-6 Action plan of Vietnam (Page1)

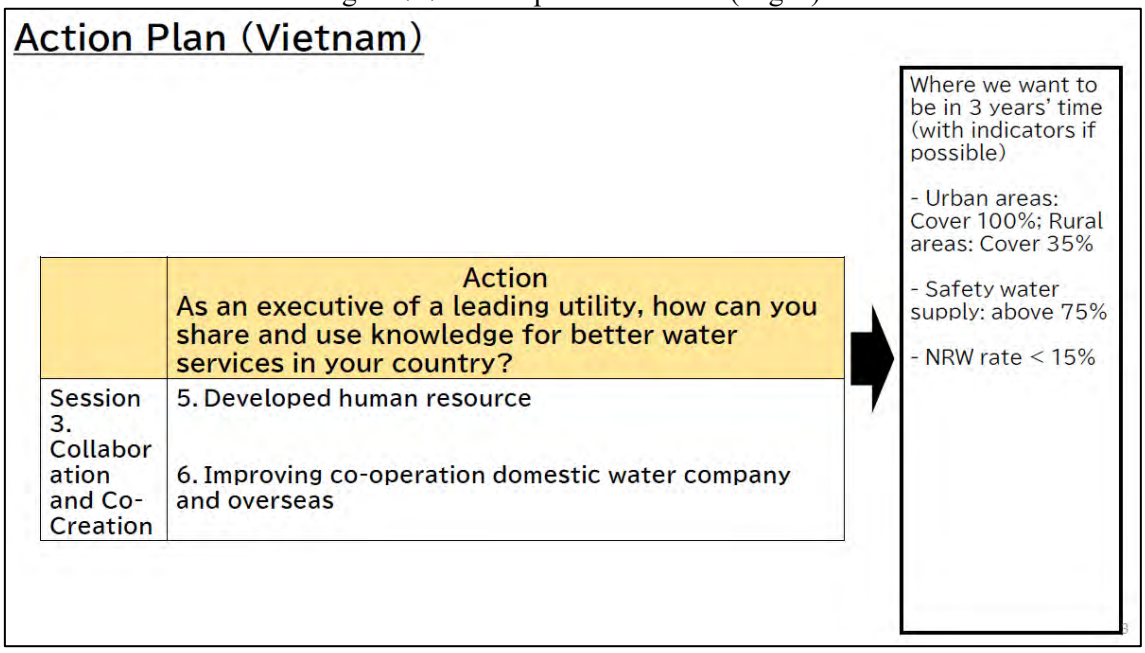


Action Plan (Vietnam)

Sub-theme	Fundamental issues, problems (Copy important items from sheets 1 and 2)	Actions (Copy from sheets 1 and 2)	With whom? (partners resources for action)
Session 2. Towards achieving SDG Goal 6	3. Protect water resource	3. Contributed the natural resource fee	Water company, local PPC, water associate group, central government, community
	4. Unsustainable financial	4. Reduce NRW, tariff adjustment, sufficiency tariff Business strategy plan for 5 years	Board of Director of water company Continued work with JICA and other International bank

2

Figure 7-7 Action plan of Vietnam (Page2)



Action Plan (Vietnam)

	Action As an executive of a leading utility, how can you share and use knowledge for better water services in your country?
Session 3. Collaboration and Co-Creation	5. Developed human resource 6. Improving co-operation domestic water company and overseas

Where we want to be in 3 years' time (with indicators if possible)

- Urban areas: Cover 100%; Rural areas: Cover 35%
- Safety water supply: above 75%
- NRW rate < 15%

3

Figure 7-8 Action plan of Vietnam (Page3)

[Contents]

We may be facing a similar problem that most countries are facing, which is the water source risk. However, it is not clear who will be responsible, with whom to cooperate to respond to it, and who will be the chair. Regarding water resource pollution, we understand that the technology is changing every single second, so we can apply the new technology to take the water. The most important point is that there are not enough funds to invest in the new technology. The second point is the strong financials. With strong and sustainable financials, we believe that we can update to the new technology. This will support training our staff and contribute to the water resource development. And lastly, we try to raise the community's awareness to protect our water resources.

There are several ways to train our staff. We need to cooperate with each other. About 15 years

ago, we had an opportunity to meet H.E. Ek Sonn Chan and his water utility. They came over sponsored by ADB and we learned from them. 15 years later, BIWASE has achieved our goal to make the NRW rate to about 5%. BIWASE has been sharing this experience with our colleagues within Vietnam to reduce the NRW rate. Most of the water companies in Vietnam have reached the target decision by the government. Most Vietnamese water companies make a plan to strengthen themselves. Firstly, we believe that leadership is the most important thing and needs to be transferred. The stronger the leader is, the stronger your employee will be. To make your company more self-sufficient and efficient, the leader needs to manage the company in a good way. Staff need to learn and understand how to manage and operate the water treatment plants.

For the national targets, the Vietnamese government has set up the targets until 2025. Service coverage in urban areas will be 100%, and then the demand for each person will be 120 L/d. NRW rate will be less than 15%. I am one of the members of the Vietnamese Water Association group, and I understand that most Vietnamese companies have yet met the national targets.

7-2 Presentation of Action Plan from Each Country in Group B

7-2-1 Cambodia

H.E. Sreng Sokvung gave a presentation on the action plan of Cambodia.

Figure 7-9 Presentation on the action plan of Cambodia

Action Plan (Cambodia)

Sub-theme	Fundamental issue, problems	Actions	With whom? (partner resources for action)
Session 1. Towards water utilities resilience to risk and change	1. Water source: drought, flood, water quality 2. High NRW 3. Asset management	1. Financing to construct more sustainable water sources 2. Fully corporation among relevant ministries and inter-government on water sources 3. Establish the risk management system 4. Introduce digital transformation	1. RGC, DPs 2. Line Ministries, MRC member countries 3. Own budget, DPs 4. Own budget, DPs

Figure 7-10 Action plan of Cambodia (Page1)

Action Plan (Cambodia)

Sub-theme	Fundamental issue, problems	Actions	With whom? (partner resources for action)
Session 2. Toward achieving SDG Goal 6	4. Lack of regulation enforcement 5. Limited of capacity of the regulator 6. Lack of financing (private operators) 7. Unprofessional operators 8. Lack of awareness of consumers	5. Prepare master plan for sector 6. Fully enforcement of regulation including Technical support 7. Enhance capacity of regulator (including motivation, commitment) 8. Funding for sector (esp. private sectors): WDF, DPs 9. Bring knowledge and experience of PPWSA to the rest of the Country	5. JICA (2 provinces as model) 6. MISTI including Autonomous Utilities 7. DPs 8. RGC, DPs 9. MISTI, PPWSA

Figure 7-11 Action plan of Cambodia (Page2)

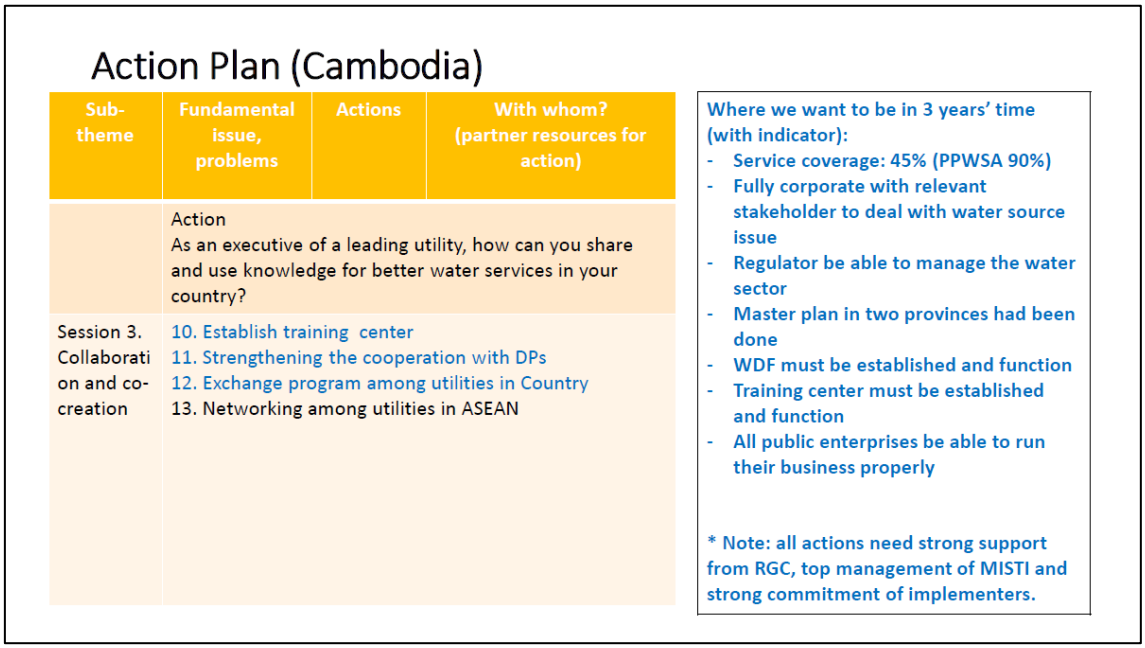


Figure 7-12 Action plan of Cambodia (Page3)

[Contents]

We have 3 issues regarding Session 1. The first issue is about water sources, and we are facing drought, flood, and the problem of water quality. The second issue is the high NRW rate. The third issue is the asset management and we are not making it properly yet. The first action needed is the financing to construct a more sustainable water source such as a dam or reservoir for the water. However, actually, in Cambodia, we are heavily limited on building reservoirs or dams for domestic water consumption. Secondly, we need full cooperation among relevant ministries in the country, and inter-government cooperation on the water source to secure enough water for domestic consumption. The third one is that we would like to establish a risk management system. Fourthly, we need to introduce digital transformation in our water supply system. The partner that we need for those. For the first action, the government and development partners. For the second action, we need the cooperation from the line ministries and also the Mekong River Commission (MRC) member countries. For the third action, we could utilize our own budget and also the funds from the development partners. Same for the action 4.

Regarding Session 2, we listed five issues or problems. The first issue is about the lack of regulation enforcement. It means we have the law and other regulations in Cambodia, but the enforcement of those regulations is still limited. The second issue is the limited capacity of our regulator. We still don't have enough capacity to regulate the sector, especially the private sector properly. The third issue is the lack of financing especially for the private operator since the funding in Cambodia mainly supports the public utilities. The fourth issue is the unprofessional operator, especially the private operator. They are mainly family businesses, so there may be a lot of problems to achieve our goal. The fifth issue is about the awareness: the understanding of the consumers about the importance of clean water, which we need to raise as well. The action that we need to do. For the first issue, we need to prepare a master plan for the sector. Regarding the second issue, we have to fully enforce the regulation, but at the same time, we need to provide technical support to them as well since it's very difficult for private operators to survive. As for the third issue, enhancing the capacity of the regulator is needed, including providing them with motivation and commitment. For the fourth issue, we need funding for the sector, especially for the private sector. Now we are in the process of establishing the Water Development Fund. About the fifth issue, we need to bring the knowledge and experience of PPWSA to the rest of the country.

PPWSA is known in the region and even in the world, but the rest of the operators in the country are still very far away from it. PPWSA has high performance but the rest has still very poor performance. Our partners for these actions. Regarding the first action, we are now working with JICA under technical cooperation. We are doing the master plan for two provinces and we would like to refer to them as a model and try our own to make the master plan for the rest of the provinces. Partner for the second action is the ministry involved in the enforcement of the regulation (MISTI) and the autonomous utilities. Here, we refer to PPWSA or Siem Reap Water Supply Authority (SRWSA) which could provide technical support to private operators. For the third action, we need support from the development partners for the enhancement of the capacity of our regulator. Regarding action four, we need funds from the Royal Government of Cambodia and also from development partners. About action five, we need cooperation from PPWSA and our own state.

Session 3, Collaboration and Co-creation. We would like to establish a training center. It could be under the PPWSA or the National Training Center. We try to continue to strengthen the cooperation with development partners and also would exchange programs among utilities in the country and also in the Asian countries.

What we expect within three years from this. we prefer to reach out to 45% in terms of service coverage of the whole country, while 90% for PPWSA. Secondly, we will be fully cooperating with the relevant stakeholders regarding the water source issue. We aim for the regulator to manage the water sector. The master plan in 2 provinces in cooperation with JICA will be completed. The Water Development Fund must be established and functioning. A training center must be established and functioning as well. All public enterprises are able to run their business properly.

All action needs strong support from the government, top management of MISTI, and the strong commitment of the implementers.

7-2-2 Indonesia

Mr. Dwike Riantara gave a presentation on the action plan of Indonesia.

Figure 7-13 Presentation on the action plan of Indonesia

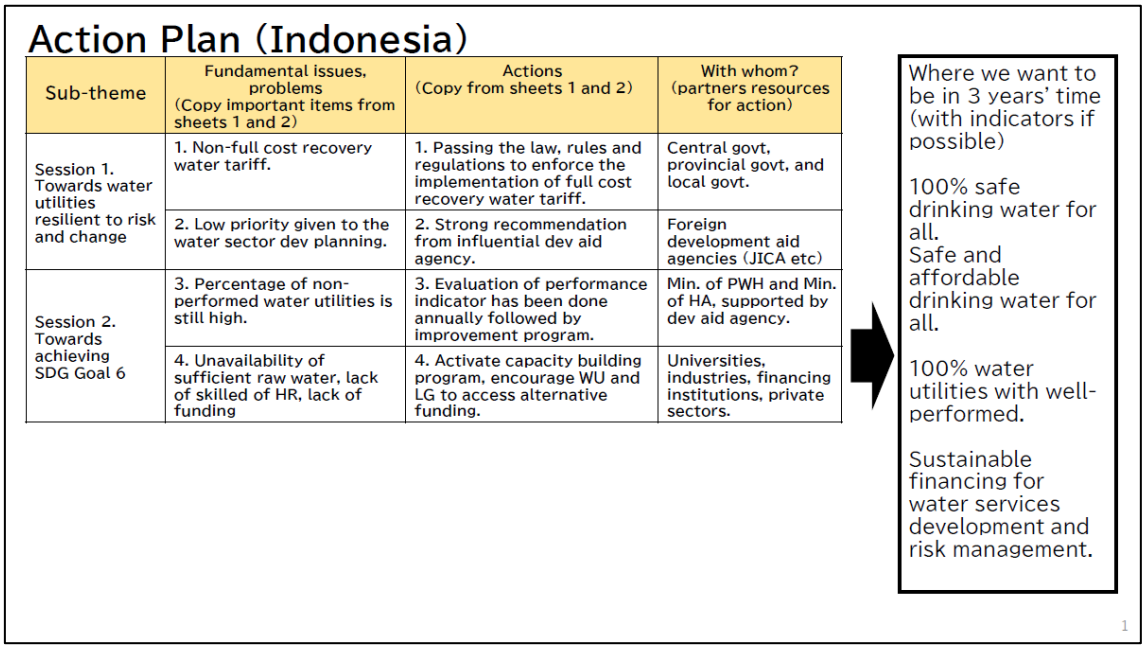


Figure 7-14 Action plan of Indonesia (Page1)

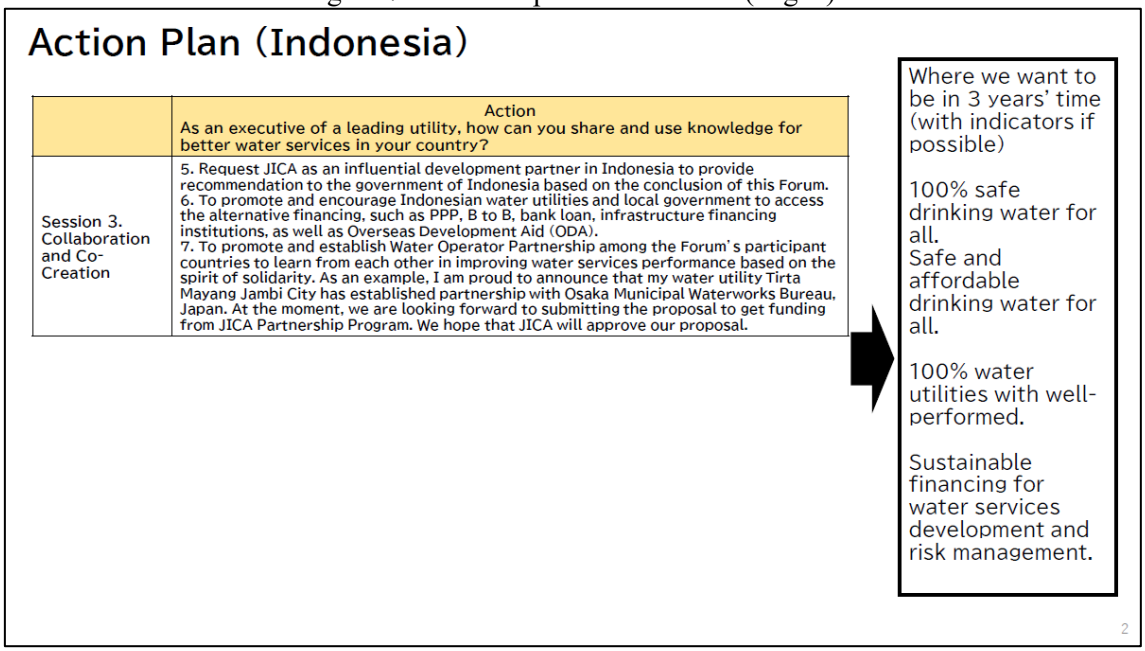


Figure 7-15 Action plan of Indonesia (Page2)

[Contents]

Regarding Session 1, fundamental issues are firstly, non-full cost recovery of water tariff, and secondly, low priority given to the water sector development planning. To address the non-full-cost recovery water tariff, we need to pass the law, rules, and regulations to enforce the implementation of full-cost recovery water tariff. The partners are the central government, provincial government, and local government. In order to give high priority to the water sector development planning, we need strong recommendations from influential development aid agencies. We need support for prioritizing water sector development planning from foreign development aid agencies such as JICA, etc.

Regarding Session 2, the fundamental issues are the high percentage of non-performing water

utilities in Indonesia, and the unavailability of sufficient raw water, the lack of skill of human resources, and the lack of funding. The action to be taken for the first issue is the evaluation of performance indicators on an annual basis followed by an improvement program. Partners are the Ministry of Public Works and the Ministry of Home Affairs, supported by a development aid agency. For the second issue, we need to activate a capacity-building program and encourage water utilities and local governments to access alternative funding. For this, we work together with the universities, industries, financing institutions, and private sectors.

Our point of view is simple and just common sense. There are only two most important things that would be able to overcome all of the problems encountered by water utilities: Good political will and enough money. In the hands of good political will, we will get enough money. In terms of politics, we are talking about leadership, good water governance, the role of government, national development planning policy, and rules and regulations. In terms of money, we are talking about the availability of the source of funding, full-cost recovery water tariff, and alternative financing. Perhaps money can't buy love and happiness, but money allows us to afford sufficient investment, build water infrastructure, pay professionals to create sound management and prepare for any potential risk, including climate change and unpredictable pandemics like COVID-19. Where do we get the money from? The most possible way is by having a full-cost recovery water tariff.

Session 3. We gained from this forum the power of strong leadership in Cambodia, Bangladesh, and other countries to make water service a top priority. We learned also about the availability of alternative financing implemented by the participating countries. Although most of them receive financing from loans or foreign aid grants, it seems to work well.

Action plan. Firstly, we request JICA as an influential development partner in Indonesia to provide recommendations to the Government of Indonesia based on the conclusion of this forum. Secondly, we will promote and encourage Indonesian water utilities and local governments to access alternative financing such as PPP, BtoB, bank loans, and infrastructure financing institutions besides overseas development aid. Last but not least, we need to promote and establish water operator partnerships among the participating countries to learn from each other in improving water services performance based on the spirit of solidarity. As an example, I am proud to announce that my water utility has established a partnership with Osaka Municipal Waterworks Bureau, Japan.

7-2-3 Laos

Mr. Khamphouvong Sikholom gave a presentation on the action plan of Laos.

Figure 7-16 Presentation on the action plan of Laos

Action Plan (Laos)

Sub-theme	Fundamental issues, problems(Copy important items from sheets 1 and 2	Actions (Copy from sheets1 and 2)	With whom? (partners resources for action)	Where we want to be in 3 years' time (with indicators if possible)
Session 1. Towards water utilities resilient to risk and change	1. Climate change: Heavily rain lead to flood high turbidity, high production cost. Dry season is drought and low water resources 2. Diseases: Covid-19 During Covid 15 water utilities net income got lost and 3 water utilities get profit.	1. Manage and develop raw water resources and infrastructure to resilience: review, monitor and construction system to withstand climate change, ensure water distribution tanks, emergency water supply equipment, water trucks, etc. can supply water in the event of a disaster or emergency, as well providing drinking water and water for basic use. 2. Meter reading and billing online. Establish water supply and sanitation to integrate and reduce the impact to residents.	WHO, UN-habitat and other donors	

Figure 7-17 Action plan of Laos (Page1)

Action Plan (Laos)

Sub-theme	Fundamental issues, problems(Copy important items from sheets 1 and 2	Actions (Copy from sheets1 and 2)	With whom? (partners resources for action)	Where we want to be in 3 years' time (with indicators if possible)
Session 2. Towards achieving SDG Goal 6	1. Coverage ratio: In urban 77.4% and latrines 63.34% 2. NRW 29.83%	1. Expansion of water supply system in urban access to safe water and latrines by increasing connection and constructing latrines for household 2. Reduction NRW by water pipe detection plan to control water leakage and change aging water meter: DMA	JICA, ADB, WB, Water net Amsterdam and other donors	1. Coverage ratio in urban 85% and latrines 90%. 2. Reduction NRW <27% (Yearly 1%)
	Action As an executive of a leading utility, how can you share and use knowledge for better water services in your country?			
Session 3. Collaboration and Co-creation	• Cooperation with JICA, JWWA and Neighboring Water Works Associations for Capacity building for management of the water supply and sanitation sector throughout the country. • Coordinate and collaborate with development partners, including private sector, to mobilize financial resources for the development of water supply and sanitation sector; **Needed Fund:** **Water Supply:** Year 2023-2025: More than 3.400 Billion KIP # 170 Million USD **Sanitation:** Year 2023-2025: More than 2.500 Billion KIP # 125 Million USD			

Figure 7-18 Action plan of Laos (Page2)

[Contents]

Session 1. In my country in the past several years, we have had two problems, one is climate change, and another is COVID-19. For climate change, we have a problem with heavy rain way too fast and high production costs. In dry seasons, water resources will dry up. As for COVID-19, 15 water utilities out of 18 had deficits while only 3 utilities got profits. For the first issue of climate change, we may manage and develop raw water resources and infrastructure, and we will also realize review, monitoring, and construction of systems to withstand climate change. Also, we need to ensure water distribution tanks, emergency water supply equipment, and water trucks, through which we can supply water in the event of disaster or emergency as well as providing drinking water and water for baseline. For COVID-19, we use meter reading and billing online and establish water supply and sanitation to integrate and reduce the impact on residents. We've won WHO, the United Nations Human Settlements Programme (UN-HABITAT), and another donor to support these actions.

Session 2. We have a problem with service coverage; 77.4% of water service coverage in urban areas and 63.34% in latrines sector. The second issue is NRW, whose rate is 29.83%. For these issues, we will expand the water supply system in urban to access safe water and latrines by increasing connections and constructing latrines for households. For the reduction of NRW, we will make a water pipe detection plan to control water leakage and change the water meter. After that, we will have an installation of DMA to fight the NRW. For these, we have partners such as JICA, ADB, WB, and Waternet Amsterdam, and we have the target indicator for the year 2025; water coverage in urban areas to be 85% and latrines coverage to be 90%, and NRW rate lower than 27%. This means you only have to reduce less than 1% for each year.

Session 3. In cooperation with JICA, JWWA, and neighboring waterworks associations, we will do capacity building for the management of the water supply and sanitation sector throughout the country. We will coordinate and cooperate with development partners, including the private sector, to mobilize financial resources for the development of the water supply and sanitation sector.

However, we need funds for these. For the water supply sector, about 170 million USD, and for the sanitation sector, about 125 million USD.

7-3 Presentation of Action Plan from Each Country in Group C

7-3-1 Bangladesh

Engr. Taqsem A Khan gave a presentation on the action plan of Bangladesh.

Figure 7-19 Presentation on the action plan of Bangladesh

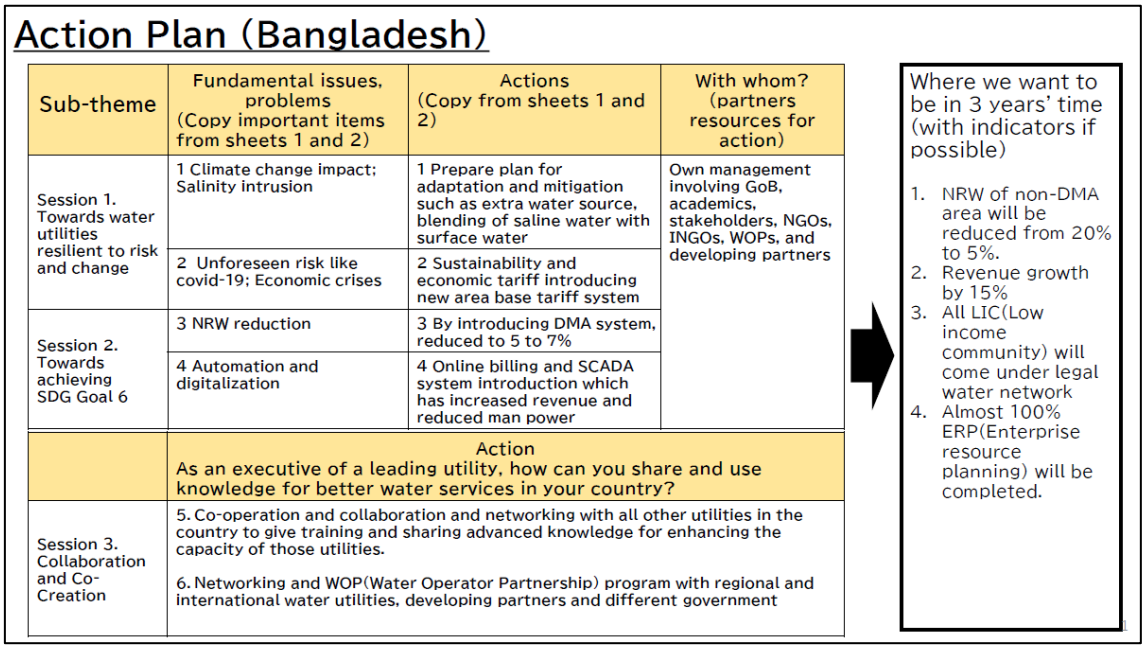


Figure 7-20 Action plan of Bangladesh

[Contents]

Session 1. What we have found when we discussed in group C, is that climate change has one of the biggest impacts that we foresee. And for us, salinity intrusion. The second issue is unforeseen risks such as COVID-19 or the economic crisis that's going on all over the world now or sometime from time to time. These are the barriers, the risks, and that brings change where we have to take appropriate actions. For the climate change impacts, the action is very simple. It is to prepare ourselves for the adaptation to climate change and mitigation of climate change impacts. One of the mitigations of climate change impacts is to prepare extra water sources. As we have planned in the master plan after the climate change impact assessment as well as for mitigation of any sort of risk, we always put some standby deep tube wells. The surface water sources are very expensive and we do have, but it is less than 70%. Therefore, we are making extra or standby underground extraction facilities so that in case of necessity we can use them. The salinity intrusion is not an issue in Dhaka but in Chittagong, Khulna, and other cities. CWASA is blending the saline water that is coming from the river with deep tube wells water or surface water where there is no saline to reduce the level of salinity and to use it. And for unforeseen risks such as COVID-19 and economic crisis, it's necessary to introduce sustainable and economic tariffs. From time to time, our government has allowed us to increase the tariff. But unfortunately, our tariff still is not a break-even or economic tariff, because there is still a gap. This gap is subsidized by the government, which neither the government wants to do nor do we want to be dependent on the government subsidy. We are gradually reducing that gap. The government is allowing us to increase the tariff. But there is a saturation point after that it will become very hard for the government to allow us to increase the tariff. We are now making a new experiment, innovation of the whole tariff system change, what we call an "area-based tariff system." As for electricity, it is very easy to introduce a system in which if you use more, you should pay more. That means a slab or progressive tariff system. But in the water sector, because of the way our plumbing has been done in the different buildings, it is not possible for us to go for that progressive tariff or block tariff. We have to go for a flat tariff which is not possible for "those who are using more, they will pay more." Here I mean that they will pay more but not at a different rate, but at the same rate. That is the reason why we are introducing the new system. The government has already formally allowed us to introduce it. Now we will do the piloting and then we will introduce that

area-based tariff system. That will give us more flexibility of "economic tariff" and that will give us sustainability of our organization.

Session 2. Our point of discussion was bankability. But in general, what is required to achieve SDGs Goal 6? There are a lot of issues. Of course, one of the biggest challenges is autonomy, or we can say the flexibility for deciding a tariff or deciding other issues by the utility itself. That means the autonomy of the utility is very much required. And one of the biggest challenges is the NRW reduction. Although we have been able to reduce our NRW rate to less than 20%, DWASA is enjoying 5 to 7% of NRW rate on DMAs. We changed all pipelines in the city and introduced DMAs. We have completed 110 DMAs out of 156, which means almost 65 to 70% of DMAs have been done. And in that area, our NRW rate is less than 10%, from 5% to 7%. Those areas that are not yet under the DMAs, still have an NRW rate of 20%, but we hope that within a few years, we will be able to reduce it. The second challenge to achieving SDGs is automation, digitization, and computerization. We have online billing and that has reduced a lot of tension from our billing section. SCADA system is introduced in all our revenue sections as well as in our pumping sections. That has given us the option for 100% recovery of our billing and that has also given a good opportunity for the customers to pay their bills. Now our billing system is fully automated and anybody and everybody can pay their bill sitting at home through mobile banking.

Regarding the partner for these actions, obviously, they are our own management issues, and we have to do them by ourselves. However, at the same time, we are getting support from the Government of Bangladesh, our academicians, stakeholders including our customers, and the Non-Government Organizations (hereinafter, "NGO"). A lot of NGOs are working with us because approximately 15 to 20% of the people of Dhaka city are living in informal settlements or slum areas. These slum areas are one of the reasons for the high NRW rate. Now, we bring all those slum areas under a legal network with the help of different local NGOs as well as international NGOs. It has reduced our NRW rate, and also it has given the people of those areas legal water and they're also very good paymasters. We are engaged with a lot of water operator partners, water programs, and also with development partners such as JICA, ADB, WB, and others. These are the stakeholders with whom we are working and trying to achieve these challenges or what we have discussed in Session 1 and 2.

Regarding Session 3, we strongly believe that cooperation, collaboration, and networking with all other utilities in our country to give them training and share advanced knowledge for enhancing the capacity of those utilities are very important, and that's what we are doing. We have a partnership with all the Water and Sanitation Agencies of Bangladesh. We have networking with other urban, and semi-urban utilities for training purposes. They are coming to us for training and they are upgrading their capacity and capability. The government is also organizing this sort of session with us, and this is also giving us a good opportunity for collaboration. Besides that, networking and WOPs programs with regional and international water utilities, development partners, and different government organizations are going on. We are having WOPs programs with at least 10 to 15 organizations besides networking.

What we are going to do in the next 3 years. During the last 12 years under the Dhaka WASA turn-around program, we made drastic changes such as NRW reduction. But still, we have some non-DMA areas. For the next 3 years, we hope that in those non-DMA areas where we are now introducing DMAs, we will be able to reduce the NRW rate from 20% to 5%. As for the sustainability of DMAs, we have introduced another manual, another operation and maintenance system since 2016. This is also giving us sustainability. We know the example of another country where they made the DMAs successfully and reduced their NRW rate to a very low value, but gradually it went back again to 30% or 40%. In order to avoid this, we have made a special DMA management team and it has yielded a very good result from 2015-16. Until now, the DMAs where the rate is 5 to 7%, the rate has not yet gone up, which means it is sustainable. Secondly, the revenue growth. We have made a drastic revenue increase from 2009 to 12, and until now the annual growth is approximately 10 to 11%. But we hope to achieve in the next three years the

revenue growth of 15%. If we can do so, it will give better sustainability. Additionally, one of the big jobs that we are doing and still have to do is to bring low-income communities living in informal settlements, under a legal water network. Almost 70% of them are already under the legal network, and as for the rest 30%, we will be able to bring them under the legal network in the next three years. This will also give us sustainability in our NRW reduction. The fourth point is enterprise resource planning. We are doing computerization, automation, and digitization of all the work, including recruitment, procurement, supply chains, finance, costing, and billing. We are heading toward an enterprise resource plan. We started this 5 to 7 years ago, but still, we have not been able to make computerization of 100%. But within the next 3 years, we will be able to bring the whole DWASA under the enterprise resource plan. It will be man-less, except for the SCADA operators and others. That's our target.

7-3-2 Nepal

Mr. Tiresh Khatri gave a presentation on the action plan of Nepal.

Figure 7-21 Presentation on the action plan of Nepal

Action Plan (NEPAL)

Sub-theme	Fundamental issues, problems (Copy important items from sheets 1 and 2)	Actions (Copy from sheets 1 and 2)	With whom? (partners resources for action)
Session 1. Towards water utilities resilient to risk and change	**Climate Hazards:** **Droughts** - Water deficits in springs, tube wells, surface sources highly exposed due to a higher concentration of contaminants and pollutants **Floods** - Exposed to water-borne diseases and lack of access to safe drinking water **Landslides** - infrastructure is exposed to breakdowns	**Droughts**- Construction of recharge pits and adopt policy measures for RWH & recharge measures **Floods:** Construction of flood resilient impounding reservoirs and appropriate WTPS **Landslides**- Establishment of early warning system	Other utility operators Environmental organizations Universities/Research Institutes
	Climate adaptation budgets for climate resilient WASH, including specific guidelines lacking	Establishment of independent authority for regulation and tariff fixation. Tariff shall cover O & M cost, partial cost recovery, affordability and climate resilience and sustainability of system	Climate Funds Development partners

Where we want to be in 3 years' time (with indicators if possible)

RESILIENT WASH SERVICES

Figure 7-22 Action plan of Nepal (Page1)

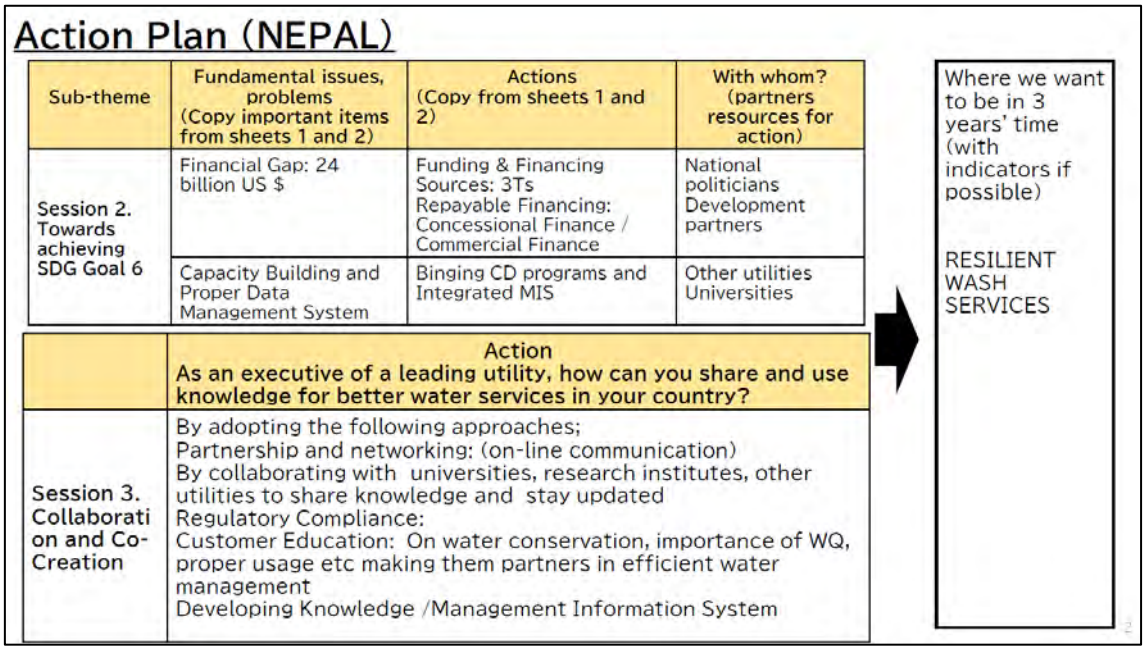


Figure 7-23 Action plan of Nepal (Page2)

[Contents]

Session 1. Nepal faces a significant vulnerability to climate change. Due to its geographical location and the melting of glaciers, rising temperatures, and erratic monsoons, there's a threat to water resources, which is hampering the development of Water, Sanitation, and Hygiene (hereinafter, "WASH") sector as well as the WASH service delivery. The prevalent hazards observed are droughts, floods, and landslides. Due to droughts, water deficit is there in the hilly regions as well as in the water depletion in the dry or the plain areas of the country. Surface water sources are highly exposed to higher concentrations of contaminants and pollutants. Similarly, due to floods, waterborne diseases and lack of access to safe drinking water are happening. Due to landslides, infrastructure is exposed to breakdowns. The actions for droughts will be the construction of recharge pits, and the adaptation of policy measures for rainwater harvesting and recharge measures. For floods, the construction of flood-resilient impounding reservoirs and appropriate water treatment plants are needed. Similarly, for landslides, the establishment of early warning systems is important. The second issue regarding Session 1 is the lack of a climate adaptation budget for climate-resilient WASH including specific guidelines. For this, the action would be the establishment of an independent authority for regulation and tariff fixation. Tariffs shall cover O&M cost, partial cost recovery, affordability, climate resilience, and sustainability of the system. The partners could be other operators of the country or outside the country, environmental organizations, universities, research institutes, and other agencies. What we want to be in 3 years is that we want to achieve climate-resilient WASH systems or service delivery.

Session 2. In the case of basic water and basic sanitation, Nepal is quite comfortable to achieve the set target. However, when you come to safely managed water supply and safely managed sanitation, it's very challenging. It is estimated that there's a financial gap of 24 billion USD to achieve SDGs Goal 6 for Nepal. For this, the funding and the financing mechanism could be adapted such as the 3T's (Transfer, Taxes, and Tariffs), or repayable financing. Additionally, the other goals are the capacity building of both the human resources and the institutions related to the WASH sector, and the introduction of a proper data management information system. Nepal has introduced the N-WASH MIS system which is a geo-referenced digital portal, that can give you real-time data on any site or any project. But it is still to be done because 50% of the municipalities are still to be covered. We are targeting to complete this within one year period.

The partners could be development partners, other utilities, and the universities.

And coming to the Session 3. The first action is the partnership and networking with other agencies, and collaboration with universities, research institutes, and other utilities to share knowledge and stay updated. The regulatory compliance as per the government regulations is also important. The third action is customer education on water conservation, the importance of water quality, and property uses, to make them partners in efficient water management. Developing knowledge and management information systems is another topic.

The target in 3 years is to achieve a resilient WASH system and WASH services.

7-3-3 Pakistan

Mr. Zeeshan Bilal gave a presentation on the action plan of Pakistan.

Figure 7-24 Presentation on the action plan of Pakistan

Action Plan (Pakistan)

Sub-theme	Fundamental issues, problems (Copy important items from sheets 1 and 2)	Actions (Copy from sheets 1 and 2)	With whom? (partners resources for action)
Session 1. Towards water utilities resilient to risk and change	1. Responsibility without Authority 2. Climate change	1. Autonomy 2. Emergency response system	1. Provincial Government 2. WASA, Relevant Government Organization .
	3. lack of water resource planning, 4.Water Source Quality (Arsenic, TDS, Brackish Water)	3. Water Resource Policy 4. Water Quality Monitory	3. National & Provincial Government 4. WASA, AFD
Session 2. Towards achieving SDG Goal 6	5. Low Tariff 6. Reliance on ground water Absence of Water Metering / Zoning,	5. Tariff rationalization 6. induction of surface water, Installation of meters and development of zones,	5. Provincial Government 6. JICA, AFD, AIIB, PPP
	7. Lack of trunk sewerage Lack of wastewater treatment	7. Provision of trunk sewerage and WWTPs	JICA, ADB, DANIDA, AFD, AIIB

Where we want to be in 3 years' time (with indicators if possible)

1. Legal framework for autonomy
2. Installation of water meters
3. Induction / increase in share of surface water in water source
4. Increase in ratio of sewage treated to sewage generated.

Figure 7-25 Action plan of Pakistan (Page1)

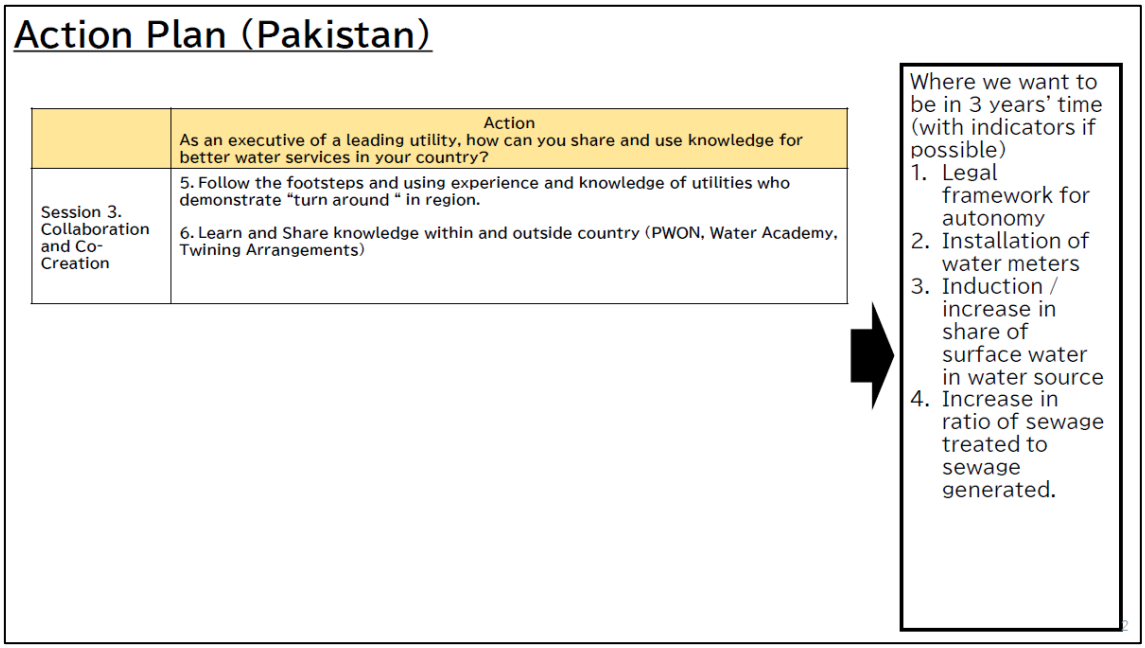


Figure 7-26 Action plan of Pakistan (Page2)

[Contents]

Session 1. The first point is responsibility without authority. Water and Sanitation Agencies are responsible for providing water and sanitation services to the major urban centers in Punjab or other parts of the country, but they don't have the authority to make decisions. They are under the development authorities, for example, WASA-L is under the Lahore Development Authority, which has nothing to do with the water and sanitation services. These development authorities are mainly for the development of urban centers and metropolitan planning. In order to meet the resilience to risks and changes, Water and Sanitation Agencies need to have the autonomy to make the decisions. It has been already requested many times for the Punjab Government to give us authority, and we will be pursuing it in the future, too. The other important part is climate change. Pakistan is one of the most vulnerable countries to climate change and has experienced the impact in the recent past. Last year, there were also very devastating floods and rains. This year also, we are facing unprecedented rains. In the case of infectious diseases such as COVID-19, we will be caught unprepared when we are struck by COVID-19. We learned a lot during that pandemic, and we need to develop an emergency response system. In the case of climate change, there are a lot of water resources in the shape of rains and floods which go untapped. We need to build storage in order to tap these resources. We have to develop the emergency response system for this with relevant government organizations, at the central level, the National Disaster Management Authority (NDMA), and at the provincial level, the Provincial Disaster Management Authority. The third issue is the lack of water resource planning. Pakistan is a water-stress country. When Pakistan was created in 1947, it had a water availability of 5,000m3/person. However, with the population growth, it is below 1,000, which is a threshold of water stress country. On the base of this, there is a strong need for resource planning and resource allocation, and in this case, we need national and provincial government support. The fourth issue is the quality of the water source. We heavily rely on the groundwater. In Lahore, Punjab, and in some areas, the groundwater is brackish, and with over-abstraction, we are facing the quality issue of arsenic and others. It is a very major challenge in the coming future. In order to address this, we need to have a water quality monitoring system. WASA-L has a laboratory of ISO17025 certification and other Water and Sanitation Agencies are also working on it. However, the quality and the capability of these laboratories need to be enhanced. At the same time, in order to address the water quality problem,

we need to blend it with surface water instead of depending on the groundwater. Because Pakistan is, at the moment, 5th largest extractor of the groundwater.

Session 2. Everybody talked about the rationalization of low water tariffs. Such a tariff can offset our costs. Being able to offset operational costs is very important. Regarding CAPEX, we can look towards the government and the development partners. The second issue is about the reliance on groundwater, water metering, and zoning. There is an absence of water metering and that's a major cause of the unsustainable use of water. We have planned to install a meter in every connection, but at the moment the percentage in most utilities is below 10%. It is causing a lot of wastage of water. In order to move our reliance from the groundwater, it is necessary that we tap surface water in rivers and canals, and install meters in development zones so that we can reduce our NRW. For this, we are working with JICA, AFD, and the Asian Infrastructure Investment Bank. Recently, WASA-L has completed our tender process for the installation of water meters on every connection under the WASA-L service area. The third issue is the lack of trunk sewerage and lack of wastewater treatment. It is impacting public health at large because of the absence of these facilities. For the provision of trunk sewage and wastewater treatment plants, different Water and Sanitation Agencies are working with these partners.

Session 3. First, it was a very good experience participating in this forum and I think we can learn from the footsteps of some utilities of Manila or Phnom Penh about how they made their turn around and can take benefit from their knowledge, experience, and plan. Secondly, it is important to learn and share knowledge with other utilities within and outside the country. Before, our utility did not have any network within Pakistan. For the last 10 years, we have developed Pakistan and we have developed Pakistan Water Operator Networks (PWON). It's very fruitful and we are sharing and exchanging our views and experiences. We meet bi-annually online or in person and every utility is contributing to this to make this Pakistan Water Operator Networks successful. Also, JICA has helped us to develop an academy called Water Academy in Lahore. We train technicians, middle managers, and managers.

It is for the Punjab Province only, and there are 4 Water Academies in the Punjab Province. The other thing is the twinning arrangements. We had a twinning arrangement with UK utilities in the past, and recently we have a twinning arrangement with Budapest. With the twinning arrangement or with regional water utility collaboration, we can learn to solve our problems.

Where do we want to be in three years' time? The first thing is the legal framework for autonomy. We need to de-link Water and Sanitation Agencies from the development authorities. In order for this, we need a legal framework for autonomy, and hopefully, we will be able to do so in three years' time as we are pressing that to the government. Secondly, the installation of water meters. It is very important for sustainable use of the water. We need to enhance the coverage of meters because it's as low as 10% in most cases. What happens when people know that they have to pay a fixed amount for water service? They don't care about the use of water, a lot of waste of water, and unsustainable use of water. Thirdly, we need to increase the share of surface water. I would not say that we would completely shift in three years, but we need to increase the share of the surface water in place to gradually shift from the groundwater to the surface water. Fourthly, we need to increase our ratio of the sewage treated to sewage generated. There's a very low percentage of the sewage being treated. When sewage is discharged into the freshwater resources, it would be a concern because it's not only destroying all the freshwater resources but is also a threat to groundwater and a public health concern. We are working with different development partners and governments to install wastewater treatment plants. Hopefully, in three years' time, we will increase the ratio of treated sewage.

7-3-4 Sri Lanka

Mr. Waruna Samaradiwakara gave a presentation on the action plan of Sri Lanka.

Figure 7-27 Presentation on the action plan of Sri Lanka

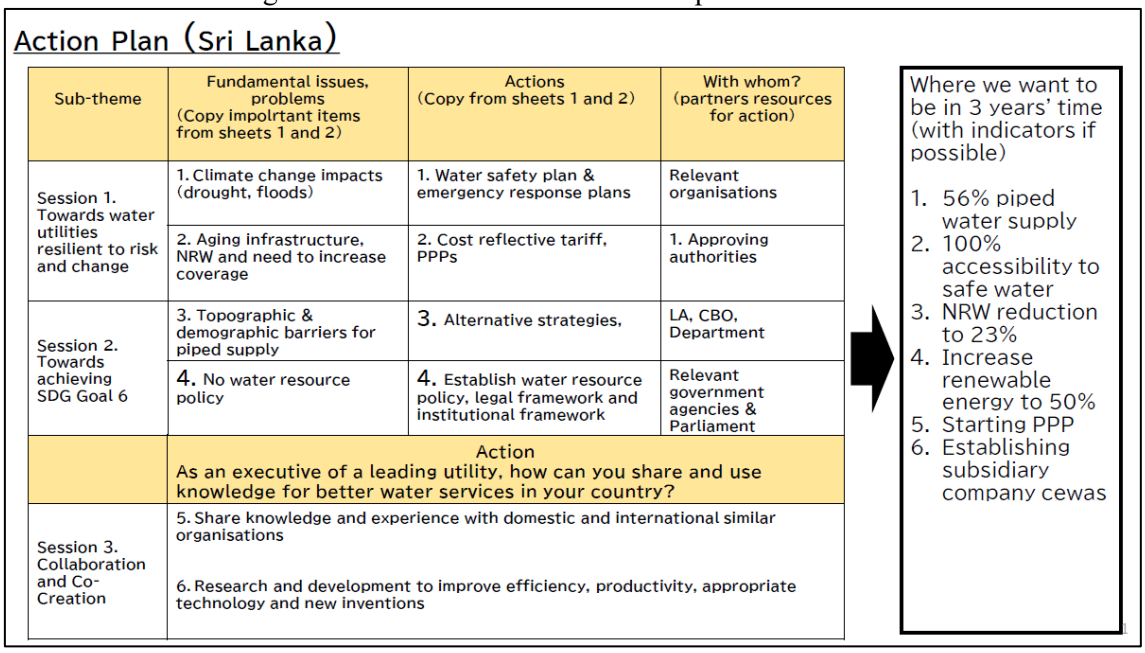


Figure 7-28 Action plan of Sri Lanka

[Contents]

Session 1. We also identified that the climate change impacts are very big issues for our country as an island nation. We have to face droughts, floods, and some other climate change impacts. Nowadays, we are facing severe drought. Some part of the country doesn't have drinking water, and some have to travel 2-3 km to find water, especially in the northern parts of the country and the southern part of the country. We believe it will be a very big issue for us. The second issue is the aging infrastructure and NRW. We face the increase of NRW because our pipe network is aging. At the same time, we need to increase the water coverage. Our drinking water coverage is around 60-62%, and we need to increase the coverage. For the first issue, we suggest or we hope to develop a water safety plan and the emergency response plan. Regarding the second one about aging infrastructure and the non-revenue water. Actually, we mentioned the NRW, not only as the leakage of water but also as the wastage of water, e.g., some people wasting their water for

gardening and washing their vehicles and some other things. For this, we use the tariff as a strategy to reduce the waste of water. When we increase the tariff, generally, we can see the reduction of wastage of water. Therefore, we have tried to increase our tariff. The tariff should be a cost-reflective one, but we were unable to do that. A few weeks ago, the government gave us approval to increase the tariff, but that was not sufficient to cover our cost. In addition to this, we hope to go for PPP. Capital is another problem for us in developing the water projects and improving some ongoing projects. We think that it is better to go for PPP because all the water supply utilities or water supply institutions are run by the government. Who will be the partner? Regarding the climate change impacts, we need to work with the relevant organizations. That means the organizations who are involved with the approval of our proposals. Sometimes, we need to get consent from provincial authorities or local authorities. For the second one, aging infrastructure, NRW, and cost-reflective tariff, we would like to work with the provincial authorities or local authorities to get their consent or their agreement with our tariff mechanism. Otherwise, we can't run our water supply business smoothly.

Session 2. We identified that topographic and demographic barriers are the main issues for supplying piped water. Some of the areas in Sri Lanka are hilly and it is somewhat difficult for NWSDB to implement their mega-type projects. It is necessary to find an alternative strategy or proper strategies for these areas. The second issue is non-existence of a water resource policy. In Sri Lanka, the water resources belong to a number of agencies. Some belong to the central government, some belong to the provincial authorities, and some belong to other ministries and departments such as Mahaweli Authority, Department of Irrigation, etc. It may hinder the maximum or efficient utilization of water. It is necessary to have a proper water resource management policy for Sri Lanka. The action should be to establish a water resource policy, legal framework, and institutional framework for the country. Regarding the partner for the alternative strategies to hilly areas, etc., we are closely working with the local authorities such as municipal councils, urban councils, and the Community-Based Organization (hereinafter, “CBO”). We have the Department of Community Water Supply, and they closely work with the community water supply organizations. We invest in the construction of water projects and hand them over to the CBO so that they can run the water business in that area. We have identified that is the best method for the areas where NWSDB cannot reach. Regarding the development of water resource policy, the partners will be the relevant government agencies and Parliament. Once we amend the Act or sometimes the regulations, we have to get approval from the Cabinet of Ministers and later the Parliament as well.

Session 3. We strongly believe that sharing knowledge and experience is vital for the improvement of the water sector. We are always working with domestic agencies such as local governments, CBOs, and the department as well. We share our technical knowledge, and sometimes, we share our materials as well, such as pipes and other things in case of urgent need. NWSDB can supply the pipes, meters, and other equipment. Also, we strongly believe that research and development is also very important for the improvement of the water sector. We have taken necessary actions to improve our research and development area. NWSDB has its own research institution and the Ministry of Water Supply and Estate Infrastructure Development (MWSEID) has a separate research institution based on the University of Peradeniya, which was constructed and implemented with the assistance of the Chinese Academy of Science. That was constructed and funded by the Chinese government. Most of the research and development works are being done there, and a number of postgraduate students, Masters and Ph.D. students, are doing their research and working with the professionals or academics at the Joint Research Development Center in Peradeniya.

Where we want to be in three years’ time. We hope to have the water supply rate up to 73%. That figure is relevant to the whole island, not the particular areas like Columbo, Kandy, or any other urban areas. Because in the Colombo area, the capital city of the country, the water supply coverage is almost 100%. And we hope for 100% accessibility to safe water. The figure is about

98% as a whole country, but in some areas, people are still traveling 2 to 3 km to find their drinking water. I think, within the next three years, we will be able to cover these areas as well. The third point is NRW reduction. The figure is also relevant to the whole country. In Colombo, we had an NRW rate of more than 30%, 7-8 years ago. After the Columbo City Water and Sanitation Improvement Project, we were able to reduce it nearly to 15 to 20%. But when considering country-wide, it may be 25 or 28% because some of the water projects or water schemes run by the local authorities have high NRW rates. It is somewhat difficult to reduce the amount because of the lack of funds. The fourth one is to increase the renewable energy rate up to 50%. As we all know, most of the cost for water purification and water transportation is energy cost. In Sri Lanka, it is around 50% of the total cost. We are planning to reduce that cost by using renewable energy such as solar energy. Actually, we are drafting our policies for that, and going for the PPP model to get solar energy. That is the fifth one, starting PPP for another project as well. The sixth point is to establish a subsidiary company for CEWAS. It is somewhat difficult to run CEWAS with our available rules and regulations. That's why we are planning to go for another subsidiary company for CEWAS. We believe that we can run CEWAS in a profitable manner with this subsidiary.

7-4 Comments from H.E. Ek Sonn Chan

After the presentation of the action plan from each country, H.E. Ek Sonn Chan offered comments for feedback.

Figure 7-29 Comments by H.E. Ek Sonn Chan

[Contents]

First, I want to have some comments regarding the action plans. Our international attendants have worked hard and have come out with an action plan in a very short time. The accuracy of the plans could not be precise, but at least, you know how to be successful in difficult conditions and situations.

There were three hot topics you raised in the action plans, funding, tariff revisions, and NRW reduction. I can share with you some thoughts about those three things.

First, funding. Money is everywhere. In Cambodia, we used to have the word, “The money is everywhere, it just needs someone who knows how to spend it.” It is exactly true. In the case of Cambodia in the very beginning, we needed the money to replace the pipes and to build treatment plants, the first-ever loan. That was the funding from WB. Commissions from Washington DC came over, but we could not convince them to accept, to endorse our requirements. But with a very strong push, they sent a senior expert from the bank. We sent him to the field and showed him what we had done. He smoked and drank a lot. I did, too. The meeting took the whole morning of Sunday, but it didn’t bear any results. But one night on Sunday completely changed the results.

Our requirements were 100% approved with 17 conditions. We looked into the conditions, and they were really something that we needed to change in our management. After that, whenever we needed a project, whenever we needed funds, all the international funding agencies came to knock on the door.

Second, tariff revision. I really appreciate many of our colleagues here, especially NPLP. Even if the tariff is only approved by the local authority, it's also a very tough effort. I have gone through three important periods of tariff revision. The first tariff revision was in PPWSA in 1997. The second was the revision in Kampong Cham in around 2010. And the recent tariff revision of PPWSA. In these tariff revisions, we had support from ADB, AFD, and from Japan. The financial institution meets the relevant authority and has a discussion. In principle, they feel like agreeing when the technician comes out to show the logic of tariff revisions' necessity. So, please ask your development partners to do it.

Third, NRW reduction. It does not mean that low water losses are good and high water losses are bad. It depends on a lot of social, political, and economic conditions, and we have no one-size-fits-all. But there's one common thing. I brought the words from Soichiro Honda in my keynote speech. "Don't fear failure, but fear doing nothing." As far as you stand up and walk after you fall, you will succeed one day. The handicapped people can play sports even better than us. Dedications are important. When PPWSA started NRW reduction, we did it with the words, "do or die." I told my colleagues that if he cannot do it, it is better to leave the authority for the other people to work for it. If we stayed there, our people would have had no water.

I have a final remark. I will end up with two requirements.

First, because many of you here are first time to come to this forum. I am the one who came from the first, second, third, and fourth, and after six years, came back again for the fifth forum. In Cambodia, we have the words, "If you drink water, please remember the guy who made the well." JICA is the one who organized this forum. This forum is very fruitful and useful. I started to have so many connections. On the last forums, I requested that it's better to have the "Water Family." And finally, we have the "Water Family." The MC asked who the members of the Water Family were. Maybe my colleagues. But they do not know that we are the Water Family. Then, is this really useful? There is a gap because we have no coordinating committee, and we have no secretariat who really takes care to connect every water institution. I would like JICA to consider it. Just a small institution to keep information together every three months can be beneficial. We can take advantage of some information, and gradually improve between the forum.

Within a few minutes, we will break away. You will be back in your country, but please remember that the farther you are the closer you will be in our hearts. I don't know what's going to happen from now. But please remember that we are the one who provides the most needed thing for life. It is much higher than humanitarian actions. Providing water means proving their lives. Supporting water utility to supply water to their people in need. This is also the highest humanitarian activity. And remember always to help the next generations.

One day friend is a friend forever. We have had many experts, many JICA officers, and many fundings or officers for 25 years, and we are still connected. We still keep the relation before 1993 until today. I hope that those kinds of relationships will last forever for you and us.

I'm quite happy to know that the private sector of Japan started to look into the Cambodian market. I met people from Marubeni, and they were keen to have business in the water sector in Cambodia. As I said, providing water is much better than providing humanitarian activity.

On behalf of the Cambodian delegation, on behalf of the Cambodians who are in need of water, I wish all of you a safe flight back to your country. Thank you very much.

7-5 Overall Comments on the 5th Executive Forum from Prof. Takizawa

Following the comments from H.E. Ek Sonn Chan, Prof. Takizawa offered overall comments on the 5th Executive Forum.

Figure 7-30 Overall comments on the 5th Executive Forum by Prof. Takizawa

[Comments]

I will give you a short story of mine, and then I will deliver my messages.

SDGs Goal 6, Target 6.1 is "By 2030, achieve universal and equitable access to safe and affordable drinking water for all." I will summarize our talk for the last four days. And I just picked up some discussions, which I thought were important.

The first one is water tariff revision. I heard that during discussions about water tariffs, affordability is very important. I agree with this. But affordability for whom? In your city, also here in Japan, we have very rich people, while we also have low-income families. You have to supply both, very rich people and low-income families. Before, we did a survey in the city of Metro Manila. We made a survey for the residents in Quezon City, asking about their income and water consumption, by checking their bills. The result clearly shows a very interesting fact (Figure 7-31).

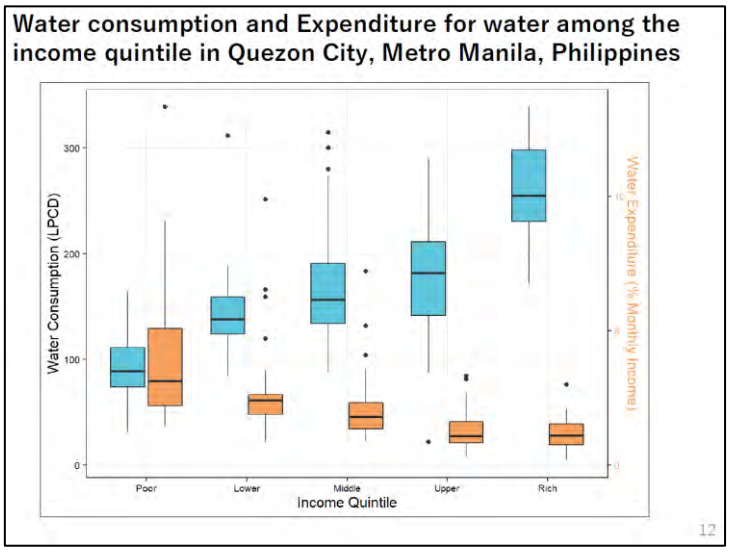


Figure 7-31 [Overall comments by Prof. Takizawa] Water consumption by household income group

We separated the target persons into five groups, depending on their household income,

following the Philippine government's quintile classification of household income. The blue color shows water consumption. The rich use large amounts of water, while the poor consume less amount of water. When it comes to how much percentage of household income they spend to get water, the rich spend a very small amount of income to get a large amount of water. On the other hand, the lowest income group spends much of their house income to get less amount of water. It is said that the maximum percentage of the household income that could be spent on water is 4%. The rich spend less than 4%, while low-income families spend sometimes more than 4%.

This is the difficulty in setting the water tariff. Because SDGs' elements are "affordable and for all." So, it is a problem how to set the water tariff. Next, "universal and equitable access." What is equitable access? If someone spends more of the household income, can you say it is equitable? That is the question I have.

The second important point is NRW reduction. In the action plans, many of you proposed a reduction of NRW. Maybe you're following this water balance table (Figure 7-32).

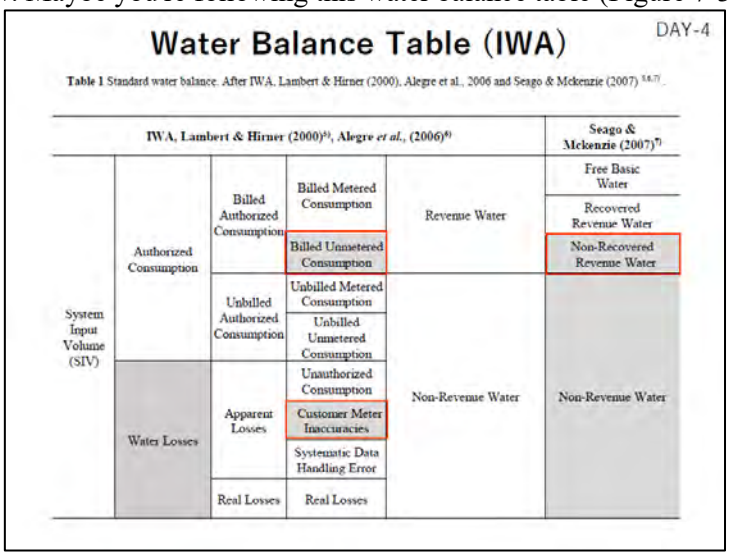


Figure 7-32 [Overall comments by Prof. Takizawa] Water balance table by IWA

Everybody knows very well about the water tariff table, but I dare say that this table has a problem (highlighted in red). The table separates water into revenue water and non-revenue water, and it does not look at the water volume. If you can get money, that is revenue water, but if you cannot, it's non-revenue water.

Please look at this one, "Billed unmetered consumption." According to the International Water Association (hereinafter, "IWA") specialist group like Helena Alegre and others, they say billed unmetered consumption is revenue water, because you can get money. But you do not know where the water went. Was it delivered? Is the volume that you said the right volume that was actually consumed by the users? We do not know. The specialists, mostly from European countries, believe that this amount is very small or negligible. This is because they have water meters. That is a prerequisite to using this table. But the reality is that we don't have water meters in many cities and countries. What if billed unmetered consumption is 90%? What should we do with that? Do you have any answer to estimate non-revenue water? How do you calculate non-revenue water? Now, we have a big question, but nobody asks this question to the IWA specialists. This is a big problem in our water management.

Inside water losses, we have "Apparent Losses" and "Real Losses." It is said that apparent losses are due to meter inaccuracies and real losses are physical losses due to water leakages which we cannot see when we go to check the water meters. It is very common in many places that water meters are broken and people estimate the figure or set fixed rates. Can you estimate NRW under this condition? No, we cannot.

We would like to look at our journal paper on this issue. What we did is we replaced the meters.

We went to see the condition of the water meters, and they were broken. So, we replaced it in the pilot project. We visited rich household areas, too. We tried to replace the broken water meter, but they didn't let us go inside. We left the broken meter and installed a water meter outside of their house. This is not usual, not common, but we did it. I talked to the Director General and convinced him that this was very important. He said we can go with this. What happened?

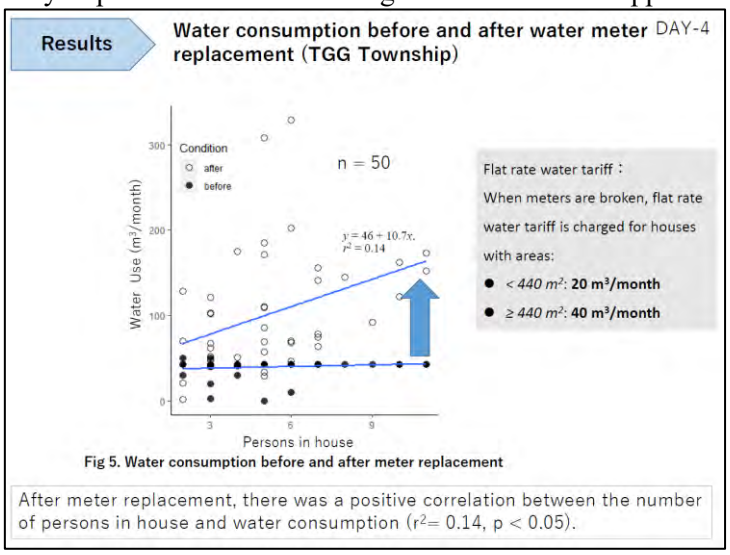


Figure 7-33 [Overall comments by Prof. Takizawa] Water consumption before/after water meter

The black dots in Figure 7-33 are water consumption with fixed rates. And the blue line or these circles are actual metered water consumption. To be sure, they consumed much more than what was charged. I asked one of my students to calculate the payback period because water utilities said we do not have money to replace the whole meter because it is costly. For large houses, the payback period is only 8.5 months. So, what happens after this? They have a higher income. In this way, we made a plan to replace water meters for the whole city. There is no tariff change, nor extra budget required. You just need to replace the water meters. Unfortunately, due to political conditions, we could not make this afterward. But it is very important to measure the water supply to the households. If you have flat rates and you have calculated NRW, that is not the truth. By the way, unfortunately, we found that the water quality was not very good. After replacing 50 water meters, two water meters were clogged within one or two months. So, this is another issue, that is, we have to supply clean water and we have to clean the pipes. As I told you, as a university professor, I am obliged to publish journal papers and we have published these references in the last 4-5 years. Some of them include your city's case study. If you are interested, please download and read it, since it is free.

Now it's time for me to give you a message. But before that, this is the way forward. Do you know Stewart Brand? He graduated from Stanford University with a biology major. But he's interested in many things like design, art, music, or some engineering works like the construction of houses. And he made so many failures. One of the successes is that he found a triangle. Everybody knows that the triangle is very strong and he started to build triangle structure buildings, which was his success and he got a lot of money. One more interesting thing is that he moved along mostly in California and one day, he was looking at the sky when he lived with his family in a boat. He found stars, and he thought, "If we can see the Earth, the picture of the whole Earth, that will be wonderful." "I can see the stars from the boat, but I cannot see where I live." So, he asked NASA. This is the story in the late 1960s when NASA started to launch satellites taking photos of the Earth. But NASA declined his request because this was a national security issue. But he pressed so hard and finally, he made it. He used the photo to publish his book or journal, "Whole Earth Catalog." He stopped publishing this paper within four years, but in this paper, it is written, "Stay hungry. Stay foolish" Have you ever heard of this word? Steve Jobs,

very famous founder of Apple Computer, quoted this word at the commencement of Stanford University back in 2005. Unfortunately, his life was very short. Stewart Brand is still alive at the age of 85.

Now, it is my turn to deliver the message. Knowing what to do is different from doing what to do. When I ask my students coming from your countries, they know much about what should be done. And then, if I ask whether they do it, they say no. There are many reasons why they cannot do that. Knowing something is important, but it is very different from doing what to do. My message to you is, “Don't be afraid.” Don't be afraid of being a daredevil. I am not asking you to be the daredevil of a US movie or comic, who is a superhero. Our superheroes are those who are in your utilities. They agree and understand what they need to do, and they dare dig and install water meters to measure water consumption. We do not need red costumes, and we need only a helmet, boots and a work shirt. That is my superhero. There may be daredevils also in this room with suits and ties. This is my message.

Chapter 8 Closing Remarks

8-1 Mr. Syuichi Yamaoka, Director General, Yokohama Waterworks Bureau

The first closing remarks were given by Mr. Syuichi Yamaoka, Director General of Yokohama Waterworks Bureau.

Figure 8-1 Closing remarks by Mr. Syuichi Yamaoka

[Contents]

Thank you for participating in this forum from both Japan and abroad. Together with JICA, with whom we have been closely cooperating in international cooperation activities for many years, I believe that we were able to make the forum a success by receiving great cooperation from the participants. For about three years, due to the impact of COVID-19, we have had to refrain from face-to-face interaction and technical assistance, and we have continued to communicate with each other through online training. However, I also realize the importance of having discussions in the same space in person.

Over the past four days, we have had many presentations and long exchanges of views in various fields for the improvement of water utilities in Asia, and I think we have been able to share ample expertise and knowledge. Through the forum, vigorous discussions were held among the participants, including executives from 10 countries, experts with advanced knowledge and technology, water utilities, and private companies in Japan. Today, through presentations by water utilities in various countries, I was also able to learn about their tremendous efforts to solve problems. I hope that the solutions to the problems of one utility will spread to more utilities and that the circle of improvement will expand. In the technical tour, with the cooperation of member companies of the Yokohama Water Business Association, participants were invited to observe the technologies that Japan is proud of. I hope that what you learned in the tour will be utilized in future efforts. On the last day, the participants discussed action plans for the future based on new expertise, knowledge, and ideas they had gained through the four-day meeting. In the future, I would be very pleased to hear that this conference was a turning point that brought an effect on improving the technological capabilities of participants' countries.

I hope that the expertise and knowledge shared at the forum will be used to improve water utilities in your country and to develop human resources for international contributions in Japan. This year marks the 50th anniversary of the international contribution of the Yokohama Waterworks Bureau. We have dispatched 368 employees to the Asian region and received 2,243 trainees up to today. With this as a new starting point, we will continue to work on our activities without stopping. Yokohama City will continue to cooperate with JICA and all of you and propose solutions not only for water utilities but also for various urban problems. Let us work together for

the peace and development of Asia by deepening our ties.

I would be happy if you enjoyed your stay in Yokohama this time. I hope the rest of your stay will also be a good one. I would like to express my hope that the results of the forum will be fruitful in water utility operations in the future.

8-2 Mr. Takahiro Morita, Director General, JICA Global Environment Department

Next, Mr. Takahiro Morita, Director General of JICA Global Environment Department made closing remarks.

Figure 8-2 Closing remarks by Mr. Takahiro Morita

[Contents]

First of all, I would like to express my deepest gratitude to everyone who attended this forum. On behalf of JICA, I would like to extend my gratitude to the participating leaders, especially from Asian countries, the people of Yokohama, and other organizations in Japan.

This forum was held with the aim of achieving more sustainable and resilient water systems in Asia by connecting water utility officials in Japan and around Asia, learning from each other, and co-creating solutions. I was very impressed to hear the action plan of each country and the summary by H.E. Ek Sonn Chan and Professor Takizawa. Throughout the forum, I believe that participants learned from each other, thought deeply about fundamental issues, co-created knowledge, and became determined to take concrete actions to expand quality water services through discussions in three sessions: Towards Water Utilities Resilient to Risk and Change, Towards Achieving SDGs Goal 6, and Collaboration and Co-Creation. I feel that the sharing of issues and lessons by water utility leaders in Japan and abroad through the forum helped them share the mission of water utilities, and further strengthened the sense of solidarity that they will continue their efforts in water services together based on the common values of Water Family.

JICA has the opportunity to follow up for one year, and we will work together to foster a platform of collaboration and co-creation which were strengthened in the forum. I hope participants from overseas will take advantage of this knowledge and realization to improve water services in their countries. On the other hand, I expect that participants from Japan will use what they have gained from the forum in their international cooperation activities. I hope you all enjoyed the four productive and memorable days. I look forward to seeing you at the next forum. With those words, I would like to conclude my closing remarks.

Chapter 9 Technical Tour

The technical tour was conducted on Day 3 (Thursday, August 24). The destinations of the technical tour (2 sites) and the itinerary are as follows.

- KUBOTA Corporation (hereinafter, "Kubota")
  - Keiyo Plant (2-16-1, Sakae-cho, Funabashi-city, Chiba Prefecture)
- Yokogawa Solution Service Corporation (hereinafter, "Yokogawa")
  - Head office in Musashino (2-9-32, Naka-cho, Musashino-city, Tokyo Metropolis (Yokogawa Electric Corporation premises)

Time	Kubota	Yokogawa
7:50	Meet up	Meet up
8:00	Departure	Departure
	Transfer (1.5h)	Transfer (2h)
9:30	Arrival in Keiyo Plant	
	Start of the tour	
10:00	-Plant outline introduction -Plant tour / Presentation of DIP and HRDIP -Q&A (Total 2.5h)	Arrival in head office in Musashino Start of the tour (2h) *Estimate
12:00	End of the tour	End of the tour
	Lunch	Lunch
13:15	Departure from Keiyo Plant	Departure from head office in Musashino
	Transfer (1.5h)	Transfer (2h)
14:45	Arrival in Yokohama City	
15:15		Arrival in Yokohama City

Figure 9-1 Itinerary of the technical tour

* As for the time, it varies depending on the progress and traffic conditions on the day of the tour.

9-1 KUBOTA Corporation (Keiyo Plant)

[Introduction of company profile]
- Watch a video about the company
- Greetings from the Keiyo Plant Manager
- Explanation of the Keiyo Plant from Kubota staff
- Hereafter, the tour divided into two groups

[Ductile Iron Pipe (hereinafter, "DIP") Plant tour]
- Tours of the plant along the manufacturing process of DIP (Melting > Casting > Annealing > Machining)

[Tour of the exhibition space]
- Conducted bending experiments of Hazard Resilient Ductile Iron Pipe (hereinafter, "HRDIP")

[Q&A at the exhibition space]
Q. Will HRDIP not have water leakage even after the earthquake?
>A. No.

Q. What is the structure of the joint part?
>A. As the exhibition shows, the joint part is composed of a gasket, lock ring, spigot projection, etc. This structure enables the expansion/contraction, joint deflection, and slip-out resistance.
Q. Do you manufacture accessories in this plant in addition to pipes?
>A. We only manufacture pipes in this plant.
Q. Explanation was made that the final process was internal and external coating. What is the material for these?
>A. For internal coating, we use FBE and cement mortar. For external coating, we use other materials.
Q. How long is the durability?
>A. For GENEX, it is 100 years including the gasket.

[Presentation by Kubota]
・ Contents include:
- (1) Explanation of construction method: DXR (Duplex method for pipeline Renewal)
- (2) Overview introduction of DIP (Especially, HRDIP)
- (3) Overview introduction of pump and valve products

[Q&A]
Q. (Perumda PAM JAYA, Indonesia) In Jakarta, our NRW rate is as high as 46%, and its causes are aging and breakage of pipelines. We need to replace the pipes. I would like to know whether you have a system or a model for the assessment of the pipeline conditions. Do you offer support services for this?
> A. Kubota has a domestic track record and can offer support services. It will be discussed later.
Q. (Perumda PAM JAYA, Indonesia) How do you deal with the dirt adherence to the inside of the pipelines when installing them?
> A. We put a polyethylene cover inside the pipeline when installing it so that the dirt will not adhere (since 30 years ago). We do experiment with this consideration during installation and record data.
Q. (Perumda PAM JAYA, Indonesia) I would like you to share the video data about the DXR construction method. Also, please share the data about the consideration during installation (polyethylene cover).
> A. Will be communicated later.

[Comments and appreciation from the participant (Maynilad, Philippines)]
・ Thank you very much for giving us a tour of your plant today. It was very hot in the plant, but it was great to learn about the DIP manufacturing process. I was impressed by Kubota's high technology and innovation. In the Philippines, we have many places with difficult installation conditions, so I thought Kubota's pipe could be used. Thank you very much.

Figure 9-2 [Kubota] Presentation scene in the meeting room

Figure 9-3 [Kubota] Q&A scene

Figure 9-4 [Kubota] Comments and appreciation from the participant

Figure 9-5 [Kubota] Bending experiment equipment of HRDIP

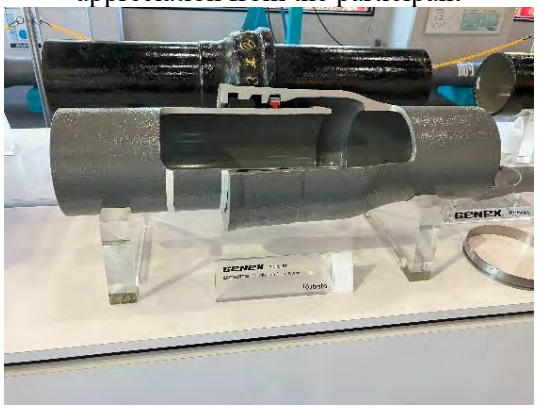


Figure 9-6 [Kubota] Cross-sectional structural mockup of HRDIP

Figure 9-7 [Kubota] Commemorative photo

9-2 Yokogawa Solution Service Corporation (Head Office in Musashino)

[Introduction of company profile]
- Greetings from the Managing Director
- Company profile introduction, solution introduction
- Hereafter, the tour divided into two groups

[Tour of robot solutions]
- Explanation of robot solutions
- Observe the robot in action

[Q&A during the tour of robot solutions]
Q. Where do you use this robot? Do you have a track record of implementation in the water sector?
>A. It is mainly used in gas plants. We don't have a track record yet in the water sector. We would like to be able to introduce the use of this robot in waterworks maintenance, etc. in the future.

[Tour of global response center]
- Watch a video about the global response center introduction
- Tour and Q&A

[Q&A during the tour of the global response center]
Q. Do calls from Japan connect to this center?
>A. Yes. We receive about 100 calls every day. This center responds to calls from Japan and all over the world.
Q. Do you resolve issues received over the phone within 5 minutes?
>A. It depends on the issue. Sometimes it takes a little longer because it may require checking with the technical staff. It also depends on the degree of urgency of the client.
Q. Are there Japanese staff in the local response center?
>A. There are no Japanese staff in the local response center, but issues that cannot be resolved there will be transferred to this global response center and will be taken care of by Japanese staff.
Q. In the case of the Philippines, do we contact this center in English or do we contact the local response center?
>A. The Philippines is under the jurisdiction of the Singapore branch office, so the Singapore branch office will be called upon to respond. Cambodia, Laos, Vietnam, and the Philippines will all be handled by the Singapore branch office.

[Presentation by Yokogawa]
- Contents include:
  - (1) Explanation of Edge Solutions for Sustainable Water Service
  - (2) Overview introduction of OmegaLand WaP Trainer

[Comments and appreciations from the participant (Sri Lanka, Bangladesh)]
- (Sri Lanka) Thank you very much for giving us a tour today. I would like to thank Yokogawa for their hospitality.
- (Bangladesh) I met old friends and appreciate the opportunity to experience the latest technology here. Thank you very much.

Figure 9-8 [Yokogawa] Presentation scene in the meeting room

Figure 9-9 [Yokogawa] Scene of the participants

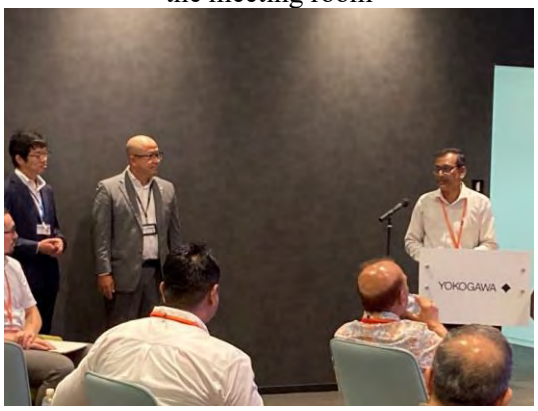


Figure 9-10 [Yokogawa] Comments and appreciation from the participant

Figure 9-11 [Yokogawa] Tour of robot solutions (1)

Figure 9-12 [Yokogawa] Tour of robot solutions (2)

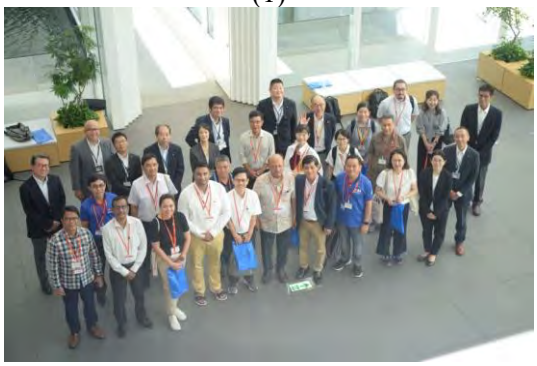


Figure 9-13 [Yokogawa] Commemorative photo

Chapter 10 Consideration

The Forum featured presentations and discussions in three sessions from August 22 to 25 (On Day 3 a technical tour was conducted). During this period, the 5th Executive Forum had a total of 495 participants (excluding the Day 3 technical tour).

- Day 1 (Session 1): Towards Water Utilities Resilient to Risk and Change
- Day 2 (Session 2): Towards Achieving SDGs Goal 6
- Day 4 (Session 3): Collaboration and Co-Creation

10-1 Results and General Comments on the 5th Executive Forum

As stated in the theme of the 5th Executive Forum, "Co-creating resilient and sustainable water supply service from Asia," we believe that the following results were achieved through this forum, which was held with the aim of realizing resilient and sustainable water supply services through impact expansion with collaboration and co-creation.

(1) Sharing Practices and Lessons Learned Through Presentations

These results are the same as those from the 1st forum through the 4th forum, and we believe that the 5th Executive Forum has fulfilled its responsibilities as well. The presentations shared in each session were useful for participants to implement in their own organizations, and the group discussions provided a good opportunity to further deepen their knowledge.

The following is a summary of the success factors and lessons learned from each presentation, which participants can take back to their own countries for further improvement efforts. The sharing of these success factors and lessons learned, as well as the group discussions based on them, is an extremely important part of the Executive Forum's significance as a place for sharing knowledge and experience.

In the 4th forum, many participants commented that they would like to see more presentations of case studies from Japan. Based on these comments, five presentations from Japan were included this time (two presentations in the 4th forum). The results of the questionnaire also indicated that there was a high interest in the case study presentations from Japan, and we believe that it was very meaningful to share the know-how and knowledge of Japan's efforts.

Table 10-1 Best practices/lessons learned shared in the presentations

Presenter	Contents of best practices	Success factors/lessons learned
Engr. A. K. M Fazlullah, CWASA, Bangladesh	Flexible response to risks such as infectious disease outbreaks and saltwater intrusion, thereby ensuring business continuity and maintaining service levels	・ Immediate and necessary actions were taken in response to risks on a timely basis based on strong leadership (For infectious diseases, the initial experience of infection led to restrictions on staff movement and quarantine, etc.; for saltwater intrusion, water was taken at low tide and mixed with groundwater as a short-term measure, while long term measures being considered).
Ms. Tomoko Ishimoto, Osaka Municipal Waterworks Bureau, Japan	Continuation of business operations in the event of a pandemic using the BCP for infectious disease that had been	・ BCP for infectious disease, separate from that for earthquakes, windstorms, and floods, had been formulated and prepared in advance. ・ Continuation of water supply services in the event of a pandemic by applying the BCP for infectious diseases.

Presenter	Contents of best practices	Success factors/lessons learned
	established in advance, and continuation of further revision of the BCP	・ Continuously revising the BCP for infectious disease based on the experience of the pandemic.
Mr. Toru Tsujie, Nagoya City Waterworks & Sewerage Bureau, Japan	Consideration and implementation of measures to offer a grace period for the payment and water tariff waiver in the event of a pandemic, based on short, medium, and long-term perspectives	・ The implementation of the measurements of a grace period and tariff waiver was examined from the viewpoint of the income/expenditure plan in the management plan and impediments to facility renewal, and the contents of measurements were determined to the extent that they would not impede business operations, not only in the short term but also in the medium to long term (from the viewpoint of "responsibility" and "management").
Mr. Pornsak Samornkraisorakit, MWA, Thailand	Implementation of saltwater intrusion countermeasures based on the development and use of digital tools (water withdrawal restrictions and increased discharge from the dam)	・ Developing their own digital tools based on the strong leadership in working with the Royal Irrigation Department and other agencies. ・ Utilizing the tools developed and working to accumulate data and continue to improve the accuracy of the forecasts.
Mr. Cao Huy Tuong Minh, HueWACO, Vietnam	Continuation of safe water supply by taking 5 measures under natural disasters and infectious diseases	・ Implementing various measures in line with the 5 pillars of (1) Safety and sustainability, (2) Flexibility, (3) Preparedness, (4) Prediction and impact reduction, and (5) Public sharing.
Mr. Nguyen Thanh Su, SAWACO, Vietnam	Monitoring raw water quality and addressing climate change by investing in equipment and developing a handbook for operators	・ Taking both hard and soft approaches to properly monitor and manage the water source quality. ・ They are trying to adapt to climate change by conducting research on the effects of climate change and long-term measures against climate change, as well as providing climate change-related training for staff.
Dr. Usman Latif, WASA-F, Pakistan	Efforts to become a self-sustainable water utility, including detection of illegal connections, registration of new connections, and correction of water tariff	・ Trying to realize the improvement of water services through the detection and optimization of unauthorized connections, the registration of new connections, as well as the implementation of rate revisions, including cross-subsidies for low-income customers. ・ The effects and results of the initiatives are organized as financial figures and used to explain them to the relevant parties.

Presenter	Contents of best practices	Success factors/lessons learned
Ms. Sarah Monica E. Bergado, Manila Water, Philippines	Linking sustainability goals to the company's business direction. In particular, achieving sustainable service delivery through NRW reduction efforts.	・As a private company, sustainability goals and ESG have been linked to company decision-making and planning. ・The company has continued its efforts to reduce NRW, viewing NRW as a new water resource, by subdividing its water supply area into smaller areas and ensuring that each subdivided area is working to reduce NRW. ・The meter is tested and calibrated to verify the certainty of the NRW figures.
Mr. Yoshinori Sakurada, Bureau of Waterworks, Tokyo Metropolitan Government, Japan	Promotion of understanding of water supply business and understanding of customer needs through communication efforts with customers, etc.	・Proactive public relations efforts that incorporate direct interaction with customers, such as holding exchange meetings, school waterworks classes, and the notification function of the Tokyo Water App. ・The results and achievements of the initiatives are quantified, analyzed, and linked to the evaluation and improvement of the initiatives.
Mr. Philavong Ladda, NPLP, Laos	The development and proposal of the corporate plans and water rate revisions, and their comparison with actual results	・The water rate revisions are considered and proposed based on the medium and long-term corporate plans (the rationale and reasoning for the water rate revision are clearly provided). ・The plan is compared with the actual results, and the reasons for not going as planned are analyzed and the plan revisions are considered.
Mr. Takichi Obara, Iwate Chubu Water Supply, Japan	Unification of water rates in the integration of water supply services, and implementation of considerations from multiple perspectives toward this, and explanation to customers.	・The use of a committee composed of outside members, including users and academic experts, to examine water rate unification from multiple perspectives. ・Holding many explanatory meetings for residents, etc., and using easy-to-understand figures at those meetings, etc., to ensure that they fully understand the need for integration and rate revisions. ・Sudden change mitigation measures were taken at the time of the water rate revision to reduce the impact on users.
Mr. Nguyen Van Thien, BIWASE, Vietnam	Financing through ODA loans, co-financing, etc.	・When utilizing ODA, the project team set goals while also focusing on the feasibility and efficiency of the project (that is the viewpoint of the financial institution), and worked patiently over the long term. ・Focusing on factors that financial institutions value, such as high customer satisfaction, low NRW ratio, and excellent financial

Presenter	Contents of best practices	Success factors/lessons learned
		management, to improve the business.
H.E. Long Naro, PPWSA, Cambodia	Utilizing schemes such as loans, grants, technical assistance, etc., and ensuring finances based on the needs	・It has developed its water supply business by utilizing schemes that meet the needs of the time, such as loans, grants, technical assistance, etc. ・Based on this experience, the utility is considering the revision of water rates, designing development projects, and taking various measures to secure funding in order to achieve the SDGs targets for 2030.
Engr. Taqsem A Khan, DWASA, Bangladesh	Implementation of various initiatives based on the "Dhaka WASA Turnaround Program" to become a bankable organization	・The turnaround program has been carried out under strong leadership with a strong sense of urgency about the future. ・The various initiatives have been undertaken with a view to becoming an autonomous organization, with a particular focus on changing the mindset of the staff. (The result is a shift from being the selectee to being the chooser in fundraising.)
Mr. Rustico Noli Cruz, DBP, Philippines	Investing through various schemes and developing co-financing with private financial institutions, etc.	・The presentation intended to provide perspective on the fundraising of water utilities from the financial institution side. ・As one of the financing options, co-financing between development banks and private financial institutions under a scheme such as the PWRF can be envisaged (especially for large projects).
Dr. Wasantha Kumari Illangasinghe, NWSDB, Sri Lanka	Establishing the knowledge center, innovation center, and quality center under the CEWAS to return and disseminate the expertise, experience, and enthusiasm of the NWSDB both internally and externally	・In response to the training needs of local residents, engineers, and overseas water utilities, the training programs have been developed and human resource development has been implemented in cooperation with domestic and international organizations and institutions.
Mr. Siphanh Inmouangxay, NPNL, Laos	Initiatives to strengthen the network of water utilities and develop water business in Laos	・The organization has been actively promoting its activities as a core organization that coordinates the water supply sector in Laos, not only by providing technical assistance, a small amount of financial support, and training to the water utilities (ordinary members) but also by serving as a contact point for projects with overseas donors and participating in overseas conferences.
Mr. Kabir Bedi,	Expanding water	・Flexible and agile cooperation with the

Presenter	Contents of best practices	Success factors/lessons learned
Perumda Tirtanadi, Indonesia	supply services in North Sumatra Province by pursuing diverse coordination and cooperation	central government, provincial and local governments, and the private sector to expand water supply services. ・ Proactively encouraging related organizations to make improvements to the factors that constrain cooperation initiatives and water supply projects, based on the relationships that have been established in the past.
Mr. Nithit Thongsa-ard, PWA, Thailand	Implementation of human resource development for sustainable growth of the organization; provision and dissemination of human resource development training outside of PWA	・ The utility sets human resource development as part of its organizational strategy, develops a separate strategy for human resource development, and, provides a wide variety of training programs to its staff, in actuality. ・ Providing experience and expertise in human resource development not only for PWA's internal human resource development, but also for small water utilities in Thailand, waterworks-related vocational training for those outside of PWA, and training for water utilities outside of Thailand, across national borders.
Mr. Koichi Hasegawa, Yokohama Water Co., Ltd., Japan	Contributing to sustainable business operations by providing Yokohama's technology and business operation know-how (consulting and advisory services) to water and sewage utilities in Japan and overseas.	・ It has been providing support to water utilities in Japan and overseas, leveraging the strength of being able to provide sustainable and flexible services as a private company while working hand in hand with the Yokohama Waterworks Bureau as a public utility.

(2) Formation of Broader Perspective and Themes with Participation of Private Water Utilities

The participation of private water utilities, such as Manila Water, Maynilad, and BIWASE, was significant in that the elements of business management, including leadership, management, and sustainability were more clearly emphasized and shared through the presentations. The interconnectedness of water services with numerous goals (targets) to the SDGs was also presented, as well as perspectives such as the ESG Indicator. In the morning session of Day 2 with these presentations, the participants asked questions spontaneously, which was evidence of their interest in the topic.

(3) Further Cultivation of Leadership

In the 5th Executive Forum, group discussions were held in Session 1, 2, and 3. The main facilitators of the group discussion were the invited participants and the assistant facilitators were

Japanese participants, and preparatory briefings on how to proceed with the discussion were held on the day before the Executive Forum. In the group discussions, the roles of the main facilitator and the accelerator who opened the discussion were allocated to the invited participants who were not presenting, as much as possible, so that many participants could play some role.

All participants had an opportunity to speak during the group discussions, which seemed to promote active participation of them. In fact, the group discussions were extremely active, with comments on the questionnaire such as, "Discussions were very fruitful," "All discussions were very lively and interactive," and "Group discussions were a very good opportunity to share experience." This is a valuable opportunity for leaders to come together and engage in active discussions among themselves. The experience of participants participating as leaders and engaging in discussions with leaders of other organizations may have contributed to further cultivating their leadership.

(4) Sharing Awareness and Networking as Water Family

In addition to the presentation of the current status and challenges of each utility and organization, as many participants as possible were asked to take on some roles in the group discussions so that all participants could speak and exchange opinions. As a result, participants were able to share their backgrounds, the stage of development of their water supply businesses, and the challenges they are facing, and each participant was able to clarify which utilities and organizations are similar to his/her own and which ones can serve as references for advanced efforts.

For consideration on the discussion of each session and topics, see "10-3 Results of the 5th Executive Forum Questionnaire (Evaluations from Invited Participants)." However, it is very interesting to note that, in general, the topics of great interest to the invited participants were service improvement of water utilities with a focus on NRW reduction, securing funds including water rate revisions, and addressing climate change risks (including water resource management), indicating an underlying interest in the sustainability of water services.

In the action plan presentation on Day 4, the opportunity was given to learn about the current situation, issues, action plans, and directions to be taken by the invited countries other than one's own, and to compare them with one's own country, which will serve as a foundation for promoting future collaboration and co-creation among the invited countries.

Networking is promoted mainly through interactions, exchanges of opinions, and discussions among the invited participants during group discussions and coffee breaks, and when combined with the information of other utilities and organizations as described above, it is expected that each country and each invited participant can promote various forms of collaboration and co-creation toward the realization of their own action plans, such as providing information, friendly competition, technical support, and collaborative efforts.

The program was organized with an emphasis on the keywords "Water Family" and "Collaboration and Co-Creation" from Day 1, and the incorporation of these keywords in the keynote speeches was also effective, and the entire program focused on sharing awareness as Water Family, network formation, and collaboration and co-creation through these activities. The fact that as many as 22 participants answered "collaboration" to the question on asking where the lessons learned from this forum would be utilized, shows that this focus was well conveyed.

(5) Embodying Each Country's Ideal Vision and Action Plan to Achieve it

The output of the Executive Forum was changed from the preparation of the Yokohama Forum Statement until the 4th forum to the preparation of an action plan on a country basis, providing time for discussion, organization, and compilation of issues, action plans, and future ideal images on a country basis. As a result, it is thought that this may have increased the sense of participation and involvement of the invited participants in the Executive Forum. By making the action plan on a country basis, it is expected that the sense of ownership will be maintained and the action

plan will be implemented through follow-up.

While goals and targets are usually pursued and set at the utility or organization level in the day-to-day operations of water services, it is very meaningful to have the participants in the same country discuss and coordinate their ideal vision and action plans to achieve it, in order to gain a broader perspective to improve and enhance the water supply sector toward a common goal at the country level. Due to time constraints, there were some cases where the participants listed their own issues (instead of sublimating them to the issues and actions of each country), but it was good to provide an opportunity to think about water services from a broader perspective of a country.

On the other hand, some presentations did not prioritize issues and initiatives. The secretariat has explained the purpose of the action plan in its explanations to the participants, aiming for them to take the step of understanding the root causes of the problems and prioritizing efforts to address the root causes when they prepare their action plans. However, it is regrettable that some countries did not reach this step, and the insufficient support from the secretariat is a point to be reflected on.

As a matter of course, action plan initiatives are carried out within the larger context of each organization's existing strategies and plans, as well as the national policy of each country. We will continue to follow up on the action plan based on this premise, but we will share with the participants, as necessary, the importance of identifying root causes and prioritizing efforts, and advise them to keep this in mind as they move forward with their efforts.

(6) Gathering and Disseminating Information that Contributes to Future project Development, etc.

Through the UP data collection and questionnaire survey conducted in advance, as well as through presentations, group discussions, presentations of action plans, and other communications during the coffee break, etc. throughout the forum period, the challenges and difficulties faced by the invited participants were shared. Such information is extremely important as basic information for the follow-up, and utilization of this information will enable the effective development of new projects. Based on the synthesis of information from the above sources, the main issues that the invited countries/utilities are considered to face are summarized in Table 10-2.

For detailed minutes of the group discussions, please refer to “11-5 Records of Group Discussions,” and for graphs comparing the major indicators from the UP data among the participating utilities, refer to “11-7 Results of Utility Profile Data Analysis” as appropriate.

Table 10-2 Main issues that the invited countries/utilities are considered to face

Country	Contents
Bangladesh	・ Saltwater intrusion countermeasures including mid- to long-term (CWASA) ・ Further reduction of NRW and its maintenance / DX implementation (DWASA)
Cambodia	・ Development of national water resource policy / Supervision, guidance, and technical assistance for private water utilities / Capacity building of MISTI personnel / Securing funds for investment in private water utilities (Country-level issues)
Indonesia	・ Improvement of performance of water utilities nationwide (using KPIs) / Capacity building and human resource development (Country-level issues) ・ Pipe leakage countermeasures (renewal of old pipes) / Securing water sources (Perumda PAM JAYA) ・ Securing water sources from outside the city due to shortage of water sources and increase in CAPEX and OPEX accordingly / Revision of water tariff / Response to climate change (Perumda Tirtanadi) ・ NRW reduction / Increase in water supply coverage (Perumda Jambi)

Country	Contents
Laos	・ Increase in water supply coverage/ Reduction of NRW/ Response to climate change (high turbidity raw water due to heavy rainfall, drought, etc.) (Country-level issues) ・ Increase in water supply coverage (NPKM) ・ Corporate plan revision and its implementation / Improvement of business efficiency (NPLP)
Nepal	・ Drought, flood, and landslides countermeasures (rainwater harvesting and recharge measures, construction of reservoirs and water treatment plants, establishment of early warning systems, etc.) (Country-level issues)
Pakistan	・ Development of national water resource policy / Improvement of the independence of Water and Sanitation Agencies (Country-level issues) ・ Breaking away from dependence on groundwater / Improvement of source water quality (expansion of sewage treatment) / Reduction of NRW (WASA-L, WASA-F)
Philippines	・ Countermeasures for contamination of groundwater sources / Breaking away from dependence on groundwater (desalination) / Reduction of NRW / Water rate revision (MCWD) ・ Reduction of NRW (Maynilad)
Thailand	・ Re-establishment of facilities through review of water supply business, etc. / Water rate revision (MWA) ・ Securing water sources / Securing funds for reservoirs and other improvements / Introduction of digital technology / Reduction of NRW (PWA)
Sri Lanka	・ Renewal of aging infrastructure and reduction of NRW / Development of national water resource policy / Expansion of water supply to hilly areas, etc. (Country-level issues)
Vietnam	・ Securing water sources (including addressing deteriorating water quality and relocating water sources) (Country-level issues) ・ Climate change measures (saltwater intrusion) (SAWACO, DAWACO)

In Table 10-1, the success factors and lessons learned are shown. With reference to these, various approaches are possible when considering the formulation of projects, such as;

・ Problem-solving support in a way that involves domestic water utilities with experience and knowledge: e.g., formulation of multiple BCPs according to risks and operations based on them by Osaka Municipal Waterworks Bureau
・ Horizontal expansion of JICA's past support and efforts: e.g., optimization of water service connections and the financial quantification of its effectiveness by WASA-F. corporate plan and rate revision accordingly by NPLP
・ Problem-solving support with reference to successful examples of overseas utilities: e.g., step-by-step NRW reduction efforts by Manila Water

At the same time, Japanese private companies held business sessions (5 companies), exhibitions (9 companies), technical tours (2 companies), etc., as information dissemination from the Japanese side to promote business with Japanese private companies. There was some communication between Japanese companies and the invited participants regarding the exhibition and the business sessions were also attended with great interest. The technical tours on Day 3 were conducted in two groups, one for the Kubota and the other for the Yokogawa. In both tours, the participants seemed to be very interested in what they saw, and positive comments were obtained in the questionnaire results, making the tours very fruitful. In fact, the tour was very

fruitful for both sides, as a participant from Indonesia offered concrete consultations to Kubota, which is expected to lead to business development for the Japanese company.

(7) Networking and Promotion between Participants and the Japanese Side

Throughout the 5th Executive Forum, communication between the invited participants and Japanese-related parties was active not only during the business sessions, exhibitions, and technical tours by Japanese private companies but also during coffee breaks, leading to networking and promotion.

The fostering of connections between the secretariat and other related parties with the invited participants will be fundamental to the smooth overseas development of the Japanese water sector and to the enhancement of the platform function as a "Water Family" in the future. As for Japanese private companies, as mentioned in the previous section, there were active direct interactions, including business talks in the exhibition space and during technical tours. This will lead to future business development, and it can be evaluated that the forum has adequately fulfilled one of its expected roles.

10-2 Evaluation, Analysis, and Reflection on the Operation of the 5th Executive Forum

10-2-1 Matters Related to Presentations

(1) Appropriate Number of Presentations

In the 5th Executive Forum, a total of 20 presentations (including 5 presentations from Japan) were made over the three days of Day 1, Day 2, and Day 4. Although the schedule was the same as the 4th forum (19 presentations in total, including 2 presentations from Japan), the number of presentations increased by 1 (as for presentations from Japan increased by 3), resulting in a very tight program. Although we were able to secure time for Q&A as mentioned below, we regret that there was not enough room in the program to reserve time for this. When planning the next Executive Forum, it will be necessary to consider the number and content of presentations and coordinate with the presenters, keeping in mind that the schedule as a whole should allow for more adequate space.

The number of presentations from Japan was increased from the 4th forum, and as indicated in "10-1 (1) Sharing Practices and Lessons Learned Through Presentations," the presentations were well received by the participants and are considered to have been successful. On the other hand, it is desirable to consider the number of case study presentations from Japan at the planning stage of the Executive Forum in the future, taking into account the perspective of the forum as a place for Asian countries to learn from each other.

(2) Presentations that Lead to More Concrete Actions

Regarding the presentations and group discussions, one participant commented, "(M)ost of participants are coming is to have a lesson learnt, from the FGD part, we only share our weaknesses without conclusion obviously, in the big forum the presenter who succeeded in the program must share also the path to reach the goals, what are the steps toward the Goal."

It would be necessary for the presenters to present and introduce more concrete and detailed solutions and measures that could be implemented immediately by similar utilities, as well as what concrete steps could be taken to achieve success (given the constraints of funds and human resources).

Similarly, in the group discussions, due to time constraints, time was taken to share the current status and issues of each participant, and in some cases, it was not possible to deepen the discussion on how to solve the issues.

It is considered that narrowing down and deepening the content of presentations and group discussion topics will lead to concrete actions by each utility. Therefore, it is desirable to consider

the content of presentations and group discussions with the above in mind when planning the next Executive Forum.

It is also important to learn not only from successes but also from failures and difficulties. This will enable us to identify concrete and realistic actions to be taken next time and actions to be avoided, such as what kind of failure the planned action may lead to, what is necessary to avoid such failure, and how the situation can be overcome in the event of a failure.

(3) Appropriateness of Simultaneous Interpretation

Simultaneous interpretation (Japanese-English) was provided at the main venue and meeting room of the Group B group discussion. The interpretation was mainly used for (1) translating some of the Japanese presentations into English since they were given in Japanese, and (2) translating English presentations into Japanese for the preparation of the minutes at the secretariat. On the other hand, however, most of the invitees were fluent in English (with the exception of some Vietnamese participants), and in principle, no problems were felt in listening, presenting, and communicating in English. In addition, for the participants from Vietnam, interpretation between English and Vietnamese was provided by the accompanying person, and similarly, no problems were observed in listening, presenting, and communicating in English. In light of the above, there is room for further consideration, including from the perspective of cost-effectiveness, as to whether or not to implement simultaneous interpretation in the next and future Executive Forums, since the appropriateness of simultaneous interpretation is considered to be a language issue for the Japanese participants.

(4) Progress Management of Presentations

In order to manage presentation time, the bell was rung several times before and at the end of each presentation. Despite some trial and error, as a result, it was possible to achieve a certain degree of presentation time management, and when time was left over, the moderator and assistant moderator led the Q&A period for about 15 minutes as appropriate. It was a good point that we were able to be flexible and manage the program in an appropriate manner as a result.

(5) Conduct of Q&A period

The presentations for both Day 1 and Day 2 proceeded relatively on schedule, which was good because it allowed time for Q&A as needed. In the next Executive Forum, there may be room to consider allocating time for Q&A beforehand for each part of the session (morning, afternoon, etc.).

On the other hand, it was very disappointing that there were no questions from the audience for DBP, who prepared the presentation via video recording and streaming, despite the fact that the presenter himself was participating online for the Q&A session. It is the point to be improved that in the absence of questions from the invited participants, advance preparation and consideration were necessary, such as asking questions from the main or assistant moderator as appropriate.

(6) Presentation Slide Data Sharing

Several presenters asked for data replacement just before their presentations (on the day before or the day of the presentation). The secretariat had to deal with multiple data updates and replacements each time, which accompanied a certain burden and time. From next time onward, the secretariat should consider measures to reduce the burden, such as storing the projection data in a designated location (address) in advance and informing the presenters of the location to update the data.

10-2-2 Matters Related to Group Discussions

(1) Grouping

The invited participants were divided into three groups based on the location of the countries and the stage of development of the water supply sector, etc. Each group had heated discussions, partly because they were from neighboring countries and the utilities were at a similar stage of development. The grouping method did not seem to pose any problems.

On the other hand, it is also worth considering the possibility of randomly grouping participants, regardless of country or region, to induce networking among participants that is not confined to communication within a specific country or region. When planning the next Executive Forum, it would be desirable to consider the grouping from this perspective as well.

(2) Appointment of Facilitator and Accelerator

Requests for the participants to take the role of facilitator were made sequentially several months prior to the 5th Executive Forum, and requests regarding the accelerator were made sequentially after the participants' arrival in Japan and before the day of the Executive Forum. It took a long time to obtain facilitator candidates' consent through e-mail correspondence, and there were times when facilitator candidates declined at the last minute, which led to sudden changes unavoidably. Most of the withdrawals were due to language barriers, but there were also withdrawals due to the lack of a suitable environment when the participants arrived in Japan. It is desirable to have the invited participants take on roles in the Executive Forum, such as presenters and facilitators, and the secretariat needs to enhance its ability to create such an environment.

Related to this, some of the facilitators and accelerators had to be changed at short notice, and the invited participants (candidates) had to be flexible in some areas, but it was a good thing that a word from the last appointed accelerator triggered a smooth discussion that followed.

On the other hand, there were some invited participants who were (or turned out to be) both a facilitator and a presenter, and in some cases, it seemed to be a heavy burden for them. Therefore, it would be better to have them concentrate on one role as much as possible from next time onward. Also, by distributing the roles, efforts should be made to have as many invited participants as possible play some role in the Executive Forum.

(3) Facilitator Preparation

The facilitators and assistant facilitators had time to meet and discuss in advance, and each group proceeded in its own way while referring to the scenarios distributed by the secretariat. In all groups, all invitees had the opportunity to speak, and the discussions were very active.

(4) Progress Management of Group Discussion

The group discussions were generally well received. On the other hand, the lack of time for individual note-taking on the action plan on Day 1 and Day 2, and the fact that a considerable amount of time was spent on NRW and tariff revision discussions on Day 2, suggest that the approximate time schedule for discussions and recovery methods in case discussions diverge should be thoroughly considered and prepared in advance. The time schedule should also be written on the whiteboard or otherwise communicated to the participants.

The fact that the participants did not use equipment such as sticky notes, whiteboards, markers, etc. this time made it difficult to visualize the direction and content of the discussions, which is an area for improvement.

(5) Utilization of UP

Regarding the UP, although data was collected, analyzed, and graphed, and the data and paper materials were distributed to the participants, it was disappointing that the data was not utilized much in the group discussions. One factor was that no invited participants brought paper materials

with them when moving to the group discussion meeting rooms. The collection, analysis, and use of UP results need to be discussed again in advance at the next Executive Forum. Additionally, the performance indicators to be collected as the UP should be the same as the monitoring indicators in the Cluster Strategy "Water Utility Growth Support" under the Global Agenda of JICA and should be oriented to enable comprehensive and continuous monitoring of the level of growth beyond the framework of the forum.

10-2-3 Matters Related to Action Plan Development

(1) Recognition and Awareness of Action Plan Development

Although awareness and recognition of the need to create an action plan were provided at the briefing at hotel check-in on the previous day and at the program orientation of Day 1, there were still some cases of lack of awareness. As a countermeasure, paper forms of action plan were distributed during the group discussion on Day 2, and each invited participant was briefed during each day of the Executive Forum on the procedures for creating an action plan. Additionally, during the technical tour on Day 3, we confirmed the arrangements for action plan preparation and role assignment such as presenter and secretary for each country. As a result, we were able to confirm by the end of the technical tour, that each country was aware of the need to create an action plan, and we were able to confirm the direction of the role assignment in the creation of the action plan on Day 4, such as presenter and secretary, except for Indonesia. In some countries, discussions were held until late at night before Day 4.

(2) Time Allocation to Create Action Plan

For the first and second sheets of the action plan, although about 10 minutes were set aside (in the scenario) for writing notes after the group discussions on Day 1 and Day 2, some groups were so engaged in heated discussions that they finished without taking time to write notes. On the other hand, with the abovementioned awareness raising having worked well, many participants were motivated to write their own memos for the first and second sheets of the action plan outside of the forum program (e.g., at night). Also, for the third sheet, each participant took time outside of the program to gather with the country's members after the Day 3 technical tour to discuss and create the memo, or to discuss themes (issues) to focus on in advance. In the time of summarizing each country's action plan (60 minutes) on Day 4, all countries were generally able to complete their action plans within the time frame. While opinions differ as to whether or not time should be allocated within the program for the creation and summary of action plans, the fact that spontaneous country-based discussions were held outside of the program, which was partly because the secretariat focused on the awareness raising mentioned above, could be considered a good thing.

During the 60-minute session of summarizing each country's action plan, Japanese resources were allocated in each meeting room to assist in the action plan Summarization. The fact that all countries were able to smoothly prepare their action plans according to the schedule was due in large part to the efforts of the Japanese resource persons. We would like to express our gratitude and consider it a very good thing that we were able to arrange a system of support.

(3) Creation of Action Plan with Data

It was discovered on Day 1 that the participants from Sri Lanka did not bring their own PCs, tablets, etc., and that the participants from Bangladesh had difficulty operating PCs, making it difficult to create data of the action plan by themselves. The secretariat arranged for PCs, and the secretariat member helped input data when preparing the action plan. With this flexible response, the situation was handled and the matter was resolved, but the fact that such a sudden response occurred is a point to be reflected on. It is necessary to communicate necessary information to the participants prior to their trip to Japan, for example, by asking them to bring their own PCs and

informing them that they will be requested to make data with PCs.

10-2-4 Matters Related to Technical Tours

(1) Allocation of Participants to Technical Tours

The allocation of participants to the two technical tours was made after confirming the wishes of the participants and taking into consideration the number of people available for the tours and the wishes of the recipient companies. Although we had informed participants in advance that it was not always possible to allocate participants according to their preferences, we received several requests for changes from participants who were assigned to the tour that did not meet their preferences, and we had to make last-minute changes. Some participants were absent from the tour if they could not make the requested changes, which was very disappointing.

For a similar event on the next occasion, when taking requests for technical tours, it is necessary to firmly remind the participants that the tour may not go as requested, and to obtain their prior understanding. There is also room for consideration of measures to encourage participation in the technical tours, such as emphasizing to participants in advance that the technical tours themselves are part of the Executive Forum program. On the other hand, it is also worthwhile to be flexible in dealing with changes and non-participation to some extent, since such changes and non-participation may be due to reasons such as the health condition of each participant, etc.

As far as possible, the participants from the same country were divided into different tours to Kubota and Yokogawa. Additionally, the secretariat tried its best to intervene and encourage communication with participants from other countries, which may have fostered multinational ties.

10-2-5 Matters Related to Other Topics

(1) Overall Program Structure

Of the overall program, Day 1 and Day 2 consecutively consisted of a series of presentations and group discussions at the venue. In particular, the Day 1 program at the venue lasted for a long time since it was the first day of the Executive Forum. Some of the invited participants came to Japan late at night the day before, and it was apparent that they were fatigued by the end of Day 1. For the next and subsequent Executive Forums, it may be necessary to consider the adjustment of the flight time to come to Japan earlier, shortening of the program of Day 1, or shortening of the overall program, etc.

(2) Session Themes Setting

According to the questionnaire results, more than 45% of the participants were particularly interested in Session 2, “Towards Achieving SDGs Goal 6.” However, given the fact that the theme of Session 2 covered very broad topics, which will be discussed later, it is fair to say that the participants were interested thoroughly in Session 1 to Session 3.

It was significant that we were able to set themes of high interest to the invited participants. However, the topics to be dealt with in waterworks change from time to time. Although the topic of the 5th Executive Forum, such as, “Dealing with risks such as infectious diseases,” is a universal theme, it is difficult to set it as the theme of the next Executive Forum. It is desirable to set themes for the next and subsequent Executive Forums according to the circumstances of the time.

(3) Role Assignment of Day 4 Summary Session

The moderator for the Day 4 Summary Session was initially planned to be the chairperson of the 5th Executive Forum. However, since the action plans of each country were to be submitted just before the Summary Session, the plan was changed during the preparation stage to have the

Day 4 MC host the Summary Session. For the next Executive Forum, the relationship between the Summary Session and the deadline for preparation of the deliverables (previously, the Yokohama Forum Statement; this time, the action plans) to be referred to in the Summary Session should be carefully considered during the preparation stage.

(4) Placement of Business Session

By holding the seminar after the lunch break, most of the participants were seated in the venue and could attend without any problems. On the other hand, it would be effective to hold the business session before the lunch break so that the participants could view the exhibition during the lunch break, which would promote conversation and stimulate interest in the exhibition.

(5) Meal Arrangements During the 5th Executive Forum

Although JICA's invitation scheme was applied to this forum, the provision of meals (e.g., arrangement of lunch boxes at the venue, meals after the technical tours, etc.) needs to be considered for the next time to improve cost-effectiveness. Although lunch boxes for Muslims were arranged, it was very difficult to prepare completely halal meals. In the questionnaire responses, there were comments such as, “If possible, please arrange food/lunch box from some Indian or Arabic restaurants because that is acceptable for all the participants including Muslim candidates” and “(T)here is suggestion that in future that dietary requirements based on beliefs may kindly be considered in the matter of food please.” Therefore, it is necessary to improve the method of providing meals in an efficient manner that meets the needs of the participants, including providing a thorough explanation of the details of the dietary restrictions.

(6) Time Allocation for Networking

Due to the rich program content of the 5th Executive Forum, networking time (mainly during coffee breaks) was limited among participants and between participants and Japanese stakeholders. The coffee break time ranged from 10 to 20 minutes (in some cases, including the transfer to the meeting room or the main venue), but it was sometimes felt to be too short considering the transfer. While it is necessary to be balanced with the main program, there may be room for consideration of having a longer break time, or even setting aside time for networking during the program.

10-3 Results of the 5th Executive Forum Questionnaire (Evaluations from Invited Participants)

On the fourth day of the 5th Executive Forum, a questionnaire survey was conducted to the invitees, and responses were obtained from all participants (100% response rate; for detailed questionnaire results, see “11-6 Results of Questionnaire.”) The questionnaire consisted of a total of 28 questions, which could be answered either on paper or via the Internet, but all respondents answered via the Internet.

(1) Overall Rating

Q5 of the questionnaire asked about overall satisfaction with the 5th Executive Forum. 67.9% of the respondents answered “Very satisfied” and 32.1% answered “Satisfied,” indicating that all the invited participants were “Satisfied” or more. We also received comments such as, “Had a chance to have good networking with other country representatives” “(T)his program is very much knowledgeable for me by meeting and getting knowledge from seniors from different water utilities of many countries” “It was well prepared and professionally organized” in the free description.

Regarding satisfaction with the group discussion (Q7), 60.7% were “Very satisfied” and 32.1% were “Satisfied” for a total of more than 92% of the participants responding “Satisfied” or higher.

Many positive comments were made in the free comments such as, “All discussions were very lively and interactive,” “Discussions were very fruitful,” and “Group discussions were a very good opportunity to share experience,” suggesting that the 5th Executive Forum was worth holding.

As mentioned above, the program of the 5th Executive Forum was generally well received, but there were some comments for improvement as follows. In particular, there were many comments that the overall program schedule was very tight, which is an area that needs to be improved for the next and subsequent Executive Forums.

(Regarding the overall program)
- The session is so tight.
- In my view the schedule is too tight hopefully for the next event, can be arranged such away, that we have a little bit free time, at least half day or one full day, to see the real culture/ real life of the Japanese people.

(Regarding the group discussion)
- The success of group discussion depends a lot on facilitator
- We can focus on specific problems and brain storming in group discussion look for possible best way to get answers from each.
- Please provide a whiteboard and sticky papers to collect participants' ideas during discussion. It can help to structure the flow of discussion.
- Lacked time to learn from each other
- (M)ost of participants are coming is to have a lesson learnt, from the group discussion part, we only share our weaknesses without conclusion obviously, in the big forum the presenter who succeeded in the program must share also the path to reach the goals, what are the steps toward the Goal

(2) Sessions and Topics of Interest

The session of greatest interest (Q9) was “Session 2: Towards Achieving SDGs Goal 6” with 46.4% of the participants responding. This was followed by 28.6% for “Session 3: Collaboration and Co-Creation” and 25.0% for “Session 1: Towards Water Utilities Resilient to Risk and Change.” Many of the invitees were particularly interested in Session 2, partly because of the many topics covered, including improvement of services, improvement of communication with customers, tariff revision, and fundraising. When asked which presentations impressed the most (Q10), many votes were given to presentations related to each topic of Session 2, such as, “Reform towards a Bankable Water Utility: “Dhaka WASA Turnaround Program”” (DWASA, Bangladesh: Fundraising), “Framing the Sustainability Agenda: Delivering on the SDGs” (Manila Water, Philippines: Improvement of services), and “Toward the Realization of Reliable Waterworks in Connection with Customers” (Bureau of Waterworks, Tokyo Metropolitan Government, Japan: Improvement of services, improvement of communication with customers). In particular, NRW reduction is still an important issue in many of the invited countries, and the issue was one of the main topics in the group discussions. Also, in the free comments in the questionnaire, there were comments that stated the necessity of technical support from Japan regarding NRW reduction, and that the NRW reduction should compose one session in the next Executive Forum.

As for the presentations that received the most interest, the one that received the most votes was “Reform towards a Bankable Water Utility: “Dhaka WASA Turnaround Program”” (DWASA, Bangladesh: Fundraising).” This is probably because the presenter, Engr. Taqsem A Khan, presented with great enthusiasm and used impressive keywords such as, “Bankable.” Engr. Taqsem A Khan also spoke and discussed actively in the group discussion, and motivated the invited participants. We are very grateful to have such an invitee. The keyword “bankable” is probably of interest to many of the invited utilities. Many utilities face high hurdles to revising

their water rates, such as the need for approval from the central government and other authorities and very complicated procedures, and may be forced to consider other financing methods. The presentation on how they have developed a master plan, changed the mindset of people, and promoted efforts to reduce NRW and digitalization, etc., and how they were able to change from a position of being selected by financial institutions to a position of selecting the financial institutions when raising funds, left a strong impression on the participants.

Other presentations that generated a lot of interest include “Framing the Sustainability Agenda: Delivering on the SDGs” (Manila Water, Philippines), “Responses to the COVID-19 Pandemic by Nagoya City Waterworks & Sewerage Bureau” (Nagoya City Waterworks & Sewerage Bureau, Japan), and “Securing business continuity even in the event such as infectious disease outbreak or saltwater intrusion” (CWASA, Bangladesh). Although all of these presentations were on different topics, the underlying theme was the sustainability of water supply services, and it can be said that ensuring the sustainability and continuity of water supply services has become even more important among the invited participants in recent years.

(3) How to Apply Lessons Learned, and the Challenges of Own Water Utilities

The most common areas of application of lessons learned from the 5th Executive Forum (Q11) were “Climate Change Risk” (22 votes), “Collaboration” (22 votes), “Tariff revision” (20 votes), and “Improvement of services” (19 votes). When asked about the major challenges/goals in the next three years (Q15), many participants answered “Climate Change Risk” (24 votes), “Tariff revision” (20 votes), “Improvement of services” (16 votes), and “Fundraising” (15 votes). Commonly ranked were addressing climate change risk, tariff revision, and improvement of services, and in addition, fundraising received the most votes as challenges/goals for their own water utility. These four topics were found to be the major focus of the invited participants.

With regard to climate change risks, many opinions were obtained, especially in the group discussions, such as the difficulty of coping with typhoons, droughts, floods, and saltwater intrusion, and of securing the quantity and quality of water sources in conjunction with these issues. In particular, many of the invited countries (Pakistan, Thailand, Vietnam, Bangladesh, etc.) raised the issue of saltwater intrusion, and the seriousness of this problem was emphasized. On the other hand, as for the presentations that impressed the participants, it is regrettable that the presentations in Session 1 did not receive many votes. This may be partly because the specific risks and conditions related to climate change differ from country to country and region to region, and it was difficult to learn something that could be applied directly to one’s own water utility. On a related note, many countries (Cambodia, Pakistan, Sri Lanka, etc.) commented on the need for national water resource management and water resource policies during the action plan presentations. It was a great achievement that the invited countries recognized and shared among themselves the need to discuss, allocate, and promote efficient use of water resources among relevant ministries and agencies (agriculture sector, etc.) as a country, given the limited availability of raw water sources due to climate change. This is not an issue that can be pursued solely by water utilities or the water supply sector, and it will take time to address because other ministries and agencies should be involved as well, but it is one of the topics that should be followed up on in the future.

With regard to the improvement of services, as mentioned above, many participants focused on reducing NRW, and this trend can be seen from the free descriptions and the action plan presentations from each country as well.

With regard to tariff revisions and fundraising, as described before, many of the water utilities face high hurdles to tariff revisions. However, it is assumed that many of them still believe that full cost recovery tariff setting is necessary and that other financing measures must also be considered in addition to tariff revisions for sustainable water services.

(4) Efforts to Activate the Network Formed through the 5th Executive Forum

When asked about efforts to activate the network formed during the 5th Executive Forum (Q13), 10 participants responded that they had "already asked for specific matters in detail" (10 votes), 24 participants responded that they will have "communication by e-mail" (24 votes), and 17 participants responded that they are "planning to meet or visit" (17 votes). Many participants exchanged questions and opinions during the forum period, and most of the participants plan to communicate via e-mail or in person after the completion of the forum, indicating that they intend to make use of the network formed to solve issues in their organizations, etc.

In the open-ended comments, we received comments such as, "Create a media social platform for intense communication such as WhatsApp group or Facebook Workplace" and "More emphasis has to be given for WOP and networking with different utilities." In addition to the emphasis that many participants placed on further networking among utilities, there is also an apparent need for more frequent and intense communication through online tools, in addition to formal networking opportunities such as this Executive Forums. This will be helpful as we continue to improve the platform's functionality in the future.

(5) What to Expect for the Executive Forum and for Japan

As for expectations for Japan (Q17), many respondents answered "Technical matters" (26 votes) and "Human resources development" (21 votes). According to the free comments, the topics were NRW reduction, work culture and ethics, etc. There was a participant who commented that the forum should have a session for NRW reduction, indicating that NRW reduction is an important issue and that participants expect input from Japan.

As for what they expect from the Executive Forum (Q19), respondents indicated that they expect the sharing of experiences and knowledge, in particular, comparing with one's own utility and getting more new ideas from other countries, networking, etc.

When asked about the place of the next Executive Forum (Q3), 53.6% of the respondents answered "Japan" and 46.4% answered "any of the participating countries". The countries with the highest number of free answers were the Philippines (4 votes), Bangladesh (2 votes), Cambodia (2 votes), and any of the participating countries (3 votes). To hold the Executive Forum in the participating country except for Japan would be a very meaningful opportunity for participants to learn about the status of water supply services and water supply facilities in the country other than Japan, so it is worth considering.

Regarding collaboration with other organizations in holding future Executive Forums (Q20), the participation of each country's waterworks association and donor organizations such as ADB and WB were mentioned. Most of the waterworks associations in each country have many water utilities as members, and waterworks associations are the organizations that bring them together and provide technical assistance and networking support. As pointed out, including waterworks associations as members would be a very important perspective from the viewpoint of disseminating the learning from the Executive Forum to other utilities in the invited countries. Also, the comment that donor organizations are expected to participate is helpful. To achieve the SDGs, it is necessary to spread the efforts and benefits not only to the invited utilities but also to other utilities in the invited countries. As an approach to this end, there is room for consideration of holding discussions involving donors.

(6) Expectations for Follow-Up

The following comments and others were raised as expectations for follow-up activities (Q21). Many participants expect support, feedback, evaluation, etc. to help them realize their action plans.

- Discuss progress and barriers to action plan implementation
- Continuing consultancy and feedback for our action plan
- Any requirements for the implementation of action plan can be supported.
- Assessment/Review of progress on the action plans committed by the participants.

・ Follow up may examine the action plans and time lines proposed against the progress achieved
・ Facilitate continuation of partners activities

(7) Evaluation and Expectations for Technical Tour

Regarding the technical tours, 56.5% of the respondents were "Very satisfied" and 43.5% were "Satisfied" (Q23). It was very good that all tour participants answered "Satisfied" or higher. For Kubota, the comments were given such as, "Interesting product," "The technology used for pipe laying and the DI pipes with 100 years lifespan impressed me," and for Yokogawa, "Very interesting technology," "I wish I could bring my engineers to learn more about Yokogawa innovations"

As for the schedule of the technical tour (Q25), more than 70% of the respondents said that holding the tour on Day 3 was "Good" and it is assumed that it was a good break from the sessions at the venue that followed on Day 1 and Day 2. On the other hand, there were also comments that the tour should be held on the first day or the last day.

The following comments were received on what they would like to see on the next Executive Forum's technical tour.

・ Advanced technology
・ High technology equipment
・ Pipe construction
・ Newly technology of piping and water plant
・ Advanced technologies in water purification.
・ Monitoring center of the water supply management
・ Water meter calibration labs and water supply design software
・ Smart water meter, leak detection equipment, implementation of standards in manufacturing water supply products (pipe, water meter, etc.).
・ SCADA system. Leakage Detection
・ The technology to reduce the NRW

10-4 Lessons and Suggestions for the Next Executive Forum (including Draft Program)

10-4-1 Lessons and Suggestions for the Next Executive Forum

In the 5th Executive Forum, not only conventional content but also original trials were implemented in the program. The following are good points and points to be improved for reference information when considering the next Executive Forum program (Draft), based on the contents of "10-1 Results and General Comments on the 5th Executive Forum" to "10-3 Results of the 5th Executive Forum Questionnaire (Evaluations from Invited Participants)."

Table 10-3 Good points of the 5th Executive Forum

Item	Contents
Q&A after presentation	・ As for Day 1 and Day 2, many presentations were short or finished on time, allowing time for Q&A as needed. Next time, it would be desirable to reserve time for Q&A beforehand (e.g., for each morning/afternoon session).
Incorporation of presentations from Japan	・ 5 presentations from Japan were included in the program which was highly rated. It is desirable to incorporate a similar percentage of Japanese case studies in the next and subsequent Executive Forums, while maintaining an overall balance.
Group discussion	・ All participants had an opportunity to speak during the group discussion and active participation was observed. Group discussions should be held again in the next Executive Forum as well.

Item	Contents
Facilitator and accelerator of group discussion	・As in the 4th forum, we asked the invited participants to take on these roles. The satisfaction level of the invited participants who took on these roles was generally high, so it is desirable to continue these activities in the next and subsequent Executive Forums. ・On the other hand, some of the invited participants served as both a facilitator and a presenter, so it would be preferable to have them concentrate on one role as much as possible in the next Executive Forum.
Action plan	・Instead of creating the Yokohama Forum Statement, an action plan was created on a country basis. As a result, we believe that it led to an increased awareness of participation and involvement in the Executive Forum by the participants. It may be a good idea to use the creation of an action plan on a country basis as an output from the next Executive Forum onward as well.
Business session	・The presentations were held after the lunch break, and it was felt that the audience attended without problems. It would also be effective to hold the seminar before the lunch break so that the audience could view the exhibition based on the information provided by the business session.
Technical tour	・Since the program continued at the venue for Day 1 and Day 2, it has been nice to take a short break by incorporating a technical tour on Day 3.

Table 10-4 Points to be improved of the 5th Executive Forum

Item	Contents
Overall program	・While there were some invited participants arriving in Japan late at night on the day before Day 1, the program of Day 1 and Day 2 was plentiful and some participants seemed to be tired. In particular, the program of Day 1 should be structured with consideration for the physical condition of the participants.
Duration and location	・From the perspective of reducing the burden on participants, one possible idea is to shorten the total 4-day itinerary to 3 days. ・In terms of the venue, in the review by the forum secretariat, there was an opinion that the forum should be held in participating countries on a rotating basis, referring to the Executive Forum in Africa. This would be a very meaningful opportunity for participants to learn about the status of water supply services and facilities in a host country other than Japan and there is room for consideration.
Time allocation for group discussion	・The time allotted for group discussion on Day 1 and Day 2 was 90 minutes, and 60 minutes for Day 4. The time was particularly short on Day 4 and felt incomplete. It is recommended that at least 90 minutes be allotted for group discussions in the next and subsequent Executive Forums.
Session theme	・It was good that we were able to set themes for Session 1 through Session 3 that were of universal interest. It would be desirable to set themes for the next Executive Forum as well, taking into account the current situation surrounding the water supply sector and JICA's policies at the time of the event. ・On the other hand, some commented that there was not enough time for discussion, as very important topics such as fundraising and water

Item	Contents
	rate revisions had to be discussed in a limited amount of time in Session 2, whose theme was very broad. ・ While it is definitely important to discuss what should be prioritized for discussion toward a major goal, it is also necessary to consider subdividing the topic into smaller sections and allowing sufficient time for a thorough discussion of each, or limiting the number of topics when setting a broad theme.

10-4-2 Draft Program for the Next Executive Forum

Based on "10-4-1 Lessons and Suggestions for the Next Executive Forum," a draft program for the next Executive Forum is presented to make it even better. This proposal is based on the assumption that the Executive Forum will be held for four days, as was the case this time. In the review by the forum secretariat, the option of holding the Executive Forum for three days was also raised. This is an issue to be considered in the planning of the next Executive Forum.

As an overall policy, no major changes are suggested since the program of the 5th Executive Forum was generally well accepted. It is envisioned that presentations and group discussions will be held in each session. The technical tour will be conducted on Day 3.

Table 10-5 Draft program for the next Executive Forum

Date	Overview
Day 1 Session 1	[AM] ・ Opening remarks, photo session ・ Keynote Speech 1, 2 ・ Program Orientation ・ Session 1 Presentation: about 2 presentations (including one presentation from Japan) ・ Q&A (regarding the AM presentations)
	[PM] ・ Business Session (2 to 3 companies) ・ Session 1 Presentation: about 2 presentations (including one presentation from Japan) ・ Q&A (regarding the PM presentations) ・ Session 1 Group Discussion ・ Session 1 Feedback
	[Evening] ・ Welcome Reception
Day 2 Session 2	[AM] ・ Summary of Day 1 ・ Session 2 Presentation: about 7 presentations (including 2 to 3 presentations from Japan) ・ Q&A (regarding the AM presentations, consider taking longer depending on the number of presentations)
	[PM] ・ Business Session (2 to 3 companies) ・ Session 2 Group Discussion ・ Session 2 Feedback
Day 3	[Full day] ・ Technical Tour
Day 4	[AM]

Session 3	・ Summary of Day 2 & Day 3 ・ Session 3 Presentation: about 4 presentations (including 1 to 2 presentations from Japan) ・ Q&A (regarding the AM presentations) ・ Session 3 Group Discussion ・ Session 3 Feedback
	[PM] ・ General discussion of three themes of the forum ・ Summary Session ・ Closing Remarks

Note: Needs consideration whether to develop action plans in the next Executive Forum as well.

10-5 Follow-up Activities (Draft Plan)

10-5-1 Purpose of the Follow-up

Follow-up activities will be conducted to monitor the status of each country's action plan formulated at the 5th Executive Forum and to provide advice and encouragement as necessary to promote awareness of each country. In addition, follow-up activities are intended to provide a platform for maintaining, fostering, and strengthening the network and connections among the participants in each country that were formed at the 5th Executive Forum.

10-5-2 Follow-up Activities (Draft Plan)

Follow-up activities will be composed of two types: country-based monitoring and plenary monitoring. Table 10-6 shows the draft process for the follow-up activities.

Table 10-6 Process for the follow-up activities (draft plan)

Schedule	Contents
Aug. 2023	Completion of the 5th Executive Forum
Dec. 2023 Jan. to Mar. 2024 Apr. 2024 May to Jul. 2024 Aug. 2024 Sep. to Nov. 2024 Dec. 2024 Jan. to Mar. 2025 Apr. 2025	Country-Based Monitoring (Initial) Plenary Monitoring (1st) *Held online Country-Based Monitoring (Interim) Plenary Monitoring (2nd) *Held online Country-Based Monitoring (Final)
May 2025	Submission of the report

(1) Country-Based Monitoring

The country-based monitoring is planned to be conducted three times: initial, interim, and final. The monitoring will be conducted basically through online monitoring, but will also include on-site visits depending on the situation in each country.

In countries where Technical Cooperation Projects of JICA are currently underway, JICA country staff and local JICA offices will conduct country-based monitoring. For other countries without Technical Cooperation Projects (Indonesia, the Philippines, Sri Lanka, Thailand, and Vietnam), the monitoring will be conducted by the survey team (Team JICWELS).

Interviews will be conducted by country or by participant on the status of activities, topics, and cases in the field after the 5th Executive Forum. A summary of the progress of the activities will

be made then. In addition, we will exchange opinions on the intention and direction of the action plan for the remaining period of the action plan, revision of the action plan, and the contents of the activities, as well as elicit issues and concerns, and work together to find clues for solutions.

(2) Plenary Monitoring

The plenary monitoring will be held twice in total as an online session. The main purpose is to provide a platform for maintaining, fostering, and strengthening connections and networks among participants from each country.

The meeting will last no longer than 1.5 hours, with participants reporting on their activities (actions), topics, and case studies, and exchanging opinions, and will be summarized on the spot. The facilitator will be publicly recruited in advance from the participants, and if no participants raise their hands, the secretariat will select one and request him/her in advance to take the role of facilitator.

Chapter 11 Appendix

11-1 Invited Participants List

Country	Organization (Abbreviation)	Position	Name
Bangladesh	Dhaka Water Supply and Sewerage Authority (DWASA)	Managing Director and CEO	Engr. Taqsem A Khan
	Chattogram Water Supply and Sewerage Authority (CWASA)	Managing Director	Engr. A. K. M Fazlullah
Cambodia	General Department of Potable Water (GD/WAT), Ministry of Industry, Science, Technology & Innovation (MISTI)	Director, Department of Technics and Project Management (D/TPM)	H.E. Sreng Sokvung
	Phnom Penh Water Supply Authority (PPWSA)	Director General	H.E. Long Naro
	Siem Reap Water Supply Authority (SRWSA)	Director General	H.E. Chan Sengla
Indonesia	Ministry of Public Works and Housing, Directorate General of Human Settlements (PU)	Deputy Director for Region III, Directorate of Water Supply	Mr. Ade Syaiful Rachman
	Perumda PAM JAYA (Perumda PAM JAYA)	President Director	Mr. Arief Nasrudin
	Perumda Tirtanadi (Perumda Tirtanadi)	President Director	Mr. Kabir Bedi
	Perumda Tirta Mayang Kota Jambi (Perumda Jambi)	Managing Director	Mr. Dwike Riantara
Laos	Department of Water Supply, Ministry of Public Works and Transport (DWS)	Director of Water Supply Regulatory Division	Mr. Khamphouvong Sikholom
	Vientiane Capital Water Supply State Enterprise (NPNL) Lao Water Works Association (LWWA)	Deputy General Manager (NPNL) General Manger, Board of Managers (LWWA)	Mr. Siphanh Inmouangxay
	Luang Prabang Water Supply State Enterprise (NPLP)	Head of Project Implementation Unit of The Project for the Expansion of Water Supply System in Luang Prabang City by JICA, General Administration, Planning and Inventory Section	Mr. Philavong Ladda
	Khammouane Water Supply State Enterprise (NPKM)	Head of Planning Division	Mr. Sinthepphavong Khampasith
Nepal	Ministry of Water Supply (MoWS)	Joint Secretary	Mr. Tiresh Prasad Khatri
	Kathmandu Upatyaka Kahanepani Limited (KUKL)	Chief Executive Officer	Mr. Gyanendra Bahadur Karki
Pakistan	Water and Sanitation Agency,	Director (Planning and	Mr. Zeeshan Bilal

	Lahore (WASA-L)	Design)	
	Water and Sanitation Agency, Faisalabad (WASA-F)	Director Implementation & Coordination	Dr. Usman Latif
Philippines	Manila Water Company, Inc. (Manila Water)	Sustainability Head	Ms. Sarah Monica E. Bergado
	Maynilad Water Services, Inc. (Maynilad)	Assistant Vice President, Non-Revenue Water Services Department	Mr. Sherwin Mendoza
	Metropolitan Cebu Water District (MCWD)	General Manager	Mr. Edgar H. Donoso
Sri Lanka	Ministry of Water Supply and Estate Infrastructure Development (MWSEID)	Secretary	Mr. Waruna Samaradiwakara
	National Water Supply and Drainage Board (NWSDB)	General Manager	Dr. Wasantha Kumari Illangasinghe
Thailand	Metropolitan Waterworks Authority (MWA)	Assistant Governor (Water Production System)	Mr. Pornsak Samornkraisorakit
	Provincial Waterworks Authority (PWA)	Assistant Governor	Mr. Nithit Thongsa-ard
Vietnam	Saigon Water Corporation (SAWACO)	Deputy General Director	Mr. Nguyen Thanh Su
	Binh Duong Water-Environment Corporation-Joint Stock Company (BIWASE)	President	Mr. Nguyen Van Thien
	Thua Thien Hue Water Supply Joint Stock Company (HueWACO)	Chairman of the Board of Directors	Mr. Le Quang Minh
	Da Nang Water Supply Joint Stock Company (DAWACO)	Chairman of the Board of Directors	Mr. Ho Huong

Online presenter is listed below.

Country	Organization	Position	Name
Philippines	Development Bank of the Philippines	Vice President and Officer in Charge Program Development Management Group	Mr. Rustico Noli Cruz

In addition to the above invitation, H.E. Ek Sonn Chan was invited from Cambodia as a special advisor for the 5th Executive Forum.

Country	Organization / Position	Name
Cambodia	Minister Attached to the Prime Minister of Kingdom of Cambodia and Vice Chairman of Council for Agriculture and Rural Development, also Former Director General of PPWSA	H.E. Ek Sonn Chan

11-2 Presenters, Facilitators, and Participants from Japan

11-2-1 Resources from Japan (Presenters, Participants, etc.)

Role		Organization	Name (Honorifics omitted)
5th Executive Forum Chairman		Professor, Department of Urban Engineering, Graduate School of Engineering, the University of Tokyo	Satoshi Takizawa
5th Executive Forum Advisor		Representative of WaQuAC-Net Former JICA Senior Advisor	Keiko Yamamoto
Opening Remarks	City of Yokohama	Deputy Mayor	Tomoko Okubo
	JICA	Vice President	Eiji Iwasaki
Keynote Speech	JICA	Senior Deputy Director General, Global Environment Department	Shigeyuki Matsumoto
MC	City of Yokohama	Yokohama Waterworks Bureau	Ikue Koyahata
	JICA	Global Environment Department	Eriko Kakegawa
	JICA	Global Environment Department	Masahito Miyagawa
Presenters	Tokyo Metropolitan Government	Bureau of Waterworks, Tokyo Metropolitan Government	Yoshinori Sakurada
	City of Yokohama (Yokohama Water Co., Ltd.)	Yokohama Water Co., Ltd.	Koichi Hasegawa
	Nagoya City	Nagoya City Waterworks & Sewerage Bureau	Toru Tsujie
	City of Osaka	Osaka Municipal Waterworks Bureau	Tomoko Ishimoto
	Iwate Chubu Water Supply	Iwate Chubu Water Supply	Takichi Obara
Session 1	Main Moderator	National Institute of Public Health	Mari Asami
	Assistant Moderator	JICA Global Environment Department	Kazuki Kaiya
Session 2	Main Moderator	TEC International Co., Ltd.	Mina Yariuchi
	Assistant Moderator	JICA Myanmar Office	Hideki Osawa
Session 3	Main Moderator	Yokohama Waterworks Bureau	Yoshinobu Ono
	Assistant Moderator	JICA South Asia Department	Izumi Shoji
Closing Remarks	City of Yokohama	Director General, Yokohama Waterworks Bureau	Syuichi Yamaoka
	JICA	Director General, JICA Global Environment Department	Takahiro Morita
Session 1 Group A	Assistant Facilitator	Yokohama Waterworks Bureau	Hidefumi Itaya
	Minutes Recorder (Main)	JICWELS	Masanobu Iizuka
	Minutes Recorder (Sub)	Osaka Municipal Waterworks Bureau	Ken Ikeda
Session 1 Group B	Assistant Facilitator	Kitakyushu Water Service Co., Ltd.	Hiroshi Hirowatari
	Minutes Recorder (Main)	JICWELS	Emily Wathen

	Minutes Recorder (Sub)	Kyoto City Water Supply and Sewage Bureau	Yuta Yokoyama
Session 1 Group C	Assistant Facilitator	JICA Senior Advisor	Ryuji Ogata
	Minutes Recorder (Main)	JICWELS	Etsuko Mitani
	Minutes Recorder (Sub)	JICA South Asia Department	Koji Nakashima
Session 2 Group A	Assistant Facilitator	JWWA	Chiaki Suzuki
	Minutes Recorder (Main)	JICWELS	Masanobu Iizuka
	Minutes Recorder (Sub)	Nagoya City Waterworks & Sewerage Bureau	Yuko Nishio
Session 2 Group B	Assistant Facilitator	JICA Technical Advisor	Yoshiaki Yokota
	Minutes Recorder (Main)	JICWELS	Emily Wathen
	Minutes Recorder (Sub)	Yokohama Waterworks Bureau	Hitomi Nakayama
Session 2 Group C	Assistant Facilitator	Nihon Suido Consultants Co., Ltd.	Takashi Dairaku
	Minutes Recorder (Main)	JICWELS	Etsuko Mitani
	Minutes Recorder (Sub)	Yokohama Waterworks Bureau	Mitsuru Shiraishi
Session 3 Group A	Assistant Facilitator	JICA Technical Advisor	Yoshiaki Yokota
	Minutes Recorder (Main)	JICWELS	Masanobu Iizuka
	Minutes Recorder (Sub)	Yokohama Waterworks Bureau	Tokiya Momozono
Session 3 Group B	Assistant Facilitator	Saitama City Bureau of Waterworks	Keisuke Sonoda
	Minutes Recorder (Main)	JICWELS	Emily Wathen
	Minutes Recorder (Sub)	Nagoya City Waterworks & Sewerage Bureau	Madoka Minami
Session 3 Group C	Assistant Facilitator	CTI Engineering International Co., Ltd.	Yasuko Kamegai
	Minutes Recorder (Main)	JICWELS	Etsuko Mitani
	Minutes Recorder (Sub)	Nagoya City Waterworks & Sewerage Bureau	Akihiro Murata

11-2-2 Participants from Japan

Ministries, Institutions, and Universities	Ministry of Health, Labour and Welfare (MHLW) University of Tokyo Kindai University Japan Water Research Center Japan Water Works Association (JWWA) WaQuAC-Net (Water Quality Asian Cooperation Network) Japan International Corporation of Welfare Services (JICWELS)
Local Governments	Bureau of Waterworks, Tokyo Metropolitan Government Public Enterprise Bureau, Saitama Prefectural Government Chiba Prefectural Waterworks Bureau Saitama City Bureau of Waterworks Kyoto City Water Supply and Sewerage Bureau Hanshin Water Supply Authority Osaka Municipal Waterworks Bureau Fukuoka City Waterworks Bureau
Private Companies	Bavitech Corporation COPRONA Inc. Inter Brothers Lapon Co., Ltd Aichi Tokei Denki Co., Ltd. Yokohama Water Co., Ltd.

	Yokogawa Solution Service Corporation NJS CO., LTD. HORIBA Advanced Techno, Co., Ltd. Tec International Inc. Toshin Inc. Kubota Corporation Kubota Construction Co., Ltd. CTI Engineering International Co., Ltd. SANSUI CONSULTANTS CO., LTD. Nihon Suido Consultants Co., Ltd. KITAKYUSHU WATER SERVICE CO., LTD Marubeni Corporation Suidou Technical Service Co. Ltd Seibu Electric & Machinery Co., Ltd. Tokyo Water Co., Ltd. Nihon Genryo Co., Ltd.
Others	Lilongwe Water Board, Malawi Ministry of Public Works and Housing, Indonesia Water and Sanitation Corporation (WASAC), Rwanda Yangon City Development Committee, Myanmar
Press	Nippon Suido Shimbun Co., Ltd. Newspaper of Waterworks Industry The Asia Economic Shimbun
Organizers	Japan International Cooperation Agency City of Yokohama

*Excluding resources from Japan.

11-3 Program

The 5th Executive Forum for Enhancing Sustainability of Urban Water Service in Asian Region

August 22 - 25, 2023
Yokohama Symposia, Yokohama, Japan

Agenda

22 August 2023: Day 1/ Session 1 – Towards Water Utilities Resilient to Risk and Change	
09:00 – 09:30	Participants' registration
09:30 – 10:00	**Welcome and Opening remarks** MC: Ms. Ikue Koyahata, Director for International Operations Division, Yokohama Waterworks Bureau, City of Yokohama Opening Remarks • Ms. Tomoko Okubo, the Deputy Mayor of City of Yokohama • Mr. Eiji Iwasaki, Vice President, Japan International Cooperation Agency (JICA)
10:00 – 10:30	**Keynote Speech 1:** ***"Leadership Required in the Water Supply Sector in a Changing World"*** H.E. Ek Sonn Chan, Minister Attached to the Prime Minister of Kingdom of Cambodia and Vice-Chairman of Council for Agriculture and Rural Development, also Former Director General of PPWSA
10:30 - 10:40	Tea and Coffee Break
10:40 - 11:00	**Keynote Speech 2:** ***"Learning together towards resilient and sustainable water supply services"*** Dr. Shigeyuki Matsumoto, Deputy Director General, Global Environment Department, JICA
11:00 - 11:10	**Program Orientation:** The Forum Secretariat
11:10 - 12:00	**Session 1 Presentation: Dealing with risks such as infectious diseases and business continuity** Moderator: Dr. Mari Asami, Chief Senior Researcher, Department of Environmental Health, National Institute of Public Health, Japan Assistant moderator: Mr. Kazuki Kaiya, Global Environment Department, JICA ・***"Securing business continuity even in the event such as infectious disease outbreak or saltwater intrusion"***, Engr. A. K. M Fazlullah, Managing Director, Chattogram Water Supply and Sewerage Authority (CWASA), Bangladesh ・***"Response to infectious diseases in water supply"***, Ms. Tomoko Ishimoto, Osaka Municipal Waterworks Bureau, Japan ・***"Initiatives of the Nagoya City Waterworks & Sewerage Bureau during the COVID-19 Epidemic"***, Mr. Toru Tsujie, Business Management Department, Nagoya City Waterworks & Sewerage Bureau, Japan
12:00 - 13:10	Lunch Break
13:10 - 14:00	**Business Session 1:** ・***"Water measurement solutions against NRW, Water disasters"***, Mr. Shuntaro Sakai, TOKYO KEIKI INC. ・***"Product Showcase for Emergency Shut Down and Flow Control"***, Mr. Kenichi Mitsuma, Maezawa Industries, Inc.

The 5th Executive Forum for Enhancing Sustainability of Urban Water Service in Asian Region August 22 - 25, 2023, Yokohama Symposia, Yokohama, Japan

14:00 - 15:00	**Session 1 Presentation: Climate Change Risk** ・***"Efforts to secure and adjust water resources"***, Mr. Pornsak SAMORNKRAISORAKIT, Assistant Governor Water Production System, Metropolitan Waterworks Authority (MWA), Thailand ・***"ENSURING SAFE WATER SUPPLY DURING NATURAL DISASTER AND INFECTIOUS DISEASES"***, Mr. Cao Huy Tuong Minh, Deputy Director General of HueWACO (THUA THIEN HUE WATER SUPPLY JOINT STOCK COMPANY), Vietnam ・***"Challenges due to climate change and countermeasures for HCMC water supply system"***, Mr. Nguyen Thanh Su, Deputy General Director, SAWACO (SAIGON WATER CORPORATION), Vietnam
15:00 - 15:20	Tea and Coffee Break and move to each group meeting room at 8th Floor
15:20 - 16:50	**Session 1 Group Discussion: Towards Water Utilities Resilient to Risk and Change**
16:50 - 17:00	Tea and Coffee Break and move back to the main hall
17:00 - 17:40	**Session 1 Feedback** ・Presentations from each group ・Comments from Prof. Takizawa, University of Tokyo and H.E. Ek Sonn Chan ・Housekeeping
18:30 - 20:00	**Welcome Reception**

23 August 2023: Day 2/ Session 2 - Towards Achieving SDGs Goal 6	
08:45 – 09:00	Participants' registration
09:00 – 09:20	**Welcome and summary of Day 1** MC: Ms. Eriko Kakegawa, Water Resources Group, Global Environment Department, JICA Moderator: Ms. Mina Yariuchi, Senior Consultant, TEC International Co., Ltd Assistant Moderator: Mr. Hideki Osawa, JICA Myanmar Office
09:20 – 10:40	**Session 2 Presentation: Improvement of services, improvement of communication with customers, tariff revision** ・***"Efforts to make F-WASA Self sustainable by improving services and taking concrete steps"***, Dr. USMAN LATIF, Director Implementation & Coordination, Water and Sanitation Agency, Faisalabad (WASA-F), Pakistan ・***"Framing the Sustainability Agenda: Delivering on the SDG"***, Ms. Sarah Bergado, Sustainability Head, Manila Water Company, Inc., Philippines ・***"Toward the Realization of Reliable Waterworks in Connection with Customers"***, Mr. Yoshinori Sakurada, Customer Service Division, Bureau of Waterworks, Tokyo Metropolitan Government, Japan ・***"Creating Corporate Plan and Revising Water Rate 2020-2025"***, Mr. Ladda Philavong, Head of Project Implementation Unit, General Administration, Planning and Inventory Section, Luang Prabang Water Supply State-owned Enterprise (NPLP), Lao PDR ・***"Unification of water tariff in the water business integration"***, Mr. Takichi Obara, Iwate Chubu Water Supply, Japan

The 5th Executive Forum for Enhancing Sustainability of Urban Water Service in Asian Region August 22 - 25, 2023, Yokohama Symposia, Yokohama, Japan

10:40 - 10:50	Tea and Coffee Break
10:50 - 12:05	**Session 2 Presentation: Fundraising** ・***"SUSTAINABLE DEVELOPMENT GOALS – SDGS"***, Mr. Nguyen Van Thien, Chairman, BINH DUONG WATER-ENVIRONMENT CORPORATION-JSC. (BIWASE), Vietnam ・***"Sustainable Water Supply Management in Phnom Penh"***, H.E. Long Naro, Director General, Phnom Penh Water Supply Authority (PPWSA), Cambodia ・***"Reform towards a Bankable Water Utility: "Dhaka WASA Turnaround Program""***, Engr. Taqsem A Khan, Managing Director and CEO, Dhaka Water Supply and Sewerage Authority (DWASA), Bangladesh ・***"Case Study: Philippine Water Revolving Fund (PWRF)"***, Mr. RUSTICO NOLI D. CRUZ, Vice President and Officer in Charge, Program Development Management Group, Development Bank of the Philippines , Philippines (ONLINE)
12:05 - 13:15	Lunch Break
13:15 - 14:05	**Business Session 2:** ・***"Aichi Tokei's Smart Meter Presentation, Battery-powered Electromagnetic Water Meter SU"***, Mr. Yuki Kawazoe, Aichi Tokei Denki Co., Ltd. ・***"Providing Safe and Clean Water to All Life on the Earth"***, Mr. Hiroshi Ejima, NIHON GENRYO Co., Ltd. ・***"Marubeni's Water Business"***, Mr. Yasunori Yoshimoto and Mr. Yohei Okazaki, Marubeni Corporation
14:05 - 14:15	Tea and Coffee Break and move to each group meeting room at 8th Floor
14:15 - 15:45	**Session 2 Group Discussion: Towards Achieving SDGs Goal 6**
15:45 - 16:05	Tea and Coffee Break and move to the main hall
16:05 - 16:35	**Session 2 Feedback** ・Presentations from each group ・Comments from Prof. Takizawa and H.E. Ek Sonn Chan ・Housekeeping

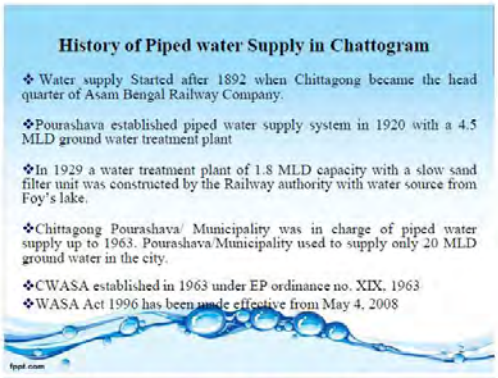
24 August 2023: Day 3- Technical Tour for the Asian Delegates	
Full day	Group1: Kubota Corporation Group2: Yokogawa Solution Service Corporation

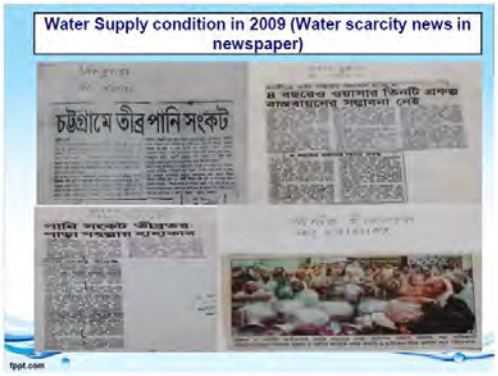
The 5th Executive Forum for Enhancing Sustainability of Urban Water Service in Asian Region August 22 - 25, 2023, Yokohama Symposia, Yokohama, Japan

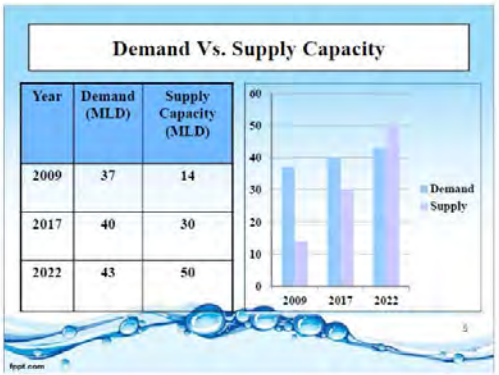
25 August 2023: Day 4/ Session 3 - Collaboration and Co-Creation	
08:45 - 09:00	Participants' registration
09:00 - 09:05	**Welcome and summary of Day 2 & Day 3** MC: Mr. Masahito Miyagawa, Director of Water Resources Group Team 1, Global Environment Department, JICA Moderator: Mr. Yoshinobu Ono, Director of Equipment Division, Yokohama Waterworks Bureau, Japan Assistant Moderator: Ms. Izumi Shoji, Director, Planning Division, South Asia Department, JICA
09:05 - 10:25	**Session 3 Presentation: Collaboration and Co-Creation** ・***""Center of Excellence for Water" Initiative",*** Dr. Wasantha Illangasinghe General Manager, National Water Supply & Drainage Board (NWSDB), Ministry of Water Supply & Estate Infrastructure, Sri Lanka ・***"Lao Water Works Association (LWWA)",*** Mr. Siphanh INMEUANGXAY, Deputy General Manager of Vientiane Capital Water Supply State Enterprise (NPNL) & General Manager of Lao Water Works Association, Lao PDR ・***"MANAGE WATER & SANITATION AND BOOST COOPERATION IN NORTH SUMATERA PROVINCE - INDONESIA",*** Mr. KABIR BEDI, President Director, PERUMDA Tirtanadi, Indonesia ・***"Human Resource Development Initiatives",*** Mr. Nithit Thongsa-ard, Assistant Governor (Human Resources), Provincial Water Authority (PWA), Thailand ・***"Waterworks technologies and knowhow; transferred from Yokohama to the world -Yokohama Water Company walks with water utilities domestic and overseas",*** Mr. Koichi Hasegawa, Executive Director, Yokohama Water Co., Ltd., Japan
10:25 - 10:40	Tea and Coffee Break and move to each group meeting room at 8th Floor
10:40 - 11:40	**Session 3 Group Discussion**
11:40 - 12:40	**Summarizing Each Country's Action Plan and Preparing for Presentation**
12:40 - 13:50	Lunch and move to the main hall
13:50 - 15:05	**Summary Session** Presentation of action plans from each country (Group A: 3 countries, Group B: 3 countries)
15:05 - 15:25	Tea and Coffee Break
15:25 - 16:45	**Summary Session (continued)** ・Presentation of action plans from each country (Group C: 4 countries) ・Comments by H.E. Ek Sonn Chan ・Overall Comments of the 5th Executive Forum by Prof. Takizawa ・About the follow-up of the action plan by the Forum Secretariat
16:45 - 17:00	**Closing Remarks** • Mr. Syuichi Yamaoka, Director General, Yokohama Waterworks Bureau, Japan • Mr. Takahiro Morita, Director General, Global Environment Department, JICA

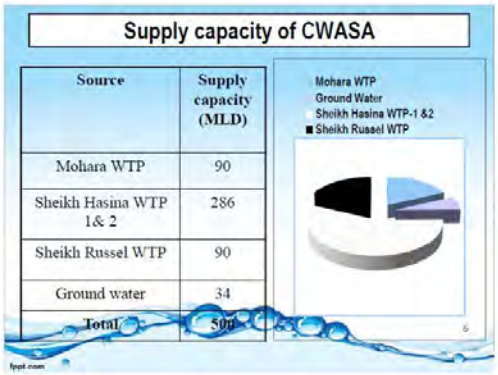
11-4 Presentation Materials

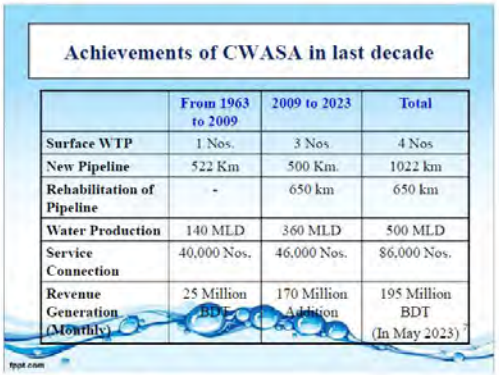
11-4-1 Day 1: Securing business continuity even in the event such as infectious disease outbreak or saltwater intrusion (CWASA)











Karnaphuli Water Supply Project

Project Cost- 18480 Million BDT

Funding Agency- JICA, GOB and CWASA.

Project Completion-2017

Main Components-

- Sheikh Hasina Water Treatment Plant (with a capacity of 143 Mld)
- Transmission and Distribution Pipeline- 68.4 Km
- 02 Nos. Reservoir and 01 Nos. Elevated Tank.

Chattogram Water Supply Improvement & Sanitation Project (CWSISP)

Project Cost- 18908.25 Million BDT

Funding Agency- The World bank, GOB and CWASA.

Project Completion-2020

Main Components-

- Construction of Sheikh Russel Water Treatment Plant (with a capacity of 90 Mld)
- Construction of Kalurghat and Patenga Boosting Station
- Transmission and Distribution Pipeline- 200 Km.
- Preparation of Drainage and Sanitation Master plan of Chattogram City.

Karnaphuli Water Supply Project-2

Project Cost- 44891.5 Million BDT

Funding Agency- JICA, GOB and CWASA.

Project Completion-2023

- A Water Treatment Plant with a capacity 0f 143 Million Litres per day has constructed.
- 40 Km Transmission Pipeline and 700 Km Distribution Pipelines has constructed.
- 01(One) Reservoir and 01 (One) elevated tank has been constructed.
- To establish a modern water supply system in Chattogram Metropolitan, the northern, central and eastern part of the metropolis is being divided into 59 district metering areas (DMA).

Bhandaljuri Water Supply Project

Project Cost- 19941.4 Million BDT

Project Completion-2023

•To supply water to the Industrial Zone (i.e. Korean EPZ, Chinese Economic Zone) etc, the project has been undertaken with the funding of EDCF, South Korea and GOB.

Main Components-

- •Water Treatment Plant (60 MLD)
- Conveyance Pipeline (12m),
- Transmission Pipeline (51.3 km)
- Distribution Pipeline (81km)
- Anowara Reservoir (10,000m3) & Potia Reservoir (3,000m3)

CWASA Success Story

▪Chattogram WASA has received the International Construction Award from Global Trade Leaders Club, Spain in recognition of its ability and quality work in project implementation in 2016 based on the opinions of representatives from 93 countries.

▪As a result of achieving quality of purified water and compliance of water treatment plant, Chattogram WASA has been awarded the **ISO 9001:2015** certificate as the first public water supply authority in Bangladesh.

International Construction Award

ISO 9001:2015 Certificate

Key Performance Indicator

Indicator	
Non Revenue Water	26%
Revenue Collection Efficiency	89%
Functioning Rate of Installed Meter	95%
Operating Ratio	0.61
Collection Period	225 days
No. of Permanent Employee per 1000 connection	6.4

Actions taken to Strengthen Financial Capacity of CWASA

- CWASA has able to increase the tariff from BDT 5.03/cum to BDT 18.00/cum for Domestic consumers and BDT 16.00/cum to BDT 37.00/cum for Non-Domestic consumers from 2010 to 2023.
- Work in ongoing to develop a **financial Model** to forecast the financial position and to restructure tariff in order to make CWASA Financially capable.

Actions taken to Strengthen Financial Capacity of CWASA

- A technical Cooperation Project under JICA grant has been undertaken to strengthen the Financial management and planning capacity of CWASA.
- Formulation of Business Plan and Strategic Plan is ongoing to make CWASA Financially Solvent.

Business Continuity during Saltwater Intrusion

- The Flow at Halda river mainly depends on the discharge from Karnaphuli River.
- 180 Million litre Water is extracted from Halda river and supplied to Chattogram city through Mohra Water Treatment Plant and Sheikh Russell Water Treatment Plant (Madunaghat).

Business Continuity during Saltwater Intrusion

- Low water release from Kaptai Dam to Karnaphuli River during dry season increases the salinity of Halda River during tidal periods
- The Chloride level went up to 2500 ppm in the month of March-April this year.
- CWASA reduces the production of the treatment Plant by minimizing raw water extraction during high tide.
- Then the finished water are blended with the Ground water to reduce the chloride level.

Work-plan and mitigation measure for reducing salinity

- Necessary actions have been taken to run 2 turbine units throughout the year as per rule curve at Kaptai Hydro-electric Plant by discussing with Plant Authority and as per direction of the office of the Honorable Prime Minister.
- Treated water from Mohara and Sheikh Russel Water Treatment Plant is blended with ground water
- Projects will be undertaken to relocate raw water intake point of Mohara and Sheikh Russel Water treatment Plant to the upstream side considering the future climate change impacts.

Business Continuity during Covid-19 outbreak

- During Covid Outbreak CWASA Successfully managed to continue stable water supply in Chattogram City.
- Necessary arrangements was undertaken for isolation of all the Engineers, Operators and Technician in the Water Treatment Plant to ensure the smooth operation of the Plant.
- CWASA installed water points to wash hands and maintain hygiene at different locations within the city.

Internet Based Services of CWASA to Implement Vision-2021 and Digital Bangladesh

- Consumers can download the bill from the website.
- Consumers can pay the bill through bank and digital payment portal (i.e Bkash and Nagad)
- Execution of all tendering works through e-tendering web portal E-GP (www.eprocure.gov.bd).
- Provide bills to the customers for payment of deep tube well license through online.
- Payment confirmation SMS is provided after bill payment.

Internet Based Services of CWASA

A computerized customer complaint tracking system has been launched to receive complaints from customers. (http://www.ccts.cwasa.info/)

Arigato gozaimasu

Thank you

11-4-2 Day 1: Response to infectious diseases in water supply (Osaka Municipal Waterworks Bureau)

Response to infectious diseases in water supply

Osaka Municipal Waterworks Bureau
ISHIMOTO Tomoko

Contents

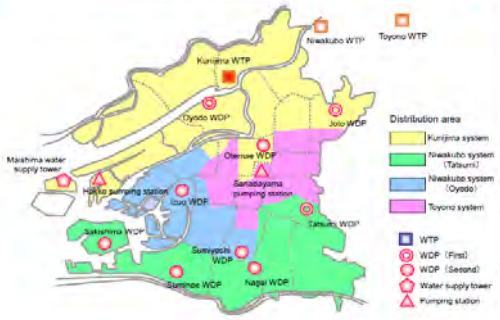
1. Overview of Osaka Municipal Waterworks Bureau

1-1. Overview of Osaka Municipal Waterworks Bureau

Foundation	1895
Water supply Area	225 km²
Population served	2,750,855 (Coverage 100%)
Households served	1,668,742
Water supply capacity	2,430,000 m³/day
Total pipe length	5,220km

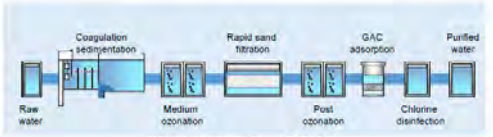
(FY 2021)

1-2. Our facilities (WTPs, WDPs, etc.)



1-3. Water Treatment

- The Yodo River, our water source, has an urban area in its upper and middle reaches, and the water quality has been affected by the drainage from that area.
- We have been striving to supply safe and high-quality tap water by changing the treatment method according to changes in the water quality of the raw water.
- Since 2000, Advanced water treatment using Ozone treatment and GAC adsorption has been introduced to all water treatment plants in order to improve water quality comprehensively such as reduce musty odor and THMs.



Water treatment flow of OMWB

2. Infectious diseases that threaten water supply

2. Infectious diseases that threaten water supply

Waterborne infectious disease

Infectious disease affecting business continuity

3. Response to Waterborne infectious disease

3-1. Before foundation of water supply in Osaka

- In Osaka city, people had used water from a well, or water from a vendor called " Mizuya" that poured and sold water from Yodo river for domestic and drinking before the foundation of water supply.
- The use of water that had not been treated properly had caused frequent cholera outbreaks, killing many people.

Cholera outbreaks in Osaka Prefecture (Before the foundation of water supply)

Year	Number of patients	Number of deaths	Patients /mille	Mortality rate
1877	1,618	1,227		75.83
1879	9,322	7,391		79.29
1882	2,604	2,097	4.16	80.53
1885	2,215	1,818	1.50	82.08
1886	19,709	15,968	11.3	81.02
1890	8,801	7,477	7.26	84.96

3-2. Foundation of water supply in Osaka

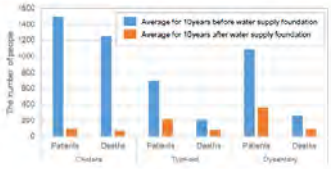
- In addition to frequent Cholera outbreaks, large-scale fires had often occurred in Osaka city.
- For the response of those incidents, the momentum to establish water supply raised, and Osaka Municipal Waterworks founded in1895.
- At that time, the water treatment was only sedimentation and slow sand filtration, without disinfection.

Sakuranomiya Water treatment plant (1985)

Water treatment flow at the time of foundation of Osaka Municipal Waterworks

3-3. Effect of introducing water supply as prevention of waterborne disease

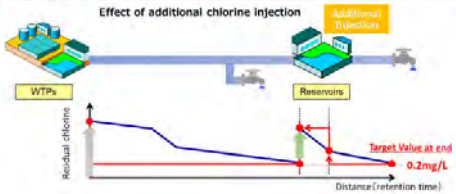
- After the establishment of the water supply system, patients and deaths from water-borne diseases decreased sharply, combined with the implementation of measures such as the improvement of sewage systems, the enhancement of hospitals specializing in infectious diseases, and the strengthening of the legal system related to infectious diseases.



Outbreak status of waterborne infectious diseases before and after water supply foundation in Osaka City

3-4. Introduction of Chlorine Disinfection

- In Osaka City, chlorine disinfection was introduced in 1930, after that, the injection amount was increased as the raw water quality deteriorated, and breakpoint chlorination has implemented since 1962 in order to secure microbiological safety of tap water.
- Currently, for ensuring higher level of microbiological safety, additional chlorine has been injected at water distribution plants in the city and the residual free chlorine concentration at the taps in the city has been continuously monitored that it is 0.1mg/L and more.



3-5. Response to chlorine resistant microorganisms

- In 1996, mass infection of *Cryptosporidium parvum* which is one of chlorine resistant microorganisms occurred in Ogose town of Saitama prefecture.
- In response to this incident, the Ministry of Health, Labor and Welfare announced guidelines for countermeasures against *Cryptosporidium* etc., and asked water utilities to take action.
- In the guideline, it is recommended as the countermeasure to control the turbidity of the filter process to 0.1 mg/L or less, and to introduce ultraviolet treatment according to the risk level of contamination by *Cryptosporidium* etc..
- After that, most water utilities have been monitoring the turbidity of filter outlet strictly and introduction of UV treatment has been promoted by mainly small-scale WTP.

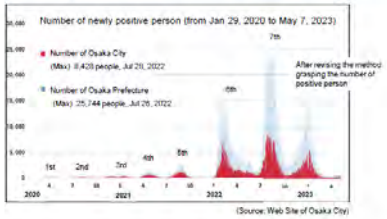
Cryptosporidium Parvum (microscopic image)

UV treatment equipment (Ishikawa WTP, Habikino city waterworks bureau)

4. Response to Infectious disease affecting business continuity

4-1. Impact of Covid-19 outbreak in Osaka City

- Covid-19 outbreak gave a great impact to our life and work.
- In Osaka city, over 90 thousand people got infected and over 3 thousand people died due to Covid-19.
- Many of our waterworks bureau staff also got infected, but we could manage water supply system without the impact of infectious expansion because of the operation based on BCP for infectious disease.



(Source: Web Site of Osaka City)

4-2. BCP (Business Continuous Plan) for infectious disease of OMWB

17

- It is the manual for addressing to an infectious disease including a new type of infection and operating water supply business without the impact of the infectious outbreak.
- Initially, it was formulated for pandemic influenza, but, it was revised in 2022 so that it can respond to a wider range of infectious diseases based on the experience of Covid-19.

4-3. Target and Damage Assumption of BCP for infectious disease of OMWB

18

Target

Pandemic influenza etc.
(The Act on Special Measure Law, Article 2, Item 1)

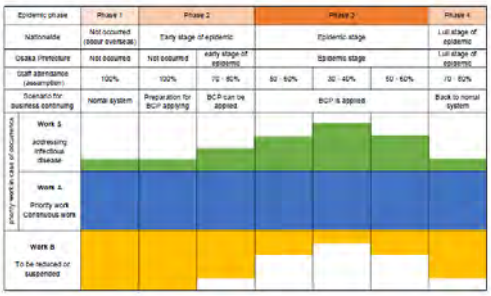
- Pandemic influenza etc.
  (The Infectious Diseases Control Law Article 6, paragraph 7)
  - Pandemic influenza
  - Re-emerging influenza
- Designated infectious diseases
  (The Infectious Diseases Control Law Article 6, paragraph 8)
  - Covid-19
  - Re-emerging Covid-19
- New infectious diseases
  (The Infectious Diseases Control Law Article 6, paragraph 9)

Damage Assumption

		Epidemic period (about 8 weeks)	Peak or Cluster rise period (about 2weeks)
Human Resource	Attendance /Remote work	75%	60%
	Absence	25%	40%
Various materials (such as chemicals for water treatment)		Difficult to secure	

4-4. Time-series image of activities based on BCP

19



4-5. Basic policy of BCP for infectious disease of OMWB

20

Prevention of staff infection and spread of infection

- Information provision and awareness for personnel
- Infection control at workspace
- Shift to new work style (remote work, staggered commuting etc.)

Building and maintaining a system to ensure the continuity of the water supply

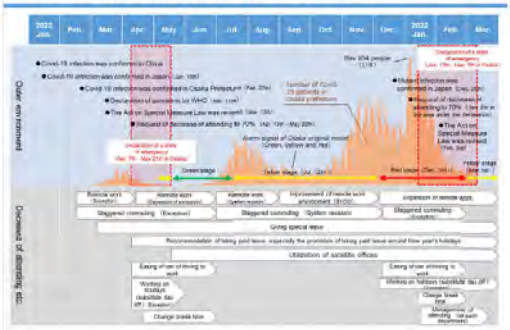
- Securing human resource and materials
- Confirmation of the safety of tap water

4-6. Activity plan according to each phase of epidemic

21

4-7. Our actual work during Covid-19 pandemic

22



23

Summary

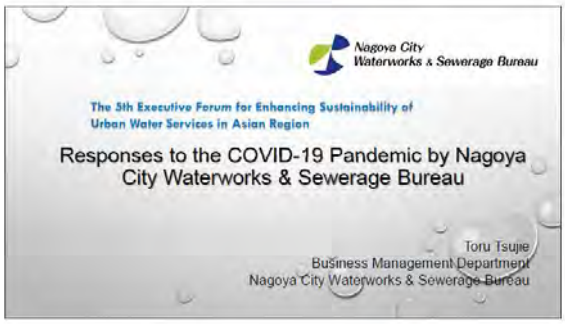
Summary

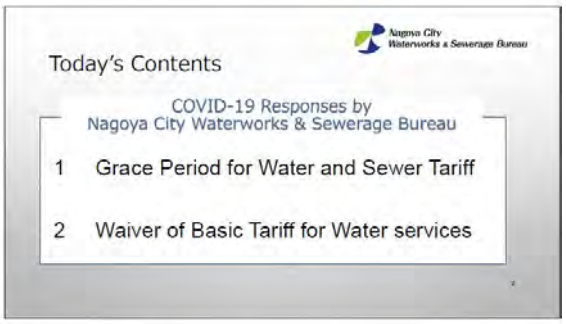
24

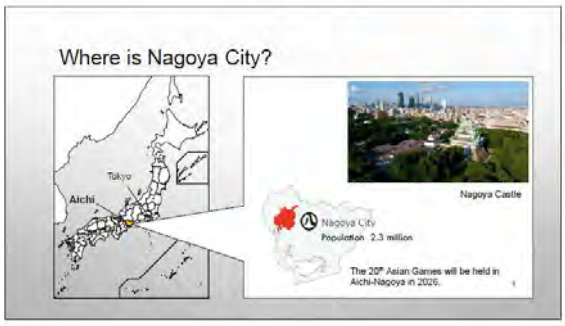
1. There are two types of infectious diseases that threaten water supply, a waterborne infectious disease and Infectious disease affecting business continuity.
2. For preventing waterborne disease, it rs important to introduce the treatment facility or equipment that can properly reduced causative microorganisms, and to operate and maintain them adequately.
3. In Japan, adequate treatment processes such as filtration, chlorine disinfection, UV treatment etc. are selected according to the microbial situation of water source and operated with regularly monitoring.
4. For infectious disease affecting business continuity, it is necessary to assume the impact if it occurs and determine the priority works and how to do them.
5. In OMWB, we addressed the Covid-19 pandemic based on the business continuity plan in which priority works, infection control works and the methods for securing human and physical resources are determined.

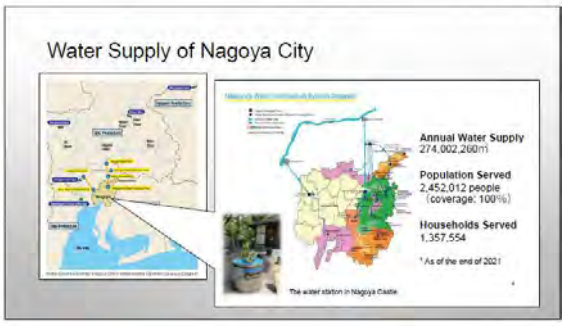
Thank you for your kind attention!

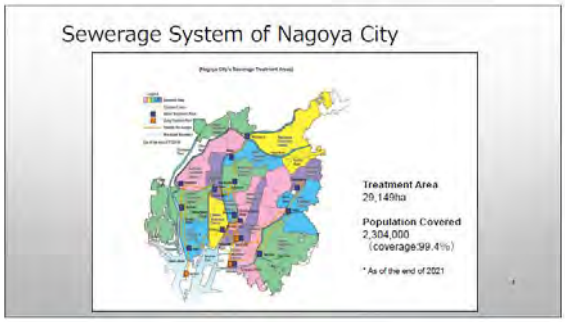
11-4-3 Day 1: Responses to the COVID-19 Pandemic by Nagoya City Waterworks & Sewerage Bureau (Nagoya City Waterworks & Sewerage Bureau)

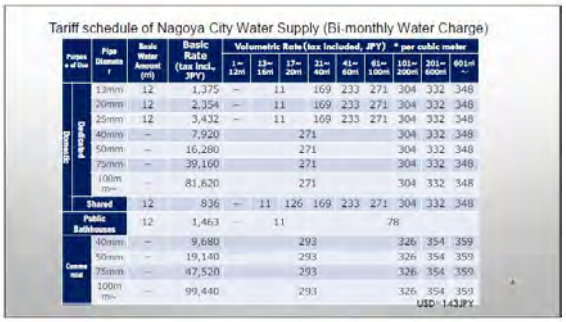




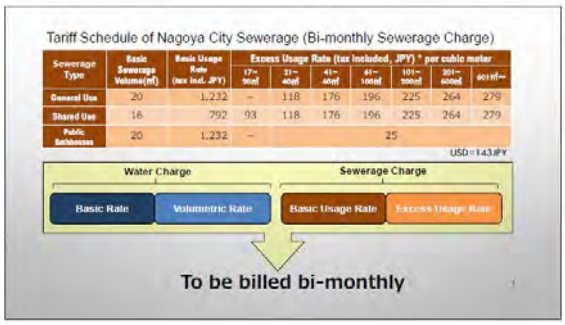




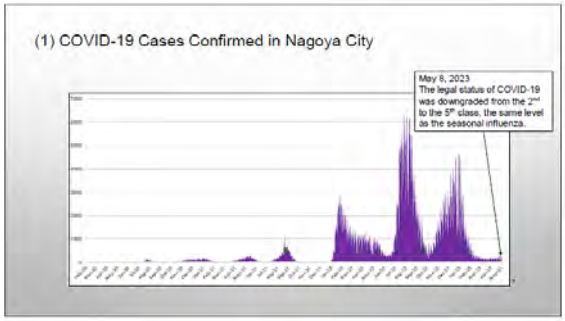


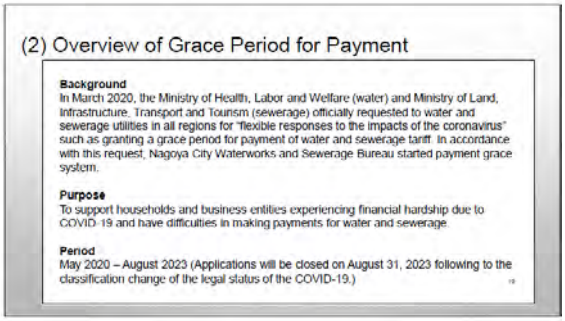


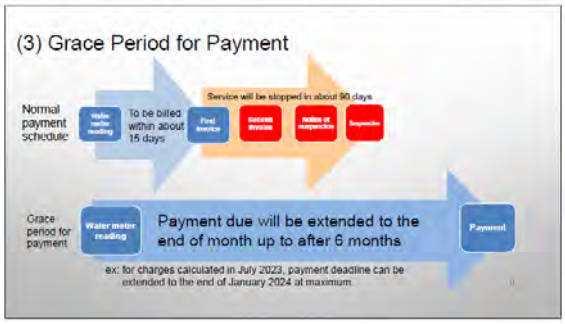
Purpose of Use	Pipe Diameter	Basic Water Amount (m³)	Basic Rate (tax incl., JPY)	Volumetric Rate (tax included, JPY) * per cubic meter							
				1~12m³	13~16m³	17~20m³	21~40m³	41~60m³	61~100m³	101~200m³	201~600m³	601m³~
Domestic Dedicated	13mm	12	1,375	–	11	169	233	271	304	332	348	
	20mm	12	2,354	–	11	169	233	271	304	332	348	
	25mm	12	3,432	–	11	169	233	271	304	332	348	
	40mm	–	7,920			271			304	332	348	
	50mm	–	16,280			271			304	332	348	
	75mm	–	39,160			271			304	332	348	
	100m~	–	81,620			271			304	332	348	
Shared		12	836	–	11	126	169	233	271	304	332	348
Public Bathhouses		12	1,463	–	11				78			
Commercial	40mm	–	9,680			293			326	354	359	
	50mm	–	19,140			293			326	354	359	
	75mm	–	47,520			293			326	354	359	
	100m~	–	99,440			293			326	354	359	

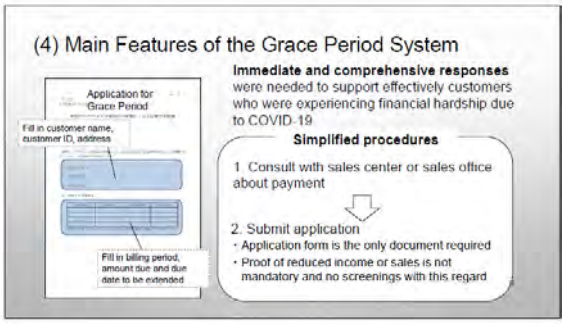


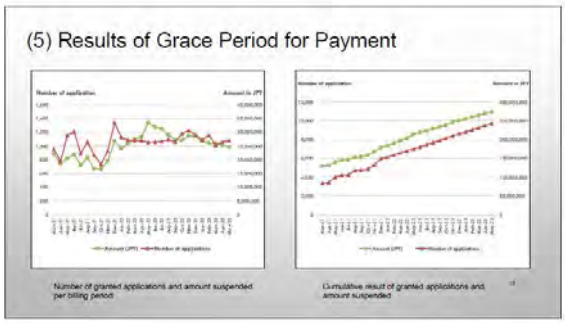
Sewerage Type	Basic Sewerage Volume(m³)	Basic Usage Rate (tax incl. JPY)	Excess Usage Rate (tax included, JPY) * per cubic meter						
			17~20m³	21~40m³	41~60m³	61~100m³	101~200m³	201~600m³	601m³~
General Use	20	1,232	–	118	176	196	225	264	279
Shared Use	16	792	93	118	176	196	225	264	279
Public Bathhouses	20	1,232	–			25			

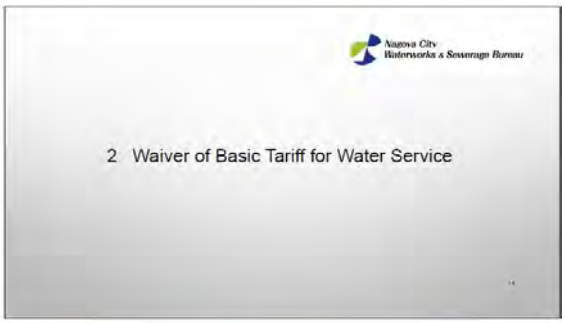

(1) COVID-19 Cases Confirmed in Nagoya City
May 8, 2023
The legal status of COVID-19 was downgraded from the 2nd to the 5th class, the same level as the seasonal influenza.

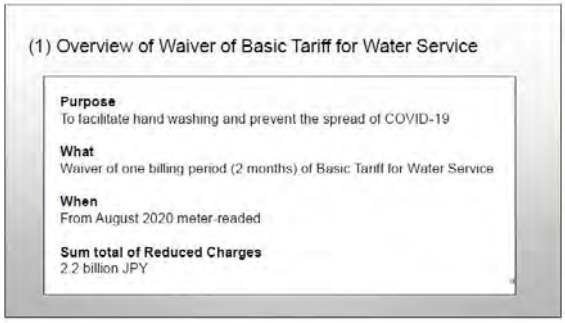

(2) Overview of Grace Period for Payment
Background
In March 2020, the Ministry of Health, Labor and Welfare (water) and Ministry of Land, Infrastructure, Transport and Tourism (sewerage) officially requested to water and sewerage utilities in all regions for "flexible responses to the impacts of the coronavirus" such as granting a grace period for payment of water and sewerage tariff. In accordance with this request, Nagoya City Waterworks and Sewerage Bureau started payment grace system.
Purpose
To support households and business entities experiencing financial hardship due to COVID-19 and have difficulties in making payments for water and sewerage.
Period
May 2020 – August 2023 (Applications will be closed on August 31, 2023 following to the classification change of the legal status of the COVID-19.)

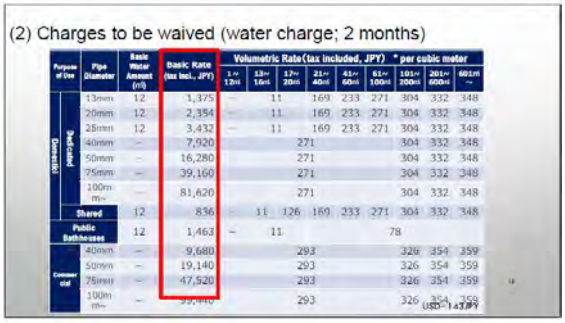

(3) Grace Period for Payment
Normal payment schedule
To be billed within about 15 days
Service will be stopped in about 90 days
Grace period for payment
Water meter reading
Payment due will be extended to the end of month up to after 6 months
Payment
ex: for charges calculated in July 2023, payment deadline can be extended to the end of January 2024 at maximum


(4) Main Features of the Grace Period System
Application for Grace Period
Fill in customer name, customer ID, address
Fill in billing period, amount due and due date to be extended
Immediate and comprehensive responses were needed to support effectively customers who were experiencing financial hardship due to COVID-19
Simplified procedures
1. Consult with sales center or sales office about payment
2. Submit application
・Application form is the only document required
・Proof of reduced income or sales is not mandatory and no screenings with this regard


(5) Results of Grace Period for Payment
Number of granted applications and amount suspended per billing period
Cumulative result of granted applications and amount suspended


Nagoya City Waterworks & Sewerage Bureau
2 Waiver of Basic Tariff for Water Service


(1) Overview of Waiver of Basic Tariff for Water Service
Purpose
To facilitate hand washing and prevent the spread of COVID-19
What
Waiver of one billing period (2 months) of Basic Tariff for Water Service
When
From August 2020 meter-readed
Sum total of Reduced Charges
2.2 billion JPY


(2) Charges to be waived (water charge; 2 months)
USD=143JPY

(3) Purpose and Responsibility of Water Supply Services

Purpose
- Promote public welfare
- Improve public health
- Improve living environment

Responsibility
- Secure fair and efficient management
- Reinforce business base
- Economic efficiency

(4) Decision Making for the Waiver

FY2019 Financial results

Net profit end of FY2019

Revenue and expenditure plan

Revenue and expense in the Nagoya City Water and Sewerage Business Plan 2028

Secure financial resources for construction and improvements

Possible negative effects on equipment improvement plan

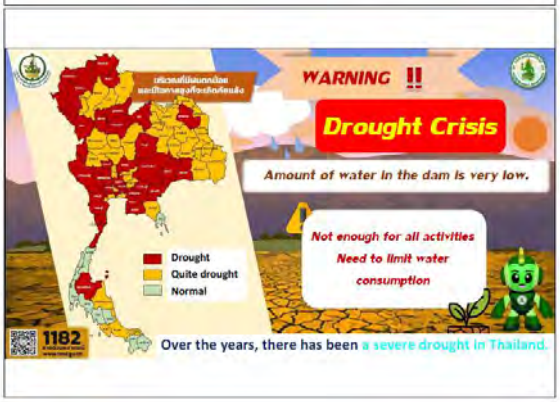
Waiver of basic water charge of 1 billing period (2 months) was decided

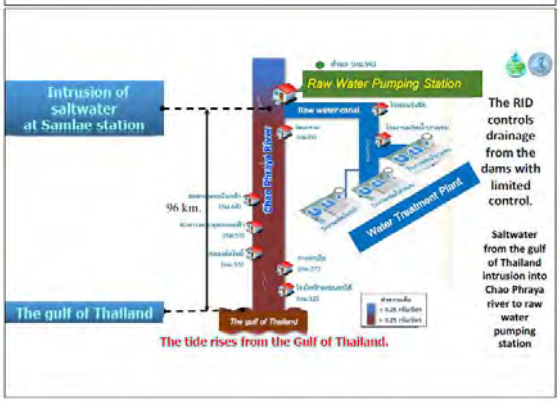
(5) Financial Resources and Purposes of Tariff Waiver and Reduction

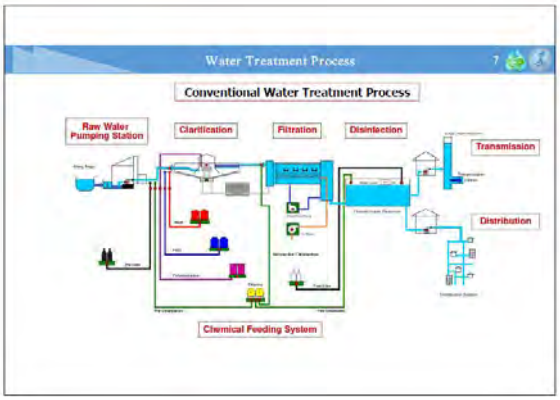
	Financial Resource	Application	Purposes
Social Welfare Reduction	Transfer from the General Account	Application for Reduction	Support socially disadvantaged people
Disaster Relief Reduction	Water service account Sewerage service account	Disaster Damage Certificate, etc.	Help reduce burden of rebuilding livelihoods Improve public health
General Reduction	Water service account	—	Improve public health

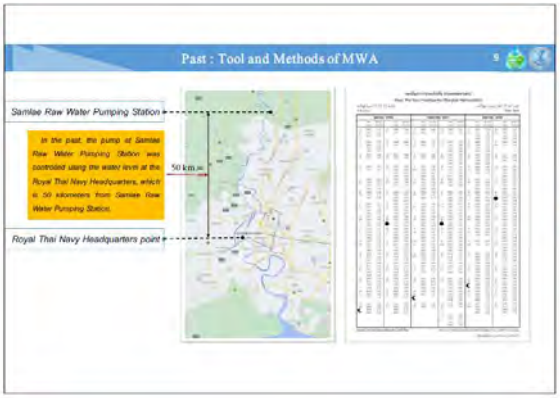
THANK YOU FOR YOUR ATTENTION

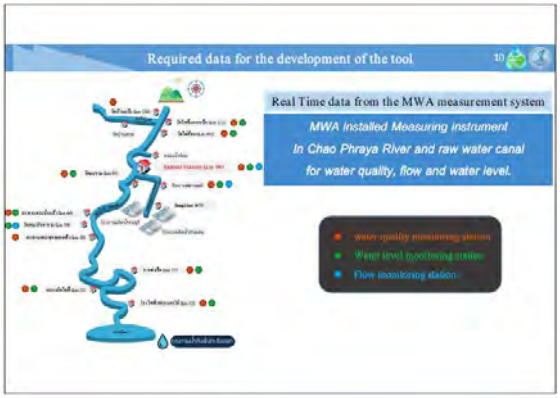
11-4-4 Day 1: Efforts to secure and adjust water resources (MWA)



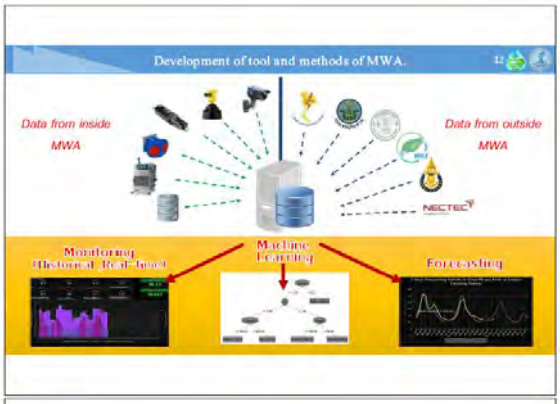


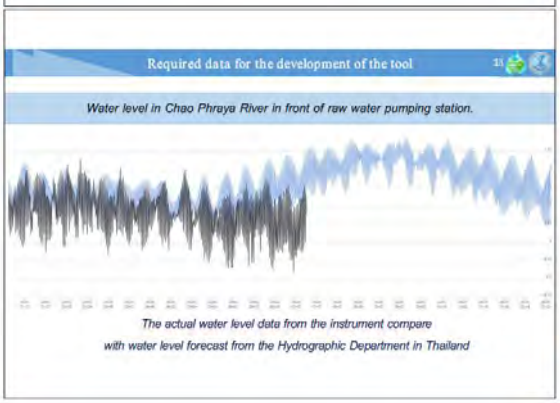


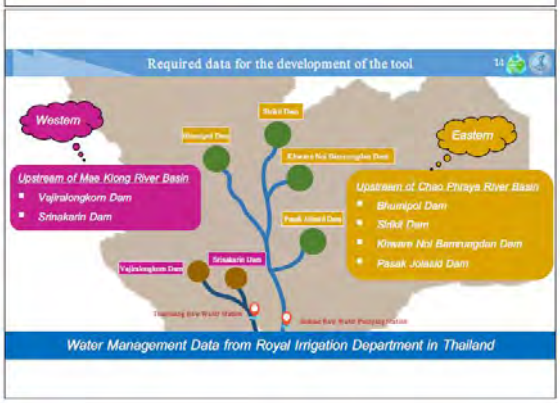

Past : Tool and Methods of MWA
9
Samlae Raw Water Pumping Station
In the past, the pump at Samlae Raw Water Pumping Station was controlled using the water level at the Royal Thai Navy Headquarters, which is 50 kilometers from Samlae Raw Water Pumping Station.
50 km.
Royal Thai Navy Headquarters point

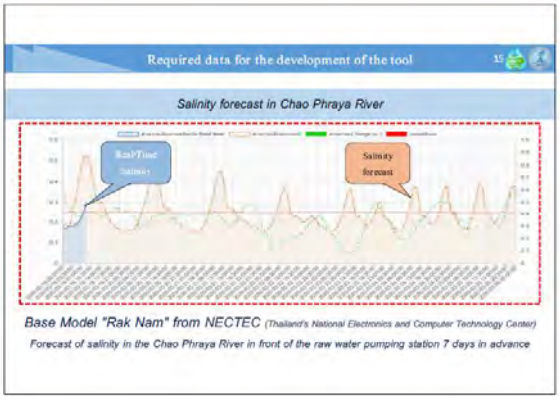

Required data for the development of the tool
10
Real Time data from the MWA measurement system
MWA Installed Measuring instrument
In Chao Phraya River and raw water canal
for water quality, flow and water level.

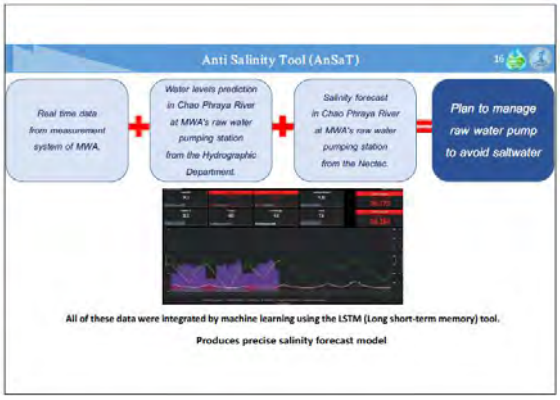

Required data for the development of the tool
11
Real Time data from the MWA measurement system
Raw water quality monitoring station in front of the raw water pumping station
Flow monitoring station behind raw water pumping station
MWA Installed Measuring instrument In Chao Phraya River and raw water canal
for water quality data and water level data.


Development of tool and methods of MWA.
12
Data from inside MWA
Data from outside MWA
NECTEC
Monitoring
Machine Learning
Forecasting

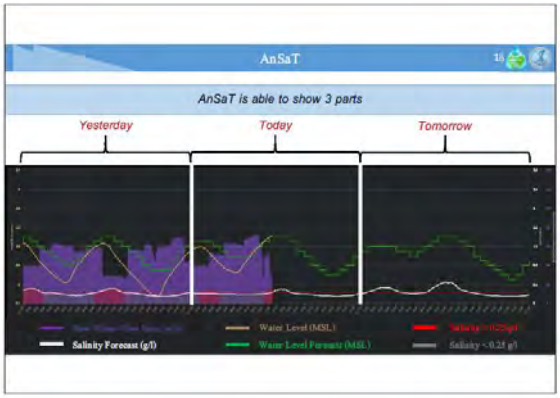

Required data for the development of the tool
13
Water level in Chao Phraya River in front of raw water pumping station.
The actual water level data from the instrument compare
with water level forecast from the Hydrographic Department in Thailand


Required data for the development of the tool
14
Western
Eastern
Upstream of Mae Klong River Basin
Vajiralongkorn Dam
Srinakarin Dam
Upstream of Chao Phraya River Basin
Bhumipol Dam
Sirikit Dam
Khwae Noi Bamrungdan Dam
Pasak Jolasid Dam
Water Management Data from Royal Irrigation Department in Thailand

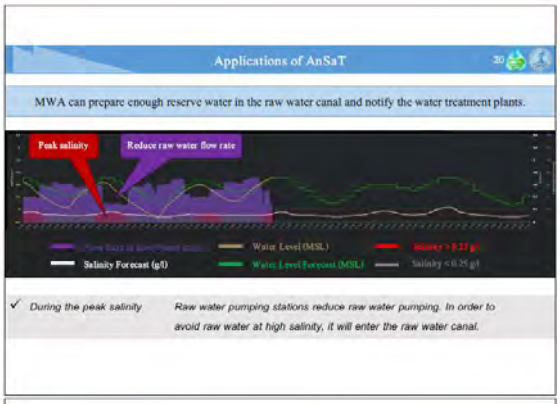

Required data for the development of the tool
15
Salinity forecast in Chao Phraya River
Salinity forecast
Base Model "Rak Nam" from NECTEC (Thailand's National Electronics and Computer Technology Center)
Forecast of salinity in the Chao Phraya River in front of the raw water pumping station 7 days in advance

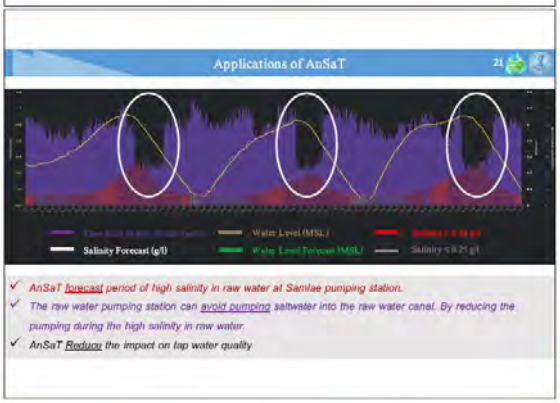

Anti Salinity Tool (AnSaT)
16
Real time data from measurement system of MWA
Water levels prediction in Chao Phraya River at MWA's raw water pumping station from the Hydrographic Department.
Salinity forecast in Chao Phraya River at MWA's raw water pumping station from the Nectec.
Plan to manage raw water pump to avoid saltwater
All of these data were integrated by machine learning using the LSTM (Long short-term memory) tool.
Produces precise salinity forecast model

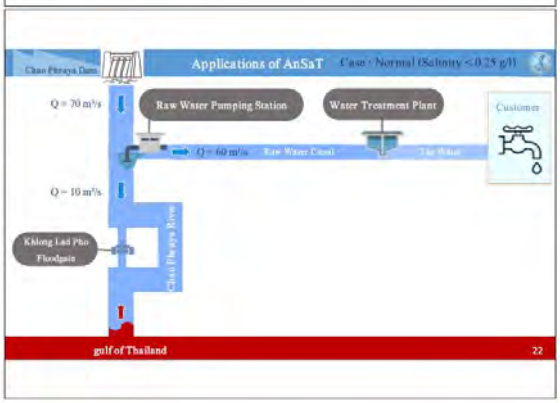

Main component of AnSaT at Samlae Pumping Station
17
34.3
30.2
46.0
4.8
4.38
7.6
36.373
36.284
Raw water flow rate
Real-Time Salinity
Real-Time water level
Water level forecast
Salinity forecast
Water level at surveillance points in raw water canal
Water Level (MSL)
Salinity Forecast (g/l)

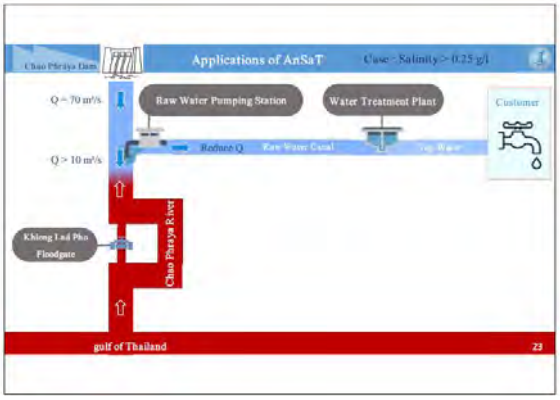

AnSaT
18
AnSaT is able to show 3 parts
Yesterday
Today
Tomorrow
Water Level (MSL)
Salinity Forecast (g/l)

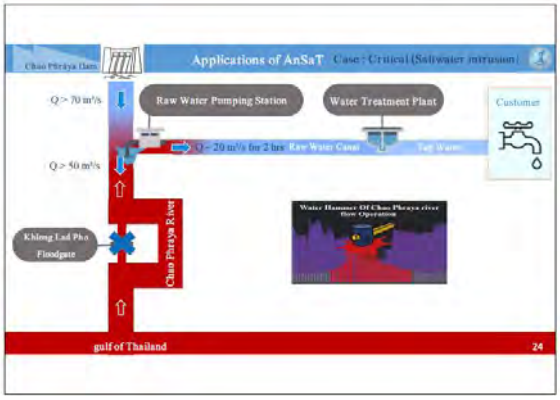

AnSaT
for solving salinity problem of MWA

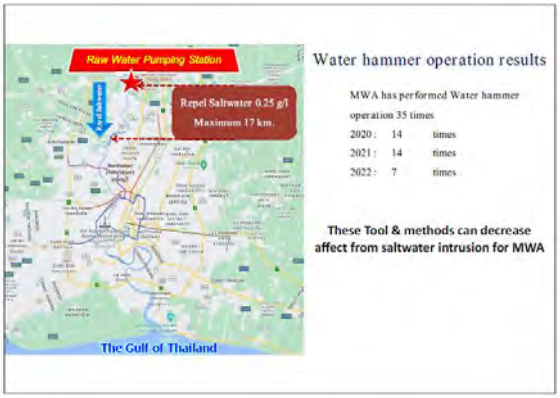

Applications of AnSaT
20
MWA can prepare enough reserve water in the raw water canal and notify the water treatment plants.
Peak salinity
Reduce raw water flow rate
Water Level (MSL)
Salinity Forecast (g/l)
During the peak salinity
Raw water pumping stations reduce raw water pumping. In order to avoid raw water at high salinity, it will enter the raw water canal.

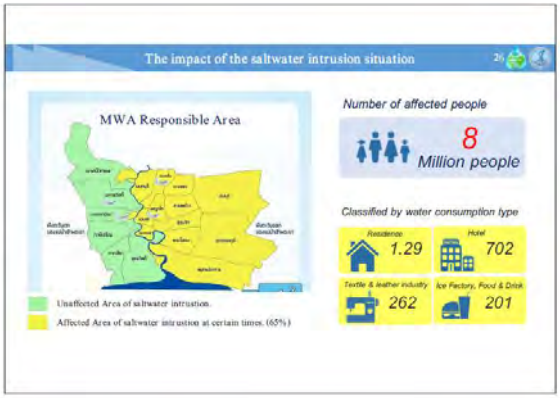

Applications of AnSaT
21
Water Level (MSL)
Salinity Forecast (g/l)
AnSaT forecast period of high salinity in raw water at Samlae pumping station.
The raw water pumping station can avoid pumping saltwater into the raw water canal. By reducing the pumping during the high salinity in raw water.
AnSaT Reduce the impact on tap water quality

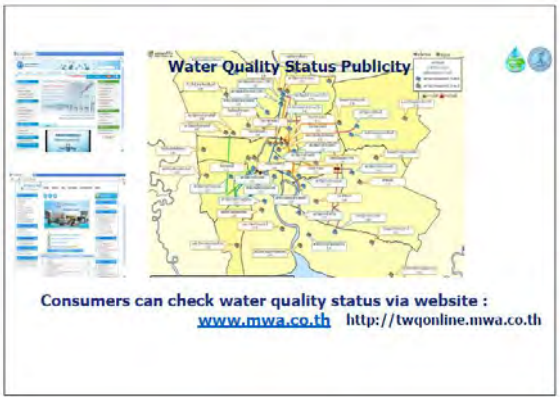

Applications of AnSaT
Case : Normal (Salinity ≤ 0.25 g/l)
Chao Phraya Dam
Q = 70 m³/s
Raw Water Pumping Station
Water Treatment Plant
Customer
Q = 60 m³/s
Raw Water Canal
Tap Water
Q = 10 m³/s
Khlong Lad Pho Floodgate
Chao Phraya River
gulf of Thailand
22


Applications of AnSaT
Case : Salinity > 0.25 g/l
Chao Phraya Dam
Q = 70 m³/s
Raw Water Pumping Station
Water Treatment Plant
Customer
Q > 10 m³/s
Reduce Q
Raw Water Canal
Tap Water
Khlong Lad Pho Floodgate
Chao Phraya River
gulf of Thailand
23


Applications of AnSaT
Case : Critical (Saltwater intrusion)
Chao Phraya Dam
Q > 70 m³/s
Raw Water Pumping Station
Water Treatment Plant
Customer
Q > 50 m³/s
Q = 20 m³/s for 2 hrs
Raw Water Canal
Tap Water
Khlong Lad Pho Floodgate
Chao Phraya River
gulf of Thailand
24

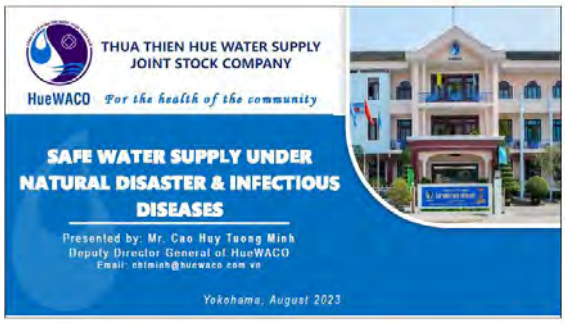

Raw Water Pumping Station
Repel Saltwater 0.25 g/l
Maximum 17 km.
The Gulf of Thailand
Water hammer operation results
MWA has performed Water hammer operation 35 times
2020 : 14 times
2021 : 14 times
2022 : 7 times
These Tool & methods can decrease affect from saltwater intrusion for MWA

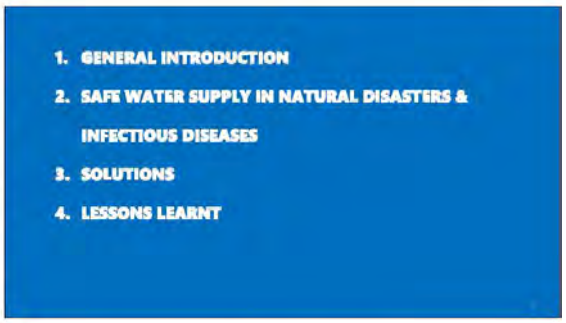

The impact of the saltwater intrusion situation
MWA Responsible Area
Unaffected Area of saltwater intrusion
Affected Area of saltwater intrusion at certain times. (65%)
Number of affected people
8 Million people
Classified by water consumption type
Residence 1.29
Hotel 702
Textile & leather industry 262
Ice Factory, Food & Drink 201

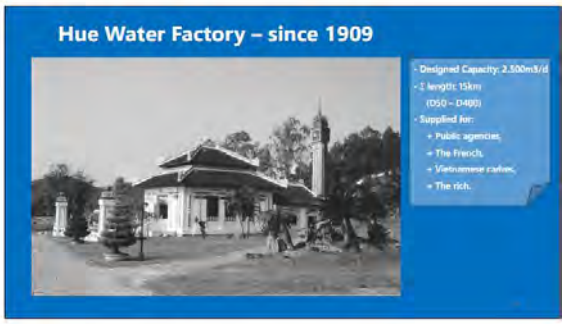

Water Quality Status Publicity
Consumers can check water quality status via website :
www.mwa.co.th http://twqonline.mwa.co.th

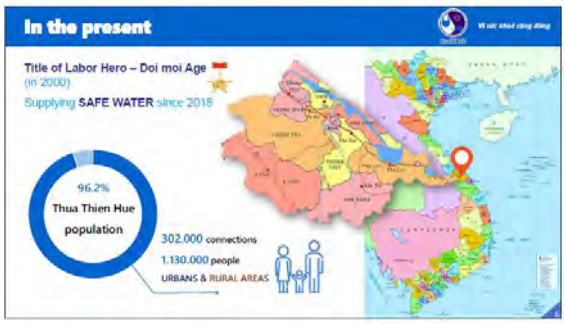

THANK YOU

11-4-5 Day 1: ENSURING SAFE WATER SUPPLY DURING NATURAL DISASTER AND INFECTIOUS DISEASES (HueWACO)









IN NATURAL DISASTERS

Typhoons & its risks to water supply

Typhoon No.5
(18 Sep 2020)
collapse of tree, electric poles → Power cut & ***intermittent water supply***

Noru Typhoon
(28 Sep 2022)
→ Collapse of house, broken roof, flood
→ ***pipes burst, washed away***

Flood & its risks to water supply

Flood at downstream
→ Pipes burst, washed away, joint disconnected
→ ***Intermittent water supply***

Drought & its risks to water supply

Drought causes scarcity of raw water
→ intake pipes are unable to withdraw water
→ shortage of distributed water

IN INFECTIOUS DISEASES

INFLUENCE OF COVID-19

- March 8th, 2020: the first positive case of Covid-19 in Hue.
- Conforming to social distancing under Directive No 15, 16/CT-TTg dated 31/3/2020 of the goverment.
- The costs of materials and fuels increased
- Weak circulation of goods.
- High risks to customers and employees
- Water demand strongly increased.
- The progress of investment projects was slow.

Securing both safe water supply and 5K

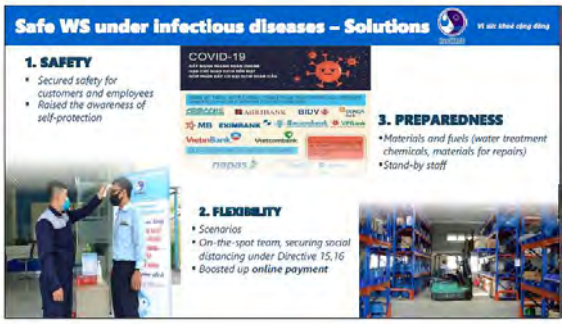
3. SOLUTIONS

Safe WS under natural disasters (ND) & infectious diseases (ID)


Solutions (natural disasters)
1. SAFETY & SUSTAINABILITY
Suitable water supply system
Sustainable design (booster pumping stations, pipelines, water treatment plants, etc.)
2. FLEXIBILITY
Rapid response teams are qualified and equipped with sufficient materials, facilities
→ Respond IMMEDIATELY
3. PREPAREDNESS
Power generator, diezel
Reservoirs
Chemicals, materials for water treatment

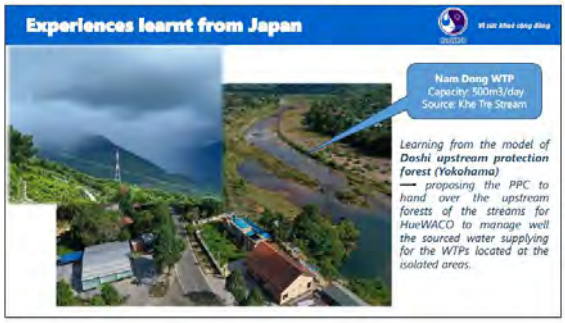

Solutions (natural disasters)
4. PREDICTION
Evaluation of risk levels
Evaluation of hazards
Forcast on business & production (with impact of weather and disasters)
5. PUBLIC SHARING
Extreme heat → water demand increased unexpectedly → water shortage → supply water from truck
Flood → deteriorated water quality→ distributed water treatment chemicals for free


Solutions (infectious diseases)
We have been applying 5K rules, including:
Face mask,
Disinfection,
No gathering,
Health declarations,
Social Distancing
5K
RULES
(in Vietnamese)


Safe WS under infectious diseases – Solutions
1. SAFETY
Secured safety for customers and employees
Raised the awareness of self-protection
COVID-19
2. FLEXIBILITY
Scenarios
On-the-spot team, securing social distancing under Directive 15,16
Boosted up online payment
3. PREPAREDNESS
Materials and fuels (water treatment chemicals, materials for repairs)
Stand-by staff


Safe WS under infectious diseases – Solutions
4. PREDICTION – IMPACT REDUCTION
Automation
Online meetings
Implemented investment projects in a timely and appropriate way
5. PUBLIC SHARING
Discount on water tariff
Automated disinfection device
Free bottled water
Rapid disinfection hand-house
ĐIỂM TIẾP NHẬN

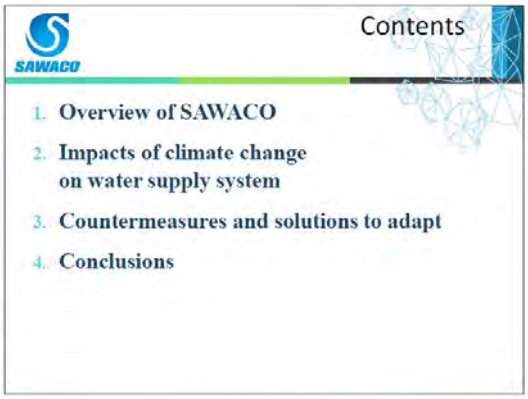

4. LESSONS LEARNT
Being proactive and flexible in responses to secure safe water supply in several conditions
Having suitable materials and fuels in place
Having safe and sustainable strategies in place
Sharing experiences with others
Applying initiatives and innovations in technology and science

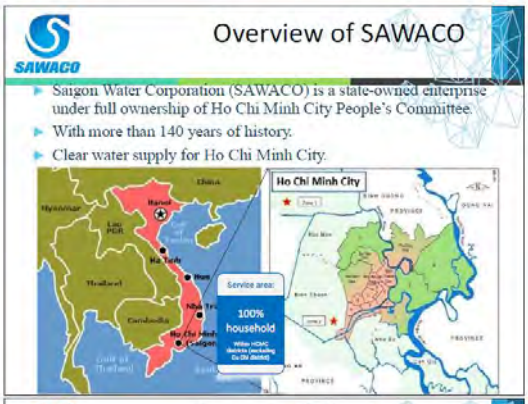

Experiences learnt from Japan
Nam Dong WTP
Capacity: 500m3/day
Source: Khe Tre Stream
Learning from the model of Doshi upstream protection forest (Yokohama)
→ proposing the PPC to hand over the upstream forests of the streams for HueWACO to manage well the sourced water supplying for the WTPs located at the isolated areas.

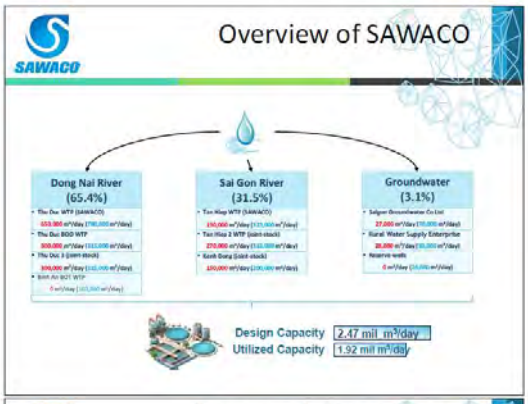

Experiences learnt from Japan
Under JICA's support, through Vietnam – Yokohama Project (2013-2016), HueWACO applied many methods for ensuring the safety and security of the water supply system:
Automated chemical injection (SCADA)
Online monitoring of water quality items (pH, Res. Chlorine, turbidity, Fe, Mn) → Cut down human resources, chemicals, electricity
→ securing safe water supply even in disasters and infectious diseases.
The capacity of waterworks management has been much improved through JICA-granted projects: grassroot project (2003), HRM and training project for central highlands of Vietnam, Phase 1&2 (2007, 2010-2013)
→ enhancing the responsive capacity to water supply risks.

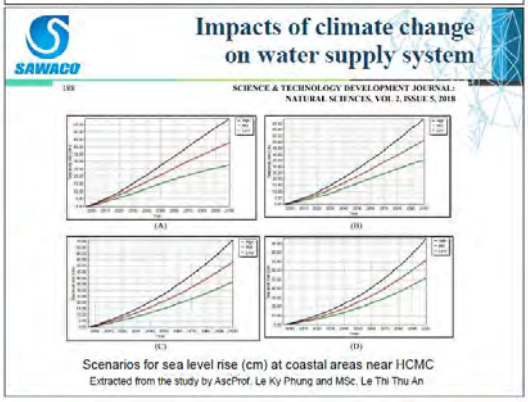

THUA THIEN HUE WATER SUPPLY
JOINT STOCK COMPANY
HueWACO
For the health of the community
ENSURING SAFE WATER SUPPLY DURING NATURAL DISASTER AND INFECTIOUS DISEASES
Presented by: Mr. Cao Huy Tuong Minh
Deputy Director General of HueWACO
Yokohama, August 2023

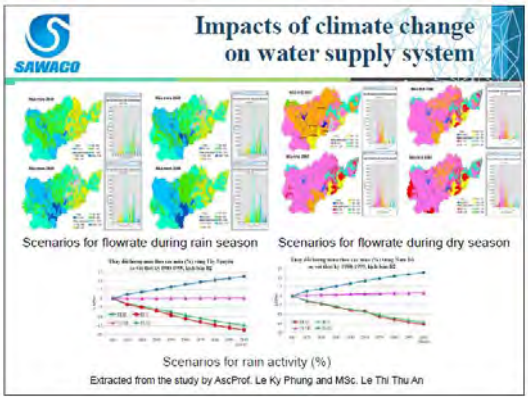
11-4-6 Day 1: Challenges due to climate change and countermeasures for HCMC water supply system (SAWACO)

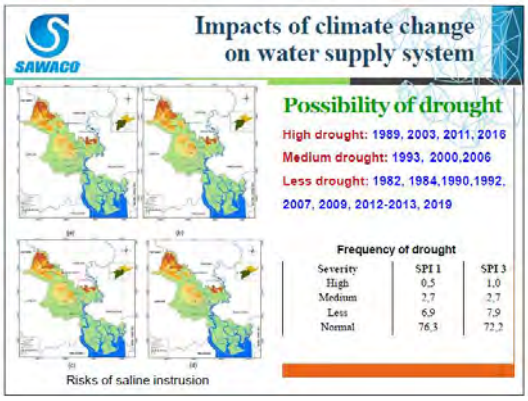


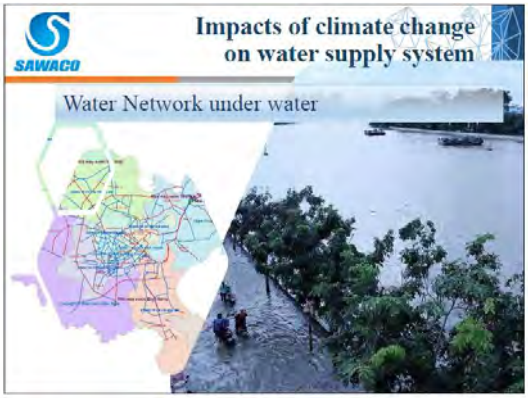


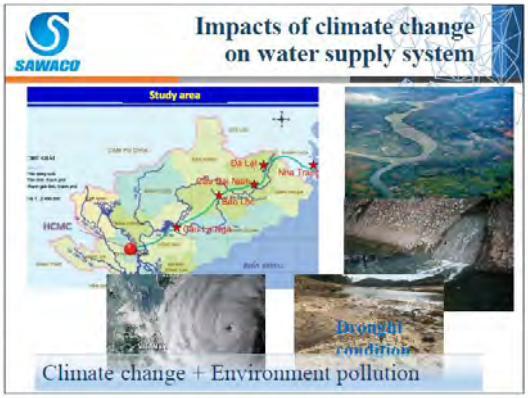




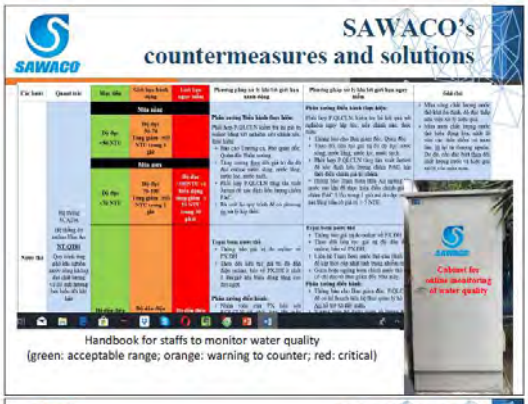




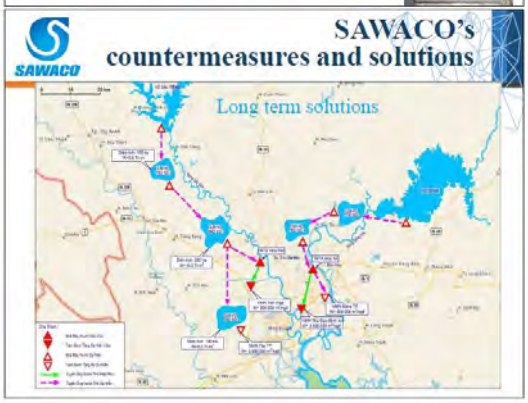

SAWACO
Impacts of climate change on water supply system
Water Network under water

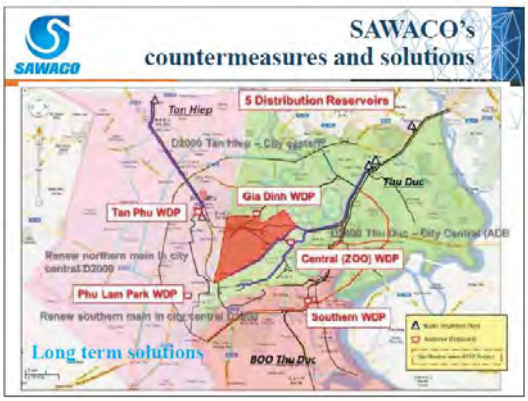

SAWACO
Impacts of climate change on water supply system
Study area
HCMC
Drought condition
Climate change + Environment pollution


SAWACO
SAWACO's countermeasures and solutions


SAWACO
SAWACO's countermeasures and solutions
Handbook for staffs to monitor water quality
(green: acceptable range; orange: warning to counter; red: critical)

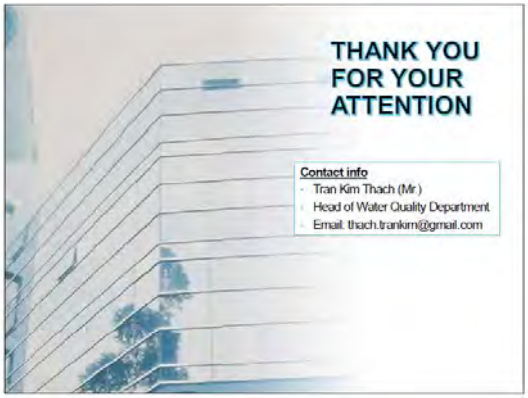

SAWACO
SAWACO's countermeasures and solutions
• Implement emergency water supply solutions for customers. When the incident > 12h :
• Water supply by tank truck, centralized water tank
• Supply water through emergency water bags.
Short term solutions


SAWACO
SAWACO's countermeasures and solutions
Long term solutions

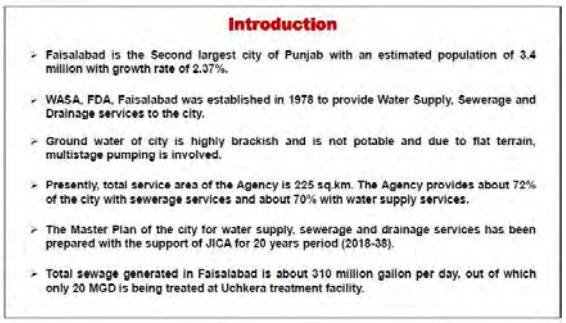

SAWACO
SAWACO's countermeasures and solutions
5 Distribution Reservoirs
Tan Hiep
Gia Dinh WDP
Thu Duc
Tan Phu WDP
Central (ZOO) WDP
Phu Lam Park WDP
Southern WDP
Long term solutions
BOO Thu Duc

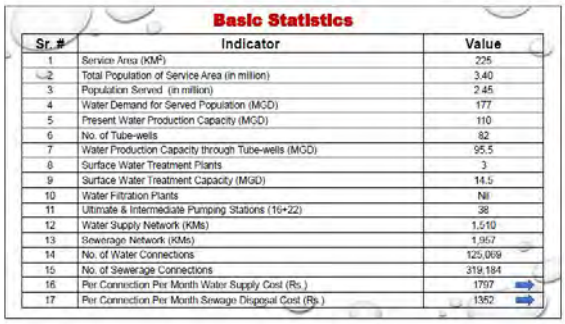

SAWACO
SAWACO's countermeasures and solutions
• Training for staff
• Incident response drills

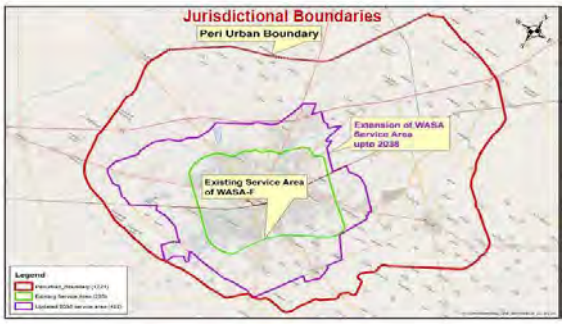

SAWACO
SAWACO's countermeasures and solutions
• Requires the coordination of many sectors (research, …).
• Learning and sharing experiences from partners

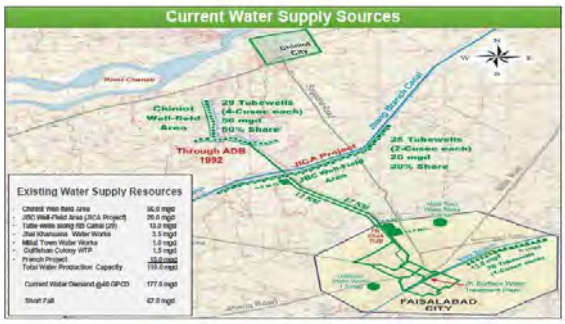

THANK YOU FOR YOUR ATTENTION
Contact info
Tran Kim Thach (Mr.)
Head of Water Quality Department
Email: thach.trankim@gmail.com

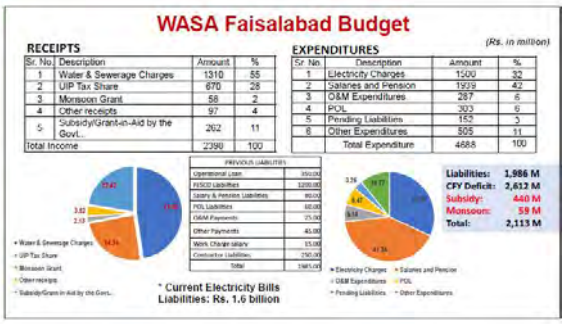
11-4-7 Day 2: Efforts to make F-WASA Self sustainable by improving services and taking concrete steps (WASA-F)

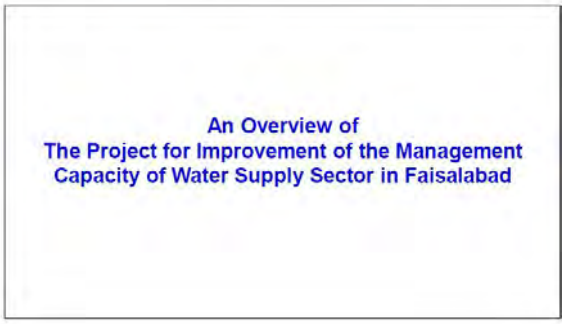












Outline of the project

Item	Contents
Project Title	The Project for Improvement of Management Capacity of Water Supply Sector in Faisalabad
Project Period	Phase 1-February 2022 to April 2023 Phase 2 - May 2023 to February 2026
Implementing Organization	Pakistan Side : Water and Sanitation Agency, Faisalabad (WASA-F) Japan Side : JICA Expert Team (JET) Joint Venture - Nihon Suido Consultants Co., Ltd. , Yokohama Water Co., Ltd. , Japan Techno Co.,Ltd.
Overall Goal	WASA-F's water supply business management situation will be improved
Project Purpose	The capacity of WASA-F that implements efforts aimed at improvement of business management is enhanced

Project Goal:

To improve WASA-F business management

Project Outputs:

- The ability to formulate and execute water supply service improvement plans will be enhanced.
- The ability to improve business operation, customer relationship, operational revenue, financial and management.
- The project shall be monitored and evaluated using "Project Design Matrix".

Input by the Donor:

- Engagement & dispatch of Short Term Eight (8) Experts.
- Training of WASA-F officials in Japan.
- Equipment for the improvement of water supply such as meters, pipes etc.

Contd. ....

Input by Pakistani Side:

- Counterpart Persons/Officials.
- Project Expense such as In-country expense for trainings, expense of utilities (electricity, fuel, communication etc.), expense of installations for improvement in selected areas (water meters, pipes etc.).

Implementation Structure:

The project shall consist of Project Director (MD WASA-F) and Project Manager along with relevant staff of WASA.

A Technical Coordination Committee headed by Project Director shall be formed to discuss the technical matters and inter organizational coordination.

A project steering committee naming JCC headed by Secretary P&D shall be formed for overall monitoring of the project.

Project Cost:

The estimated cost of Grant is 400 million PKR.

Steps to Make F-WASA Self-Sustainable With the help of JICA Experts

Outcomes Of Door To Door Survey To Increase Consumer Base

- Since 2017 onwards more than 50000 consumers have been added into the network
- Since 2022 onwards around 17000 consumers have been added into the network
- Efforts made during last 6 months:
  - Illegal connections identified and regularized = 3612 Number
  - New connections registered = 1548 Number
  - Tariff corrections/conversions = 856 Number

TOTAL FINANCIAL IMPACT — Rs. 10.15 million

Measures to Enhance Revenue & Reduce Expenditure

Enhancement in Revenues

Sr.#	Description / Activity	Enhancement in Revenue (Million Rs.)
1.	Detection of Illegal Connections	152.00
2.	Detection of Misuse Connections	15.00
3.	Improvement in Collection Efficiency	119.00
4.	Bottling Plant, Metering, NRW Reduction etc.	25.20
	Total Impact	311.20

Reduction in Expenditures

Sr.#	Description / Activity	Enhancement in Revenue (Million Rs.)
1.	Curtailment of Electricity Expenditures	60.00
2.	Application of Solar Systems	Planned for future years.
3.	Reduction in POL Expenditures	64.11
4.	Outsourcing, HR rationalization etc.	396.00
	Total Impact	520.11

Deficit in absence of Reforms:	Rs. 2767.17 Million
Deficit with Reforms:	Rs. 1935.86 Million
Impact of Reforms:	Rs. 831.31 Million

Potential Expansion of Consumer Base

Survey & updation of data of Consumers

Sr.#	AREA OF PLOT	CONNECTIONS	
		WATER	SEWER
1	Up to 2.5 Marla	45072	120689
2	Above 2.5 Marla to 3.5 Marla	31502	70181
3	Above 3.5 Marla to 5 Marla	26585	77064
4	Above 5 Marla to 10 Marla	10404	28500
5	Above 10 Marla to 20 Marla	2946	7303
6	Above 20 Marla to 40 Marla	436	1178
7	Above 40 Marla	179	297
	TOTAL	117284	305212

TOTAL REVENUE POTENTIAL
Rs. 8.8/ million

Estimated Potential of Consumers subject to Expansion of W/S and Sewerage Network

1) As per survey conducted by JICA Master Plan Team in 2015, total served area is 225 sq.km out of 410 sq.km including Peri Urban area of which WASA coverage is 72%. The households of this served area are 3,00,960.
2) As per 2017 census the estimated household in WASA jurisdiction are around 3,80,000. The potential consumers are about 45,000.
3) As per Record of Primary & Secondary Health Care Department, the current number of households in Faisalabad is 5,69,673. Out of these 3,63,620 households fall within the service area of WASA. Therefore, the estimated potential for additional connections is 58,408.*

* In case 58,408 connections are brought into billing network, the monthly financial impact would be around Rs.9.87 million within existing tariff.

Increase in Water Rates

- Chief Minister on 06.04.2023 reviewed the proposed enhancement in WASAs tariff and directed to adopt uniform tariff along with subsidizing the low income groups (Upto 5 Marla)
- According to revised business model, Multan & Rawalpindi will become self-sustainable, while, annual subsidy of Rs. 3,566 million will be required for Lahore, Faisalabad & Gujranwala
- Variation of electricity and POL rates will be incorporated with indexation, bi-annually (January & July)

Other Initiatives and Future Plans

- **Automation of Business Processes**
  WASA-F has automated its various business processes such as Consumer Billing, Financial Book-keeping, Pension and Payroll, Asset and Complaint Management. Establishment of WAN is planned in future to connect field offices.
- **Supervisory Control And Data Acquisition (SCADA)**
  WASA-F has installed a high-tech SCADA system to run its surface water treatment plant and measurement of water supply at source as well as various nodes of water supply network, which will be extended in future years to cover remaining installations.
- **Consumer Facilitation**
  Consumers of WASA-F are facilitated for payment of their bills by using all possible channels for financial transitions such as 1-Link ATMs, Mobile Apps, EasyPaisa, Jazz Cash, NADRA Kiosk, UBL Omni, HBL Konnect etc.
- **Pre-Cast Manhole Slabs and Covers**
  For early rectification of complaints regarding broken manhole slabs and missing manhole covers the use of pre-cast manhole slabs and covers is introduced in WASA-F.

Contd. .....

Other Initiatives and Future Plans

- **Solarization of WASA Installations**
  - Feasibility study for installation of 24 MW solar plant done through international consulting firm.
  - WASA-F is looking for some donor to execute this project in PPP mode.
  - A small plant having capacity 0.7 MW is included in PEECA project for WASA Faisalabad.
- **Geo-tagging of WASA Consumers**
  - All assets including water works, disposal stations, tube wells etc. are mapped on GIS. Current developments are also being incorporated.
  - GIS consumer survey is recently outsourced to increase consumer-base. Through this intervention an increase of 10,000 connections per annum is targeted for the coming five years.
- **Tracking System**
  Tracking system on service vehicles has been installed. However, installation of tracking system on newly purchased vehicles has been planned during current financial year.

Contd. .....

Other Initiatives and Future Plans

- **Metering**
  WASA-F has planned installation of 80,000 water meters through various interventions in coming five years to save water and increase revenue.
- **Non-Revenue Water (NRW)**
  - 1000 km network has been checked for leakages control through advanced techniques. However, remaining 500 km network will be checked in coming three years.
  - 6 model zones having about 22,000 consumers will be considered for 100% metering and enhanced supply hours in coming two years.
  - Installation of 60,000 meters has been planned on eastern side of the city in coming three years.
- **HR Development**
  WASA-F has established a Training Academy with the technical support of JICA where professional training is being imparted to WASA employees.

Arigatou gozaimasu

ありがとう

Thank you

WATER SUPPLY COST ANALYSIS

Sr. No.	Category of Connection	No. of connections	Monthly Existing Rate	Monthly Demand (Rs. in million)	Monthly Subsidy per connection given to WASA by GoP (Rs.)	Actual Monthly Production cost	Difference (per connection subsidy being provided by WASA)	Category wise subsidy being provided by WASA (Rs. in million)
1	2	3	4	5 ((3x4)/1000000)	6	7	8 (7 - (4+6))	9 (3x8/1000000)
1	UPTO 2.5	50713	83	4.209	49.93	1797	1664	84.390
2	Above 2.5 Marla to 3.5 Marla	31696	124	3.930	49.93	1797	1623	51.445
3	Above 3.5 Marla to 5 Marla	27247	145	3.951	49.93	1797	1602	43.652
4	Above 5 Marla to 10 Marla	10164	242	2.460	49.93	1797	1505	15.298
5	Above 10 Marla to 20 Marla	2588	322	0.833	49.93	1797	1425	3.688
6	Above 20 Marla to 40 Marla	441	644	0.284	49.93	1797	1103	0.486
7	Above 40 Marla	171	966	0.165	49.93	1797	781.07	0.134
8	Commercial	1957	1175	2.299	49.93	1797	572.07	1.120
9	Bulk Water (Industrial)	92	31521	2.900	49.93	1797	-29773.93	2.739
	TOTAL	125069						197

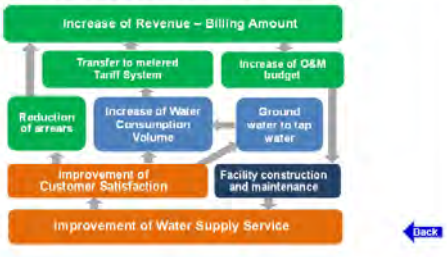
Back

SEWERAGE COST ANALYSIS

Sr. No.	Category of Connection	No. of connections	Monthly Existing Rate (Rs.)	Monthly Demand (Rs. in million)	Monthly Subsidy per connection given to WASA by GoP (Rs.)	Actual Monthly Production cost	Difference (per connection subsidy being provided by WASA)	Category wise subsidy being provided by WASA (Rs. in million)
1	2	3	4	5 ((3 x 4)/1000000)	6	7	8 (7 - (4+6))	9 (3 x 8/1000000)
1	UPTO 2.5	111345	55	6.124	49.93	1352	1247	138.855
2	Above 2.5 Marla to 3.5 Marla	67261	83	5.583	49.93	1352	1219	81.996
3	Above 3.5 Marla to 5 Marla	74701	97	7.246	49.93	1352	1205	90.020
4	Above 5 Marla to 10 Marla	26505	161	4.267	49.93	1352	1141	30.244
5	Above 10 Marla to 20 Marla	6622	242	1.603	49.93	1352	1060	7.020
6	Above 20 Marla to 40 Marla	1033	403	0.416	49.93	1352	899	0.929
7	Above 40 Marla	267	644	0.172	49.93	1352	658.07	0.176
8	Commercial & Industrial	24453	1467	35.873	49.93	1352	-164.93	-4.033
	TOTAL	312187						345

Back

Business Model for Management Improvement



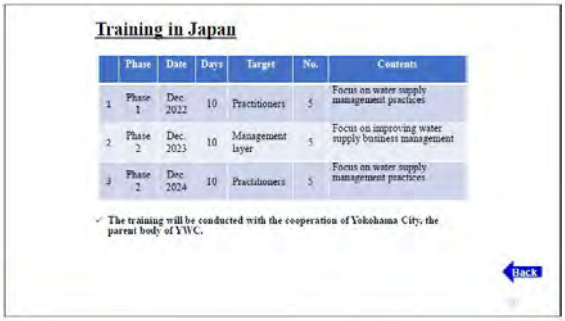
Back

Outputs of the Project

Output No.	Contents
Output 1	Strengthen ability to formulate and implement water supply service improvement plans
Output 2	Strengthen ability of efficient operation of facility
Output 3	Strengthen ability to carry out customer related works to increase revenue
Output 4	Strengthen ability of financial improvement
Output 5	Strengthen ability to create Business Improvement Plan

Back


Member of JICA Expert Team
Name
Duties
Dairaku NSC Chief Advisor/Waterworks Management
Konno NSC Deputy Chief Advisor/Project Planning
Matsumoto NSC Waterworks Engineering
Segawa Note:1 Water Distribution Management 1
Hosotani YWC Water Distribution Management
Kinno JAT Construction Management Support
Takatoi NSC Electromechanics
Murakami Note:2 Information Management
Mori JAT Finance 1
Kasai Note:3 Finance 2
Wada YWC Customer Service
Kinugasa YWC Tariff Collection
Note1: Yokohama Water Works Bureau, Support to YWC
Note2: Hiroshima Mizu-mirai, Support to NSC
Note3: Africa Accounting Advisory Ltd, Support to JAT
Back


Training in Japan
Phase
Date
Days
Target
No.
Contents
1 Phase 1 Dec. 2022 10 Practitioners 5 Focus on water supply management practices
2 Phase 2 Dec. 2023 10 Management layer 5 Focus on improving water supply business management
3 Phase 2 Dec. 2024 10 Practitioners 5 Focus on water supply management practices
The training will be conducted with the cooperation of Yokohama City, the parent body of YWC.
Back


W
A
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Developed By
Corporate General Solutions (Pvt) Ltd.
Back


W
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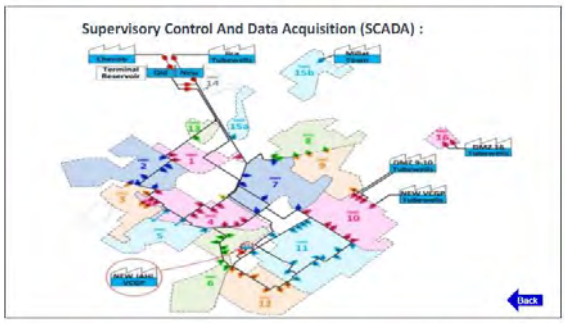
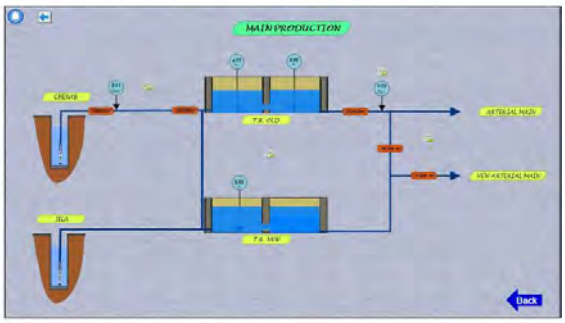
WATER AND SANITATION AGENCY (WASA) FDA
General Ledger
Developed By
Back

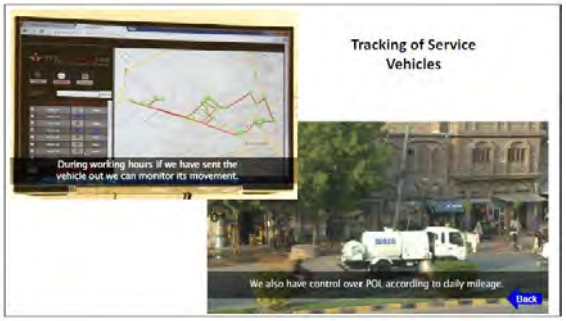

Supervisory Control And Data Acquisition (SCADA) :
Back

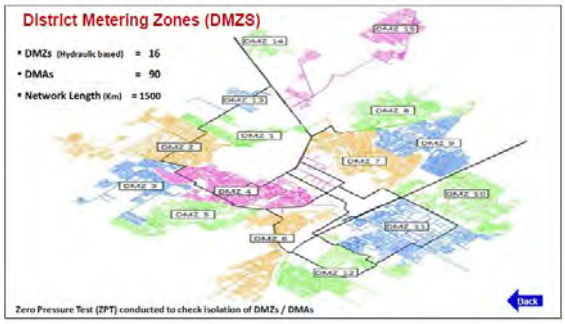

MAIN PRODUCTION
Back

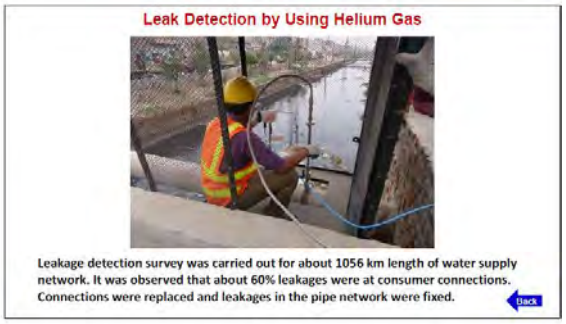

Online Payment of WASA Bills through Mobile Apps
Transaction Successful
Rs. 134.00
Utility Bill Paid
PAID
HBL Mobile
Back


Introduced Pre-Cost Slabs and Covers
Back


Geographic Information System (GIS) Section
PEOPLES COLONY NO 2. (JICA PILOT AREA)
Back


Tracking of Service Vehicles
During working hours if we have sent the vehicle out we can monitor its movement.
We also have control over POL according to daily mileage.
Back

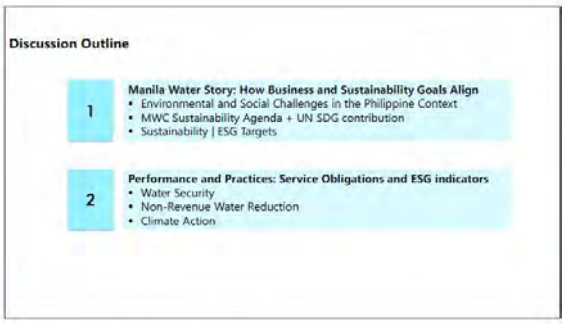

District Metering Zones (DMZS)
• DMZs (Hydraulic based) = 16
• DMAs = 90
• Network Length (Km) = 1500
Zero Pressure Test (ZPT) conducted to check isolation of DMZs / DMAs
Back

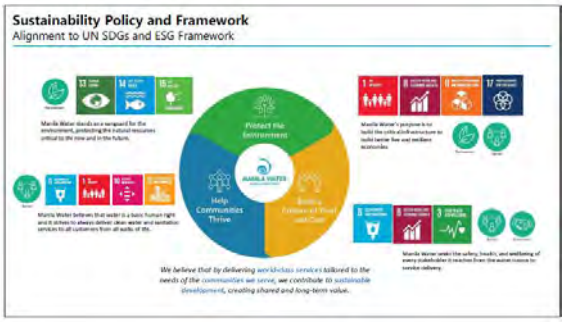

Leak Detection by Using Helium Gas
Leakage detection survey was carried out for about 1056 km length of water supply network. It was observed that about 60% leakages were at consumer connections. Connections were replaced and leakages in the pipe network were fixed.
Back

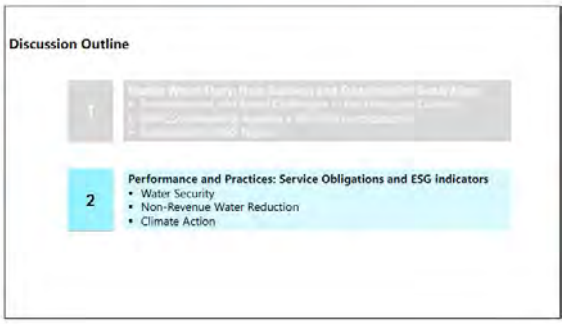

WASA Academy Faisalabad
Back

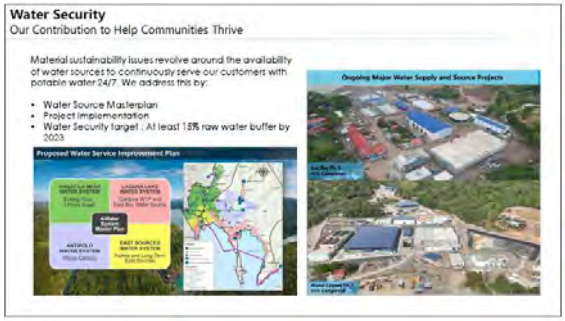

Back

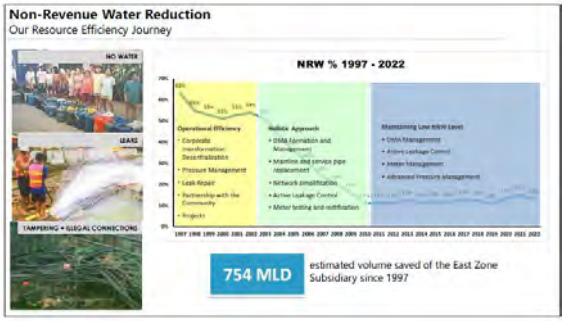
11-4-8 Day 2: Framing the Sustainability Agenda: Delivering on the SDGs (Manila Water)







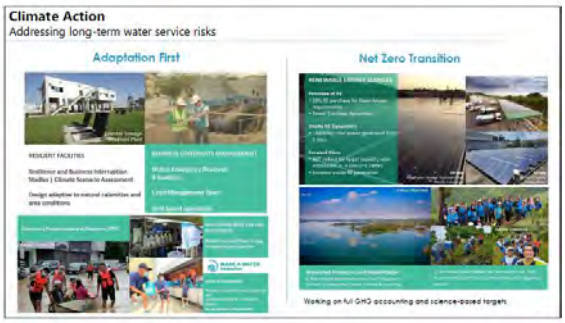

Water Security
Our Contribution to Help Communities Thrive
Material sustainability issues revolve around the availability of water sources to continuously serve our customers with potable water 24/7. We address this by:
• Water Source Masterplan
• Project Implementation
• Water Security target : At least 15% raw water buffer by 2023
Proposed Water Service Improvement Plan
Ongoing Major Water Supply and Source Projects

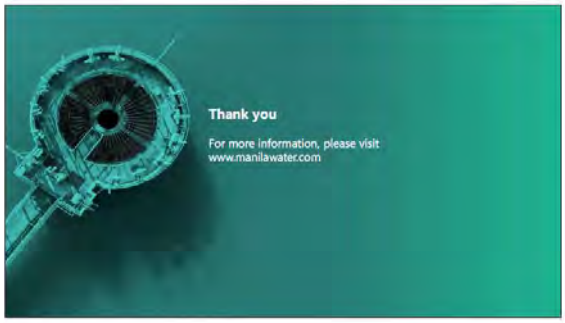

Non-Revenue Water Reduction
Our Resource Efficiency Journey
NO WATER
LEAKS
TAMPERING + ILLEGAL CONNECTIONS
NRW % 1997 - 2022
754 MLD
estimated volume saved of the East Zone Subsidiary since 1997


NRW Reduction Strategies
Employing a Multi-pronged Approach
People
Employee Accountability + Community Relationship
Process
Establish Territory Management
Technology
Provide Proactive Technical Solutions
Training and resources
Autonomy
Recognition & Accountability
Clear Metrics
Customer Centricity
Employee Empowerment and Talent Upskilling
Proactive Customer Service
Public Consultation
Community and Stakeholder Education

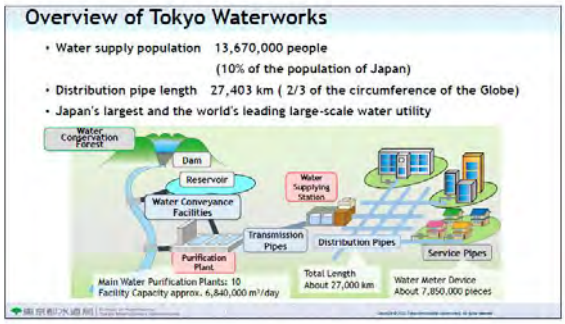

NRW Reduction Strategies
Employing a Multi-pronged Approach
People
Employee Accountability + Community Relationship
Process
Establish Territory Management
Technology
Provide Proactive Technical Solutions
Decentralization and Customer Focus
Business Zone Managers
Area Business Manager
Territory Managers

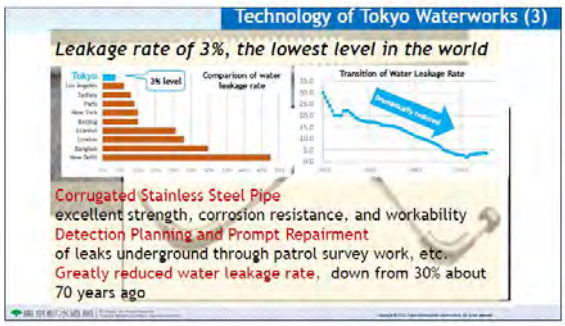

NRW Reduction Strategies
Employing a Multi-pronged Approach
People
Employee Accountability + Community Relationship
Process
Establish Territory Management
Technology
Provide Proactive Technical Solutions
Master Plan Development
Network Simplification
Pipe Replacement
Pressure Management
Active Leakage Control
Meter Management + R&D
Pressure Management
Operations Control Center

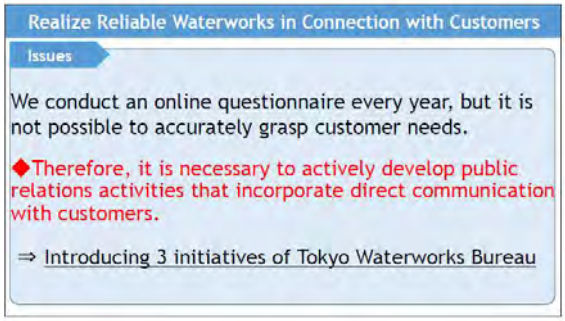

Climate Action
Addressing long-term water service risks
Adaptation First
Net Zero Transition
Working on full GHG accounting and science-based targets


Thank you
For more information, please visit
www.manilawater.com

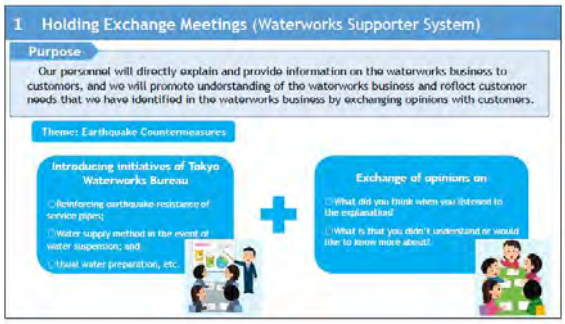
11-4-9 Day 2: Toward the Realization of Reliable Waterworks in Connection with Customers (Bureau of Waterworks, Tokyo Metropolitan Government)



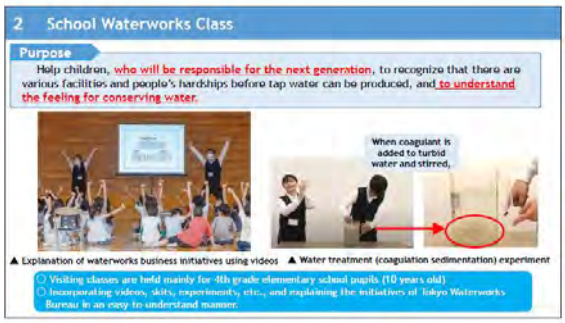


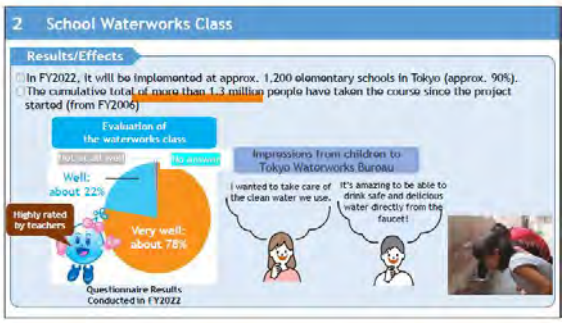

Realize Reliable Waterworks in Connection with Customers
Issues
We conduct an online questionnaire every year, but it is not possible to accurately grasp customer needs.
◆Therefore, it is necessary to actively develop public relations activities that incorporate direct communication with customers.
⇒ Introducing 3 initiatives of Tokyo Waterworks Bureau


Details of Initiatives
1 Holding Exchange Meetings (waterworks supporter system)
2 School Waterworks Class
3 Tokyo Water App (Notification Function)


1 Holding Exchange Meetings (Waterworks Supporter System)
Purpose
Our personnel will directly explain and provide information on the waterworks business to customers, and we will promote understanding of the waterworks business and reflect customer needs that we have identified in the waterworks business by exchanging opinions with customers.
Theme: Earthquake Countermeasures
Introducing initiatives of Tokyo Waterworks Bureau
Exchange of opinions on


1 Holding Exchange Meetings (Waterworks Supporter System)
【 Opinions from participants of the exchange meeting 】
I want to really feel the weight of the water supply bag in case of a disaster.
【 Reflecting Opinions 】
Carrying a water supply bag on the back


2 School Waterworks Class
Purpose
Help children, who will be responsible for the next generation, to recognize that there are various facilities and people's hardships before tap water can be produced, and to understand the feeling for conserving water.
When coagulant is added to turbid water and stirred,
▲ Explanation of waterworks business initiatives using videos
▲ Water treatment (coagulation sedimentation) experiment
Visiting classes are held mainly for 4th grade elementary school pupils (10 years old)
Incorporating videos, skits, experiments, etc., and explaining the initiatives of Tokyo Waterworks Bureau in an easy-to-understand manner


2 School Waterworks Class
Results/Effects
In FY2022, it will be implemented at approx. 1,200 elementary schools in Tokyo (approx. 90%).
The cumulative total of more than 1.3 million people have taken the course since the project started (from FY2006)
Evaluation of the waterworks class
Well: about 22%
Very well: about 78%
Highly rated by teachers
Impressions from children to Tokyo Waterworks Bureau
I wanted to take care of the clean water we use.
It's amazing to be able to drink safe and delicious water directly from the faucet!
Questionnaire Results Conducted in FY2022

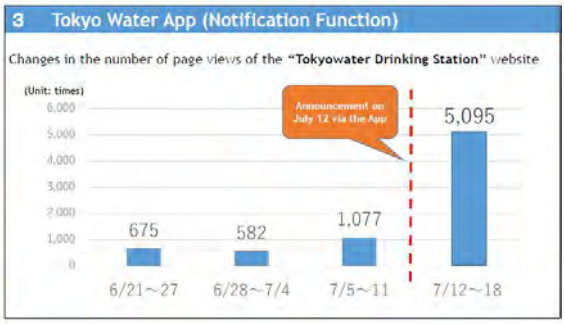

◆ Special Website "Home Waterworks Class"
Review
Learning
Learning from Videos !
Waterworks Class 2023
Click here for the class for schools
Click here for the class for the public
Let's go home and try it!
Learning from Videos !
School waterworks class (about 60 minutes)
Let's go to water facilities
"Let's go to water facilities" (about 5 minutes)


3 Tokyo Water App "Release of Tokyo Water App ! "
Easy and convenient and very popular!
Enjoy life with water smoothly
Tokyo Water App
Over 1 million registered users! (as of July 2023)
Using the App makes it so convenient and comfortable!
01 easily and quickly from your smartphone!
02 Compatible with smartphone payments and credit card payments (pay-as-you-go)!
03 check meter reading slips, water consumption and charges in the App!
04 various notifications from Tokyo Waterworks Bureau!
Released in October 2022!


3 Tokyo Water App (Notification Function)
Before
Sending to an unspecified number of people
[Website of Tokyo Waterworks Bureau]
[Twitter]
After
One-on-one delivery directly to individuals
Deliver notifications directly through the App in addition to the existing website of Tokyo Waterworks Bureau and Twitter
• Charges (meter reading slip)
• Event information, etc.
*In addition, smart meter installers are notified of suspected water leaks
Unlike the website of Tokyo Waterworks Bureau or Twitter, the notification function of the App can be delivered directly to customers.
It can play an important role as a communication tool from Tokyo Waterworks Bureau to customers.

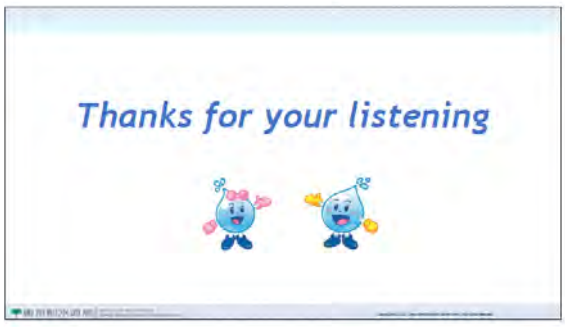

3 Tokyo Water App (Notification Function)
■ There are about 900 "Tokyowater Drinking Station" where you can drink cold water in Tokyo.
▲Tokyowater Drinking Station installed at the International Forum
▲Children drinking tap water


3 Tokyo Water App (Notification Function)
■ The App guides you to "Tokyowater Drinking Station", a water supply spot, in response to consecutive days of extreme heat.
Tokyo Water App
7,673
Tokyo Water App
The location of Tokyowater Drinking Station


3 Tokyo Water App (Notification Function)
Changes in the number of page views of the "Tokyowater Drinking Station" website
(Unit: times)
6,000
5,000
4,000
3,000
2,000
1,000
0
675
582
1,077
5,095
Announcement on July 12 via the App
6/21~27
6/28~7/4
7/5~11
7/12~18


Summary: Toward the Realization of a Water Supply Trusted by Customers
◆Continue to implement various communication initiatives to directly connect with customers
◆ Promote to improve customer service by focusing on services that are in line with the times using ICT technology (the App, etc.)


SusHi Tech TOKYO
Sustainable High City Tech Tokyo
Tokyo Metropolitan Government is sending "Sustainable High City-Tech Tokyo = SusHi Tech Tokyo" to create "sustainable new value" that overcomes common urban issues using cutting-edge technologies and various ideas, etc. to the world.


Thanks for your listening

11-4-10 Day 2: Creating Corporate Plan and Revising Water Rate 2020-2025 (NPLP)

The 5th Executive Forum in Yokohama
Session 2 Presentation "Towards Achieving SDGs Goal 6"

Creating Corporate Plan and Revising Water Rate 2020-2025

Mr. Ladda Philavong

Luang Prabang Water Supply State-owned Enterprise (NPLP), Lao PDR

1

Content

1. Overview
2. Needed to increasing water tariff 2020-2025
3. Tariff revision and corporate plan 2020-2025
4. Compare between actual tariff and the plan
5. The lessons learned from this differentiation of plan & actual
6. Challenges of NPLP

1. Overview

A. Luang Prabang Province, Lao PDR

- The Lao People's Democratic Republic (Lao PDR) was established in December 2, 1975. Consists of 17 Provinces and one Capital.
- Luang Prabang Province locate in the center of northern part of Lao PDR, was formed Lao capital from the 14 th to the 16 th century the town became the capital of the powerful kingdom of Lane Xang (Lao PDR). The ancient town of Luang Prabang City has finally registered as the official World Heritage Site by UNESCO since 1995.
- Consists of 1 City and 11 Districts, area 16,875 Km², population 477,193 inhabitants, 85,678 Households, 757 Villages with density of 28 people per square kilometer (2022).
- GDP per capital1,925 USD

B. LuangPrabang Water Supply State-owned Enterprise(NPLP)

- The Water Supply State-Owned Enterprise Luang Prabang was established on 01 January 1997 under the Business Law No 03/94 dated 18 July 1994 (before called branch of Lao Water Supply State-Owned Enterprise)
- Whole Province has determined water supply service areas in 35 service areas (since 2020) (previously 19 service areas)
- Currently 8 water supply service areas (2 operated by private companies), under construction 4 service areas, remaining 23 areas no have water supply system
- Service areas: Urban and rural

B. LuangPrabang Water Supply State-owned Enterprise(NPLP)

- Government capital: 100 %
- Goal: provide potable water supply to all people of Luang Prabang province

B. LuangPrabang Water Supply State-owned Enterprise(NPLP)

Year 2022

- Population in service area : 283,454
- Population served : 119,051
- Currently 8 water supply service areas
- Coverage ratio (8): 88%, (35): 42%, whole province: 24%
- Design capacity 13 WTPs: 58,000 m3 /day
- Total connections: 27,672 meters (Non-Domestic 3,496)
- Pipeline network: 556 Km (DN 50-400)
- Average tariff: 0.211 USD/m3
- Operating Income: 1.8 Million USD
- Net Income: 0.02 Million USD
- Staff per 1,000 connections: 6.7

C. Previously corporate plans and tariff revisions

Agreement to approved water tariff 2013-2015 adjustment by provincial governor

Tariff level 2013-2015 (approved)

Category	Yip/m³	Yip/m³	Yip/m³
	2013	2014	2015
Domestic			
0-7 /m³	1,680	1,764	1,852
7.1-15m³	2,340	2,540	2,734
>15.1m³	3,058	3,156	3,251
Government			
Flat rate	2,990	3,289	3,618
Commercial			
Flat rate	3,250	3,575	3,933
Overall Average	2,267	2,482	2,720

Proposed tariff level 2019-2021 (not approved)

Category	Yip/m³	Yip/m³	Yip/m³
	2019	2020	2021
Domestic			
0-7 /m³	1,722	1,977	1,969
7.1-15m³	2,560	2,840	2,970
15.1-30 /m³	3,200	3,630	3,710
>30.1m³	3,840	4,400	4,450
Government			
Flat rate	3,840	4,400	4,140
Commercial			
Flat rate	4,800	5,510	4,505
Overall Average	3,852	4,368	4,391

Under the technical support from JICA(under MaWaSU) and ADB project, we had conducted mid-term corporate plans with tariff revision, the provincial government was approved the year 2013-2015 and 2015-2020. However, tariff revision was approved only 2013-2015.

2. Needed to increasing water tariff 2021-2025

Process of approving tariff revision

- Approved by provincial governor
- Provincial governor submit to provincial assembly
- Submitted to provincial board of Management of NPLP
- Submit to provincial department of public works and transport, and department of water supply
- NPLP prepare corporate plan and tariff revision (3-5 years)

- 2015, we conducted corporate plan 2015-20 by proposed tariff adjustment 2019-2021 then submitted to government, however we were rejected (2016 to 2020 the tariff level was the same level as 2015)
- Resulted net incomes of NPLP showed negative from -0.168 million USD (2017) to -0.497 million USD (2020)
- To ensure we are not a financial burden on the State's budgetary resources, we aim to operate our business on a sustainable basis, seeking to cover all costs, 2020, we conducted tariff revision and corporate plan 2020-2025 (investment projects: expansion of water supply system in LuangPrabnag city (JICA's grant), the new water supply systems in Chomphet, Pakseng, Thapo, Viengkham and Namtoaum (ADB and government's fund)
- NPLP had submitted the plan to government 2020 then approved by provincial governor in 2021

3. Tariff revision and corporate plan 2020-2025

The aim of creating corporate plan

1. To help NPLP manage its operations effectively and efficiently as the province continues to grow
2. To help Luang Prabang provincial government and other senior stakeholders appreciate and understand the water supply sector business and the challenges it faces
3. To set operational and financial goals and targets by which NPLP's performance can be assessed, transparently and objectively
4. To set out the corporate strategies to be adopted and activities undertaken to achieve the goals
5. To identify resources (financial and human) required to support the strategies and activities to be undertaken

3. Tariff revision and corporate plan 2020-2025

Table of content of corporate plan 2020-2025

Framework for Achievement of Goals and Targets

1. Internal planning to improve service by operate our business on a sustainable basis, covering all costs as O&M, all debt service, provision for depreciation of existing assets and/or minor capital investment work
2. Organization and resources by staff per connections ratio 5.7, to focus on skill development of each staff for further development with the help of technical assistance funded by our development partners such as JICA, ADB and etc
3. Capital investment is projected to reach a figure of almost 398 billion Kip in 2025 with expansion of water supply system in LuangPrabnag city (JICA's grant), the new water supply systems in Chomphet, Pakseng, Viengkham and Namtoaum (ADB's loan, government's grant and NPLP's fund)

3. Tariff revision and corporate plan 2020-2025

The basic idea for setting water tariff level and adjustment

Agreement to approved water tariff adjustment by provincial governor

- Customer in the province pays at the same rate in their respective tariff category
- Three consumer categories – domestic, government and commercial (non-domestic)
- Tariff structures for domestics are based on a "rising block" principle (three blocks), lowest block (lifeline block), increasingly higher tariff blocks for higher consumption levels designed for subsidy in the lifeline block, government and commercial tariffs are all flat rates
- More closely reflecting the real cost of supply with some provision to cross-subsidize the residential lifeline block
- In accordance with the provisions of the Water Supply Law (2009)

3. Tariff revision and corporate plan 2020-2025

Projection water tariff adjustment for 2021-2025

Category	Kip/m³ 2020	Kip/m³ 2021	Kip/m³ 2022	Kip/m³ 2023	Kip/m³ 2024	Kip/m³ 2025
Domestic						
0-7.0m³	1,852	1,965	2,080	2,200	2,293	2,385
7.1-15.0m³	2,754	2,900	3,055	3,280	3,410	3,550
>15.0m³	3,253	3,445	3,655	3,870	4,025	4,195
Domestic Average	2,741	2,905	3,080	3,265	3,395	3,530
Government						
Flat rate	3,618	3,870	4,140	4,430	4,622	4,890
Commercial						
Flat rate	3,933	4,210	4,503	4,820	5,060	5,310
Overall Average	3,250	3,465	3,690	3,933	4,113	4,300

Remark: 1USD$ = 9,006 kip date 17/06/2020

in 2020, overall average real tariff 1 m³ : 3,250 kip (0.361 USD$)

- 2021-2023, annual adjustments equate to 6%/annum for the domestic consumers, and 7%/annum for the government and commercial consumers. 2024-2025, 4%/annum for the domestic consumers, and 5%/annum for the government and commercial consumer.
- For the poorer sections of the community, who normally consume less than 7.0m³/month, the lifeline tariff block will rise from the existing 1,852 Kip/m³ 2019/2020 to just 2,385 Kip/m³ by 2025 (2023: 0.1215/m³).
- This will enable water bills to remain at less than 2% of the monthly household income for a poor family, well below the internationally accepted norm of 4-5% (minimum salary 1,300,000 kip/month)

4. Compare between actual tariff and the plan

Category	Kip/m³ 2020	Kip/m³ 2021	Kip/m³ 2022	Kip/m³ 6/2023
Domestic				
Plan average	2,741	2,905	3,080	3,265
Actual average	2,857	3,008	2,929	3,290
Government				
Plan average	3,618	3,870	4,140	4,890
Actual average	3,624	3,870	3,868	4,465
Commercial				
Plan average	3,933	4,210	4,503	4,820
Actual average	3,982	3,271	3,116	4,839
Overall plan average	3,250	3,465	3,690	3,935
Overall actual average	3,267	3,173	3,630	3,874
Overall actual/plan	101%	92%	98%	98%
% Actual tariff increasing year by year		-3%	14%	7%

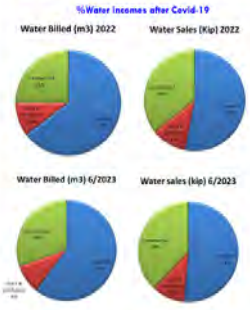
Remark: 1USD$ = 17,220 kip date 30/12/2022
In 2022, overall average real tariff 1 m³ : 3,630 kip (0.211 USD$)
1USD$ = 18,231 kip date 14/06/2023
In 6/2023, overall average real tariff 1 m³ : 3,874 kip (0.212 USD$)

- 2020-2021 the tariff level was the same as 2015, in the table actual tariff average was decreasing -3% and 92% compare to plan because during covid-19 pandemic
- Sine December, 2021, provincial government had allowed water tariff adjustment 2021-2025, the actual water tariff has increasing year by year, 2022/2021 was 14% and estimating 7% of 2023/2022
- However, the actual tariff average is not meet the plan (98%), continuing effected since covid-19, Ukraine war, energy and inflation crisis...

5. The lessons learned from this differentiation of plan & actual

- Graph 2019, before Covid-19 non-household water consumptions was highest tariff level (40%) had generated income 48%, while household water consumption was 60% but generate income only 52%, the main incomes is depends on non-household sector
- Why we cannot meet the plan? during Covid-19, the number of tourists dropped huge impact on water demand, the sales volume in 2020, 2021 had drop to the same level as 2017, graph 2021non-household consumptions was dropped to 33% (38%), household consumed up to 67% but generated incomes 62%
- The incomes from non-household had dropped 10%

5. The lessons learned from this differentiation of plan & actual



- After Covid-19, although in 2022 the sales volume had increased to be close to 2018
- In graph 2022, the water sales of non-households was significant increasing to 47%, household was 52% (close to before Covid-19)
- Water sales data for 6 months 2023 of non-households sector is increasing to 39% (49%) (the share is equal to2019), the estimated amount of water billed in 2023 is likely to slightly exceed 2019.
- However, the water sales of 2023 is still 23% below the plan
- Currently, operating costs have increased as electricity 138%, fuel 86%, chemicals 32%, inflation 42.02% (USD), we need to review and update corporate plan and water tariff as soon as possible

6. Challenges of NLPB's need to improvements

- **External factors**
  - It is the economic policy in the response of the major powers in the world, economic competition, the fluctuation of the dollar in the world market, the price of fuel in the world market, which may have a negative impact on economy of the Lao PDR.
  - The government's policies in reforming state-owned enterprises.
- **Internal factors**
  - To review and update corporate plan and new water tariff adjustment as soon as possible
  - The reform program is aimed at improving efficiency, transparency, accountability and of course our sustainable operation
  - We expect the staff per connections ratio to decrease to around 5.7 due to improvements in efficiency.
  - NRW reduction, NRW is relatively high (currently 27% as the plan is 23%) due to old, small pipelines in high pressure systems and improper operation and maintenance of the network.


Thank you so much for your attention
ARIGATO GOSAIMASU
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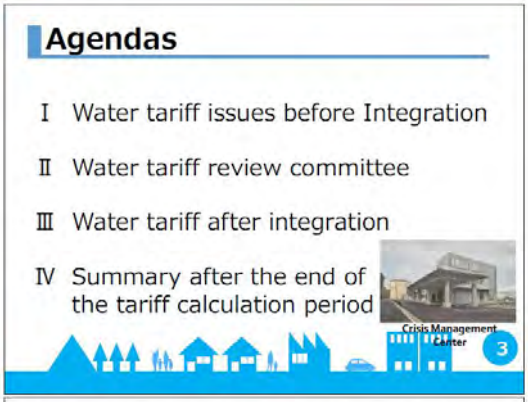
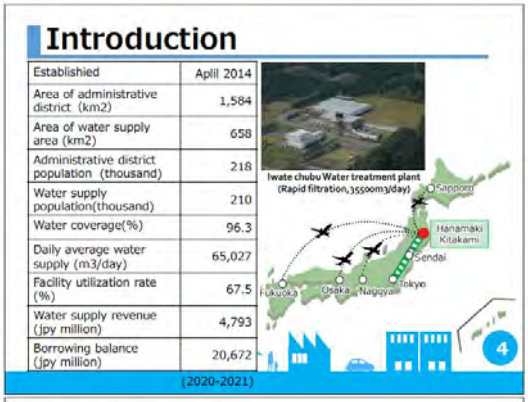
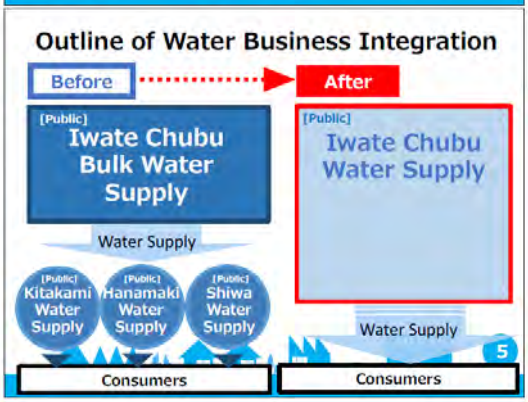
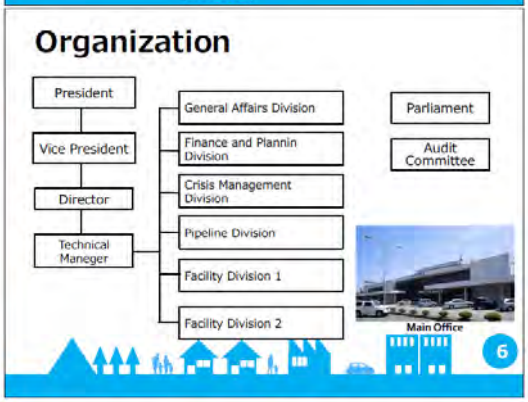
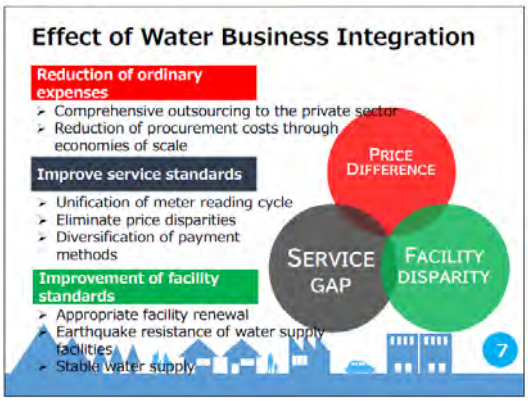
11-4-11 Day 2: Unification of water tariff in the water business integration (Iwate Chubu Water Supply)

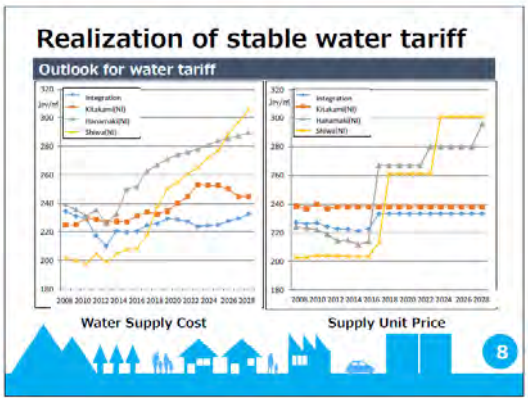












Improve service standards

Diversification of payment methods

	Kitakami	Hanamaki	Shiwa	Integration
Open on holidays	Sat Sun	×	×	Sat
Credit payment	○	×	×	○
Number of banks	8	7	8	12

Water tariff

	Kitakami	Hanamaki	Shiwa	Integration
tariff structure	By diameter	By usage	By usage	By diameter
Minimum usage	0m3	Household 8 m3 Business 10m3	Household 8 m3 Business 10m3	0m3
Volume tariff	Gradual increase	Flat rate	Flat rate	Gradual increase
Supply cost (jpy/m3)	234	234	222	217
Unit price (jpy/m3)	238	213	204	228

9

Improvement of facility standards

Overview of Ministry of Health, Labor and Welfare (MHLW) subsidized projects

- Planning Period
  2011-2020
- Investment Amount
  Integration-related investment
  13,992 million jpy
  Facility renewal investment
  15,861 million jpy
  Total 29,853 million jpy
- Financial Resources
  Subsidy from MHLW 9,951 million jpy
  Investment from municipalities 5,556 million jpy
  Debt and funds 14,346 million jpy

Image diagram of water supply widening project

10

Without appropriate investment

11

I
Water tariff issues before Integration

Tenshochi (Row of cherry trees)

Process leading to tariff unification

April 2002	Proposals at the public corporate council
January 2004 -March 2006	A committee to consider how the water supply business should be in the Iwate Chubu Region
March 2006	Submission of committee reports
March 2009 -March 2010	Formulation of Regional Water Supply Vision
March 2011	Formulation of basic concept
October 2011	Conclusion of an agreement document between the mayors of the constituent municipalities
February 2012	Formulation of a business plan for water supply business integration
December 2012 -February 2013	Water tariff review committee
May-June 2013	Briefing session for water supply users
February 2014	Resolution of the Water Supply Ordinance
March 2014	License for water supply business

Water tariff before integration

	Kitakami	Hanamaki	Shiwa
Tariff structure	By diameter	By usage	By usage
Usage category	General Public bath Temporary	Household Business Business 2nd Public bath Temporary	Household Business Factory Public bath Temporary
Volume tariff	Gradual increase	Flat rate	Flat rate
Minimum usage	0 m3	Household: 8 m3 Business : 10m3 Business 2nd:100m3 Public bath:0m3	Household: 8 m3 Business : 10m3 Factory: 10m3 Public bath:200m3
Unit price	239 jpy/m3	213 jpy/m3	205 jpy/m3
Final revision	1998	2010	1992

14

Basic tariff

Meter Caliber (minimum usage)	Kitakami	Hanamaki		Shiwa	
	General (0㎥)	Household (8㎥)	Business (10㎥)	Household (8㎥)	Business (10㎥)
Φ13	700	1,417	2,349	1,430	2,270
Φ20	1,000	1,515	2,447	1,500	2,340
Φ25	1,300	1,612	2,544	1,520	2,360
Φ30	2,500	1,709	2,641	1,640	2,480
Φ40	3,300	1,903	2,835	1,740	2,820
Φ50	6,700	3,165	4,097	2,820	3,660
Φ75	15,100	–	4,771	3,120	3,960
Φ100	27,100	–	5,748	–	
Φ150	60,300	–		–	

(JPY)

Volume tariff

Amount of water used	Kitakami		Hanamaki		Shiwa	
	General					
	Under Φ25	Over Φ30	House hold	Business	House hold	Business
1~10㎥	135					
11~20㎥	165	205				
21~30㎥	205		180	238	180	240
31~50㎥	250					
51㎥~	275					

Issues associated with the unification of water tariff

Ⅰ Difference in supply unit price

Max 239 JPY Min 205 JPY

Ⅱ Difference in tariff structure

Since the Water tariff is divided into usage purpose-based tariff and diameter-based tariff, there are users whose price increases greatly exceed the average revision rate.

Ⅲ Minimum Usage

Affects many users depending on whether it is set or not.

Ⅳ Basic tariff for large diameter users

There is a difference of 2 to 4.8 times for users with a caliber of φ50 or more

Ⅴ Water Use at "Public Bath"

The tariff difference is too large, and the applicable criteria are vague

17

Ⅱ Water tariff review committee

Summer festival(fire works)

Water tariff review committee

Ⅰ Committee composition

Academic Expert 2 (Accountant, Water Business Advisor)
Water User 6

Ⅱ Basic concept

①Ideal Price
⇒Easy to explain theoretically
②Easy to understand
⇒tariff classification is not complicated
③Consideration for consumers
⇒Cheaper for domestic use
④Set a low increments
⇒Avoid placing an undue burden on large-scale customers

19

Water tariff review committee

Ⅲ Calculation period

5 years

Ⅳ Estimated maintenance cost (capital reward)

Desirable to include it as an expense

Ⅴ tariff Structure

	Tariff Structure	Minimum Usage	Volume tariff
Plan A	By diameter	Non	Gradual increase
Plan B	By diameter	Non	Flat Rate (gradual increase by diameter)
Plan C	By diameter	Set	Flat Rate (gradual increase by diameter)

Plan A with a small price increase rate for consumers is desirable

Communication with water users

Ⅰ Briefing on integration

Briefing sessions were held for each community center in the region. (Total 58 locations)

・Current status and issues of water supply business
・Benefits of integration

Ⅱ PR Paper

Estimated cost of facility renewal

Prospects for Population and Water Tariff Income

7.8km / 932km

0.84%
119year

Ⅲ Water tariff after integration

Shishiodori (folk performing arts)

Integrated Water tariff ① [Basic tariff]

Caliber	Kitakami	Hanamaki		Shiwa		Integrated
	General	House hold	Business	House hold	Business	General
Φ13	700	1,417	2,349	1,430	2,270	700
Φ20	1,000	1,515	2,447	1,500	2,340	1,000
Φ25	1,300	1,612	2,544	1,520	2,360	1,200
Φ30	2,500	1,709	2,641	1,640	2,480	2,400
Φ40	3,300	1,903	2,835	1,740	2,820	3,200
Φ50	6,700	3,165	4,097	2,820	3,660	6,200
Φ75	15,100	–	4,771	3,120	3,960	14,400
Φ100	27,100	–	5,748	–		26,300
Φ150	60,300	–		–		53,700

24

Integrated Water tariff ② [Volume tariff]

	Kitakami		Hanamaki		Shiwa		Integrated
	General						
	Under Φ25	Over Φ30	House hold	Busin ess	House hold	Busin ess	General
1~10㎥	135	205	180	238	180	240	120
11~20㎥	165						175
21~30㎥	205						210
31~50㎥	250	250					240
51㎥~	275	275					260

25

Example of Revision Rate ① [Household use φ20]

Revision Rate (%)

V(m3)	Kitakami	Hanamaki	Shiwa
0	100	66	67
1	100	75	75
2	99	83	84
3	99	92	93
4	99	100	101
5	99	109	110
6	98	117	119
7	98	126	127
8	98	135	136
9	98	128	129
10	98	123	124
15	98	112	112
20	98	106	107
30	98	108	108
40	96	113	113
50	95	116	116

Number of water tariff (/month)

V(m3)	Kitakami	Hanamaki	Shiwa
0	664	682	193
1	478	363	113
2	552	355	108
3	757	443	129
4	889	552	151
5	924	652	183
6	934	674	205
7	906	687	188
8	864	806	226
9	859	718	210
10	862	737	205
11~20	8,039	7,447	2,852
21~30	4,230	4,427	1,859
31~40	1,354	1,714	669
41~50	355	510	210
51~	158	223	89

Average revision rate
Kitakami 96.8% Hanamaki 107.5% Shiwa 111.8%

26

Example of Revision Rate ② [Business use]

Revision Rate (%)

Caliber	V(m3)	Kitakami	Hanamaki	Shiwa
50	0	93	151	169
	10	94	200	224
	100	94	117	118
	1,000	95	110	109
	2,000	95	110	109
	3,000	95	110	109
75	0	95	290	364
	10	96	330	414
	100	95	144	149
	1,000	95	113	113
	2,000	95	111	110
	3,000	95	111	110
	5,000	95	110	109

Number of water tariff (/month)

V(m3)	Kitakami	Hanamaki	Shiwa
0	1	3	3
1~10	8	11	5
11~100	61	60	13
101~1,000	70	94	19
1,001~2,000			
2,001~3,000			
3,001~			
0	1	2	1
1~10	2	1	0
11~100	9	5	5
101~1,000	33	31	6
1,001~2,000			
2,001~3,000			
3,001~			

Sudden change mitigation measures

Ⅰ Outline measures
Compare the tariffs before and after the revision, and gradually bring them closer to the new tariffs by 1/5 every year.

Ⅱ Amount of financial impact
▲337 million jpy
(2014-2018 cumulative)

Ⅲ Effect
(1) Guarantee of fairness of burden
(2) Avoidance of sudden price increases/decreases
(3) Construction of a simple tariff structure
(4) Responding to changes in social conditions

Information Session for Users

28

Ⅳ Summary after the end of the tariff calculation period

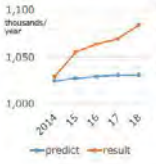
GETO highland (Snow Resort)

Michinoku Folk Village (Outdoor Museum)

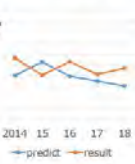
Summary after the end of the Water tariff calculation period

Ⅰ Comparison with water demand forecast

Number of water users



Revenue water

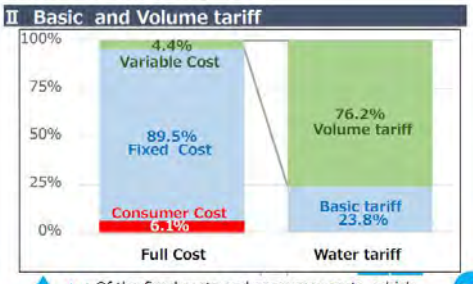


Water supply revenue

30

Summary after the end of the Water tariff calculation period

Ⅱ Basic and Volume tariff



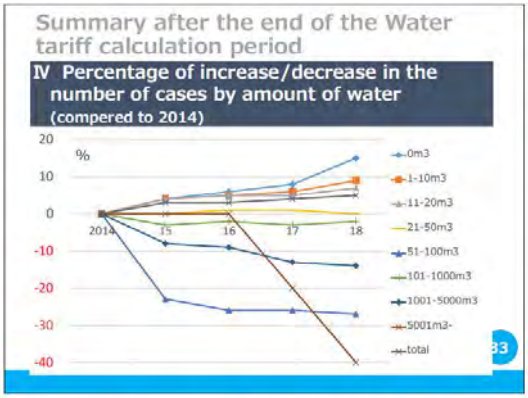
Of the fixed costs and consumer costs, which account for more than 90% of the total cost, only **23.8%** are recovered by basic tariffs

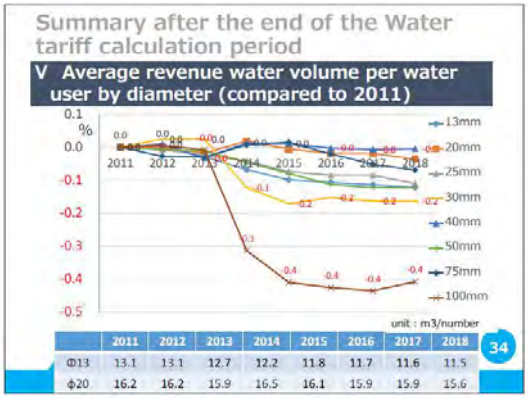
31

Summary after the end of the Water tariff calculation period

Ⅲ Supply unit price by diameter

Caliber	Average Unit Price
Φ13	214 jpy/m3
Φ20	219
Φ25	232
Φ30	263
Φ40	264
Φ50	272
Φ75	282
Φ100	286
Φ150	326
Average	229
Supply Cost :	210


Summary after the end of the Water tariff calculation period
Ⅳ Percentage of increase/decrease in the number of cases by amount of water (compered to 2014)
%
20
10
0
-10
-20
-30
-40
2014
15
16
17
18
0m3
1-10m3
11-20m3
21-50m3
51-100m3
101-1000m3
1001-5000m3
5001m3-
total
33

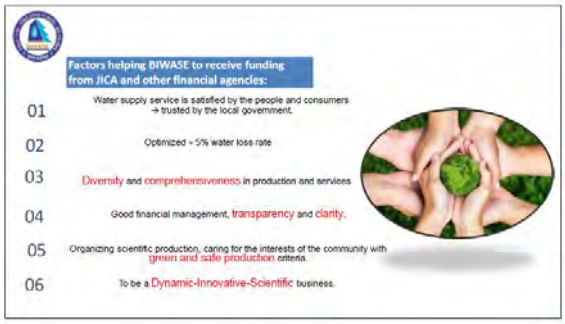

Summary after the end of the Water tariff calculation period
Ⅴ Average revenue water volume per water user by diameter (compared to 2011)
%
0.1
0.0
-0.1
-0.2
-0.3
-0.4
-0.5
2011
2012
2013
2014
2015
2016
2017
2018
13mm
20mm
25mm
30mm
40mm
50mm
75mm
100mm
unit : m3/number
2011 2012 2013 2014 2015 2016 2017 2018
Φ13 13.1 13.1 12.7 12.2 11.8 11.7 11.6 11.5
φ20 16.2 16.2 15.9 16.5 16.1 15.9 15.9 15.6
34


Founding Celemony
Water Festival
Minister of Internal Affairs and Communications Commendation
JICA Seminar
Resident Seminar
Water resource cultivation tree planting
Thank you for your attention
Iwate Chubu Water Supply

11-4-12 Day 2: SUSTAINABLE DEVELOPMENT GOALS – SDGS (BIWASE)

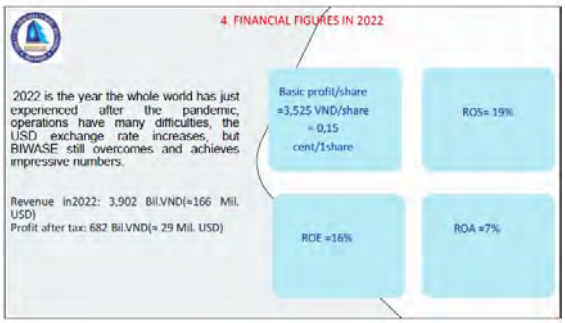

2. THE EQUITIZATION PERIOD 2015-2016
2015-2016: Marking the transformation from SOE to JSC
In September 2016, the company completed the equitization procedures, officially transformed into a joint stock company with charter capital of VND 1,500 billion ~ $ 75 million.
Current market capitalization: VND 2,506 billion ~ $ 106.5
In July 2017, BIWASE stock was officially listed on HOSE with stock code BWE.


From its previous relationships and reputation, BIWASE has continuously received capital support from JICA and ADB through unsecured loan contracts worth USD 16 million signed on November 17, 2020 and USD 20 million signed on November 17, 2020. December 9, 2022. By this money + accumulated money, BIWASE invested to increase capacity of Tan Hiep WTP to 100,000m³/day, serving Binh Duong new city and the urban cluster of joint ventures between Tokyu - Becamex.


Factors helping BIWASE to receive funding from JICA and other financial agencies:
01 Water supply service is satisfied by the people and consumers → trusted by the local government.
02 Optimized ~ 5% water loss rate
03 Diversity and comprehensiveness in production and services
04 Good financial management, transparency and clarity.
05 Organizing scientific production, caring for the interests of the community with green and safe production criteria.
06 To be a Dynamic-Innovative-Scientific business.

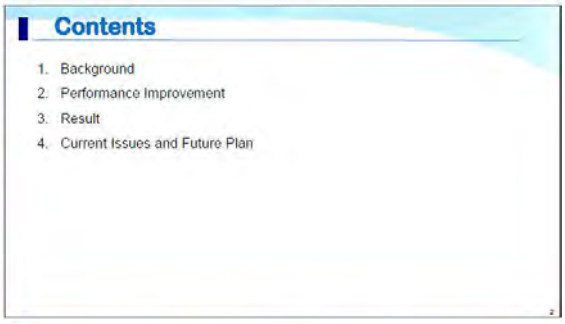

The ways BIWASE grows its water service
01 Customer service is an important part of business. It is necessary to be responsible for quantity and quality of products to ensure health of consumers.
02 In rural areas, population density + income of resident are lower than the ones of urban residents, if utility services are provided, people have less difficult living.
03 However, the countryside is being developed more and more, population will be quick increased → it is an opportunity, although not fast, but will come.
04 If we do a good job of providing clean water in urban areas, industrial zones, rural areas, in terms of state management, local government will be pleased .... → create prestige in local authorities + with donors, because we also care about supplying clean water to poor and rural households → create prestige in the eyes of donors.

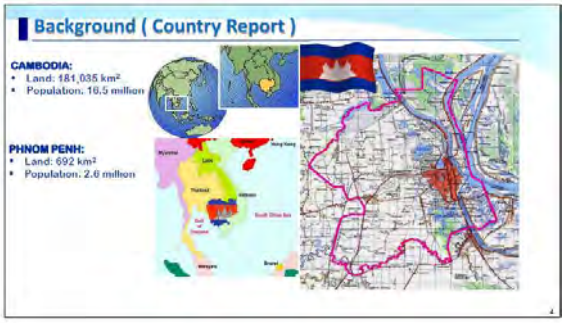

3. CURRENT SITUATION
BIWASE is currently listed on HOSE with stock code BWE.
Charter capital: 1,929 Bil. VND~ 82 Mil. USD
Currently, BIWASE's market capitalization is ~ 90,000 Bil. VND≈3.874 Bil.USD
JFE - an investor from Japan is one of the important investors of BIWASE, owns 3.5% of charter capital.
BIWASE and JFE signed a long-term cooperation agreement, focusing on sharing scientific and technical knowledge, investment and consulting in the environmental field.
→This cooperation has brought significant benefits to both sides.

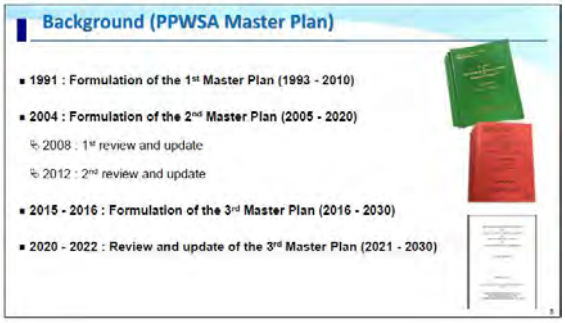

4. FINANCIAL FIGURES IN 2022
2022 is the year the whole world has just experienced after the pandemic, operations have many difficulties, the USD exchange rate increases, but BIWASE still overcomes and achieves impressive numbers.
Revenue in2022: 3,902 Bil.VND(≈166 Mil. USD)
Profit after tax: 682 Bil.VND(≈ 29 Mil. USD)
Basic profit/share ≈3,525 VND/share ≈ 0,15 cent/1share
ROS≈ 19%
ROE ≈16%
ROA ≈7%


BINH DUONG WATER-ENVIRONMENT CORPORATION-JSC.
BIWASE
We are ready to share our experience with you in seeking investment capital from JICA.
Contact:
Email:
Address:
Tel:

11-4-13 Day 2: PPWSA: Sustainable Water Service in Phnom Penh (PPWSA)

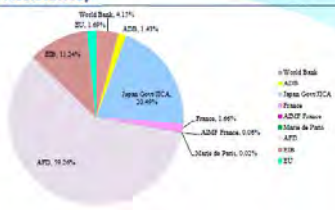






Background(External Assistance)

- 1993, received International Assistances for reconstruction & development
- Government gave high priority to Water Supply



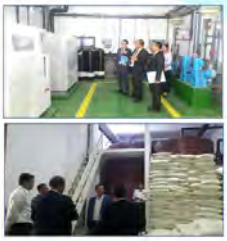
Total Grant : approx. USD 183 M
Total Loan : approx. USD 707M

Performance Improvement

Performance Improvement (Management of Water Production)

1) Innovation in Production Line

- Jul 2012 : PAC was used to replace alum and lime, reducing production cost.
- Jun 2016 : Mordernization of the treatment system using Sodium Hypochlorite System at Phum Prek WTP where chlorine gas was replaced by liquid chlorine, aimed to reduce risks in using gas chlorine, and production cost (saved USD0.0007 per cubic meter)



Performance Improvement (Management of Water Production)

2) Energy Saving

Solar Panel in Phum Prek WTP with 770 kW (Japanse Grant Aid

Solar Panel in Bakheng WTP with 6.7 MW AFD Loan

Performance Improvement (Management of Water Production)

3) Applied Technology

Monitoring System (SCADA, KIS & Sense Water)

Performance Improvement (Water Quality)

4) Water Quality Management

- ✓ Setting up labs at all WTPs with daily control of water quality
- ✓ Tested in WTPs and along the network
- ✓ Complying with WHO & NWDQS
- ✓ Requesting for MISTI's accredition for the labs
- ✓ Set up ISO/IEC 17025 for Laboratory

Performance Improvement (Network Improvement)

5) Pipe Replacement and Expansion Program

- **Urgent rehabilitation of old cast-iron pipe of 288km**
  - Phase 1: 1994-1995
  - Phase 2: 1997-1999
- **Where to replace the pipes**
  - Start from the area nearest to water treatment plants
  - Area of most leakages
  - Extension to suburban areas in the last stage
- **Laying of pipes**
  - Standardization from house connection to transmission pipe
  - Pipes up to DN2000 are laid by PPWSA skilled staff and workers
  - Staff capacity building
  - Established the SOP
  - Incentive for good result and penalty for bad intention

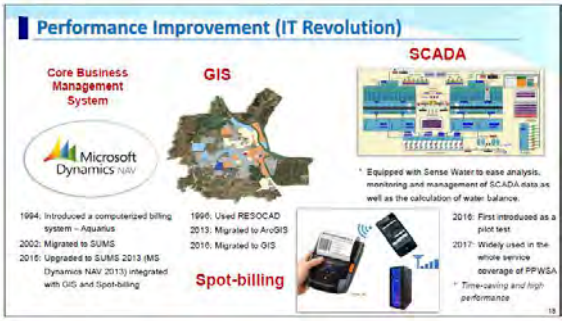
Performance Improvement (NRW Reduction)

6) NRW Reduction Program

- Effective leak repair
- Updating customer base
- Metering of all service connections
- Fight against illegal connections
- Standardized design of last mile service connection
- District Metering Area (DMA) program
- Introduction of internal service contracts
- Set up the Water Loss Control Committee

DMA Total = 108 Locations

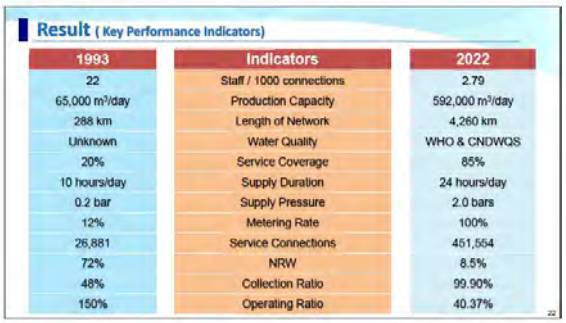

Performance Improvement (Asset maintenance)
7) Water Network Maintenance Program
Set up SOP introduced by JICA experts.
Fixed the schedule of routine maintenance for all network facilities: valves, air valves, district meters, etc.
Created the check sheets for all distribution facilities.
Created taskforces to perform the maintenance.
Incentive for good result and penalty for bad intention.

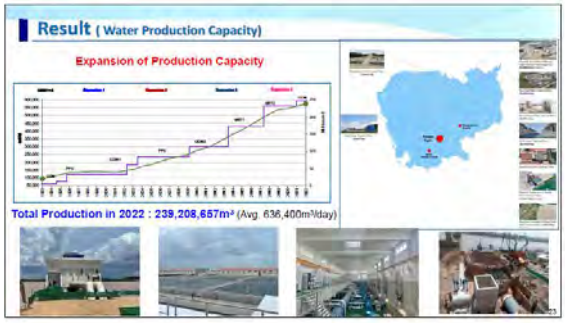

Performance Improvement (IT Revolution)
Core Business Management System
Microsoft Dynamics NAV
GIS
SCADA
1994: Introduced a computerized billing system – Aquarius
2002: Migrated to SUMS
2016: Upgraded to SUMS 2013 (MS Dynamics NAV 2013) integrated with GIS and Spot-billing
1996: Used RESOCAD
2013: Migrated to ArcGIS
2016: Migrated to GIS
Spot-billing
2016: First introduced as a pilot test
2017: Widely used in the whole service coverage of PPWSA
Time-saving and high performance

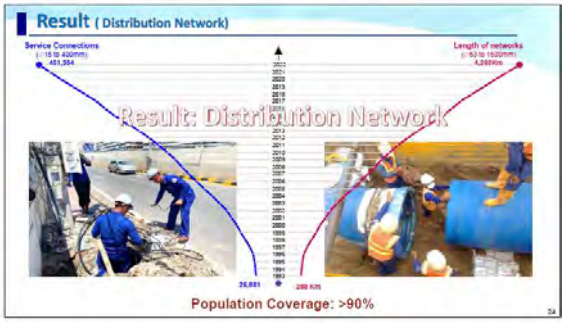

Performance Improvement (HR Improvement)
Comprehensive Human Resources Policy based on the five following pillars : Detect, Recruit, Train, Motivate and Replace
Detect
Recruit
Train
Motivate
Replace


Performance Improvement (Social Responsibilities)
Water for All
1999: Commencement
Installment payment: 10, 15 and 20 months
Subsidy: 30%, 50%, 70% and 100% of HC fee
Total subsidy: USD1.81M
145 communities
Total low-income conn. by 2022: 39,745
Water Supply to Tenant Workers & Students
1999: Commencement
4,790 landlords with 108,836 rented rooms
Approx. 0.5M tenant workers and students
Standpipe Water Supply
2015: Commencement
Tariff: KHR500/m³
16 standpipes
Others
Water supply to boundary soldiers
Humanitarian aid: Red Cross, Emergency
Public infrastructure: schools, roads, wells
Educating poor students
PPWSA staff rescue
etc.


Result

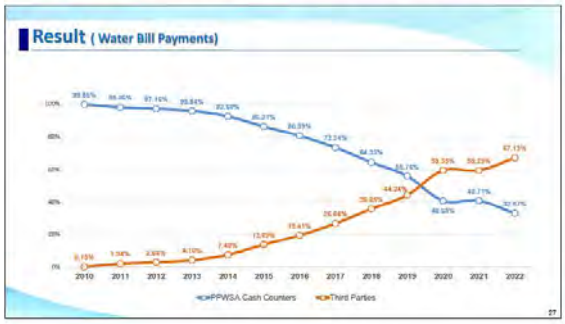

Result (Key Performance Indicators)
1993 | Indicators | 2022
22 | Staff / 1000 connections | 2.79
65,000 m³/day | Production Capacity | 592,000 m³/day
288 km | Length of Network | 4,260 km
Unknown | Water Quality | WHO & CNDWQS
20% | Service Coverage | 85%
10 hours/day | Supply Duration | 24 hours/day
0.2 bar | Supply Pressure | 2.0 bars
12% | Metering Rate | 100%
26,881 | Service Connections | 451,554
72% | NRW | 8.5%
48% | Collection Ratio | 99.90%
150% | Operating Ratio | 40.37%

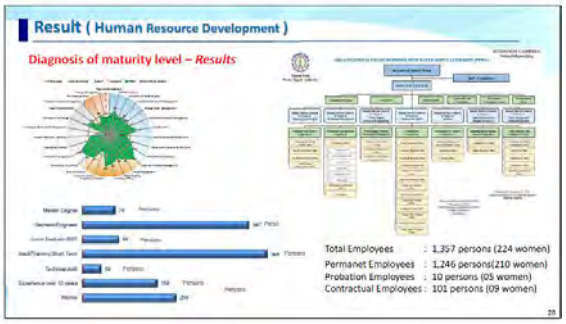

Result (Water Production Capacity)
Expansion of Production Capacity
Total Production in 2022 : 239,208,657m³ (Avg 636,400m³/day)


Result (Distribution Network)
Result: Distribution Network
Population Coverage: >90%


Result (Non-Revenue of Water)


Result (Financial Status)

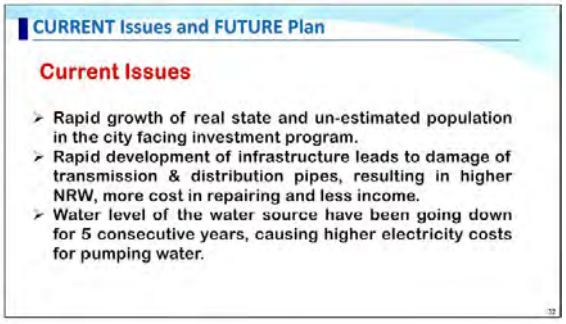

Result (Water Bill Payments)
PPWSA Cash Counters
Third Parties


Result (Human Resource Development)
Diagnosis of maturity level – Results
Total Employees : 1,357 persons (224 women)
Permanet Employees : 1,246 persons(210 women)
Probation Employees : 10 persons (05 women)
Contractual Employees : 101 persons (09 women)


Result (Water for All)
The low-income

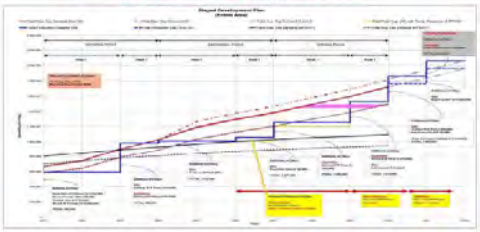

International Cooperation
National Water Supply
(Capacity Building to 8 Provincial Capital)
International Water Supply
JICA


Current Issues
and Future Plan


CURRENT Issues and FUTURE Plan
Current Issues
Rapid growth of real state and un-estimated population in the city facing investment program.
Rapid development of infrastructure leads to damage of transmission & distribution pipes, resulting in higher NRW, more cost in repairing and less income.
Water level of the water source have been going down for 5 consecutive years, causing higher electricity costs for pumping water.

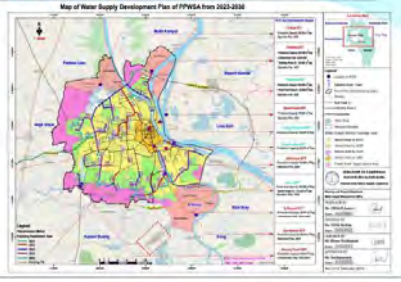
CURRENT Issues and Future Plan

Planning of Expansion of Water Production



CURRENT Issues and FUTURE Plan

- Expasion of Water Production to meet the required water demand
- Expansion of Water Service to all the districts inside the boundary of Phnom Penh City and Takmoa City
- Set up monitoring control system to manage water supply and reduce water loss.
- Synchronize water transmission mains to all the water treatment plants.



CURRENT Issues and FUTURE Plan

New Generation
Digital Transformation

Target

Making Ground Framework for strategically managing to meet the rapid development of the facilities and organization for sustainable of water supply system to the citizen in the city of Phnom Penh.

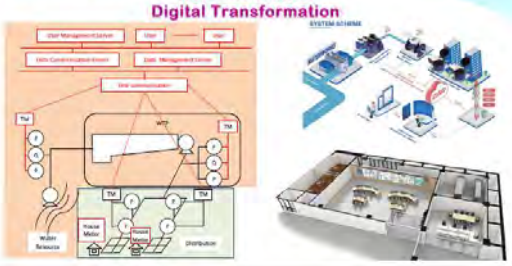
The Impact of Digital Transformation

- ✓ Cross-sectional management of production processes, management processes, and human resources, and increase organizational efficiency by utilizing funds and human resources with responsiveness
- ✓ Maturation of management system
- ✓ Improving of Operation Ratio and reduction of NRW.
- ✓ Reliable on the management and controlling of the water supply system

→ Improving Profit Margins + Eco City

CURRENT Issues and FUTURE Plan

New Generation
Digital Transformation



CURRENT Issues and FUTURE Plan

Intergrated Control Center

4x District Operation Center

Domestic Smart Water Meter

District Operation Center

- Reducing water leakage and NRW and saving O&M costs through the systematic operation management
- The SWMS supports enhancing systematic operation management to reduce leakage rate, prevent illegal water connections, and save O&M costs
- The system enables to improve water reliability and contributes to economic development
- Stable provision of high-quality tap water can improve residents' convenience and living quality.
- It prevents waterborne epidemics and improves residents' public health through water quality management.
- Investment in establishing the SWMS develops the practical value of the area benefiting from the water supply facilities.
- Cooperative relationship between Cambodia and Korea through Korea's technology transfer on the SWMS and capacity building on reducing NRW.

Classification	Period	Korea	Cambodia	Total
Phase1 (Grant)	2024-26	11.6695		11.6695
Phase2 (Loan)	2024-27	37.0165	4.4695	41.4855

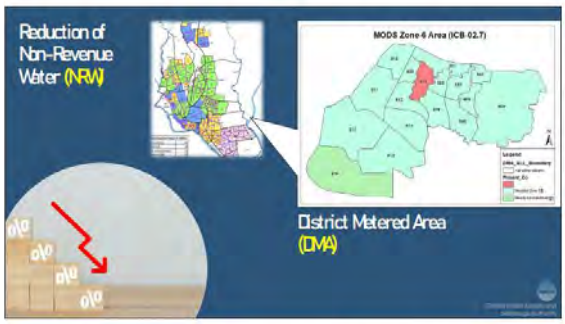
11-4-14 Day 2: Reform towards a Bankable Water Utility: "Dhaka WASA Turnaround Program" (DWASA)

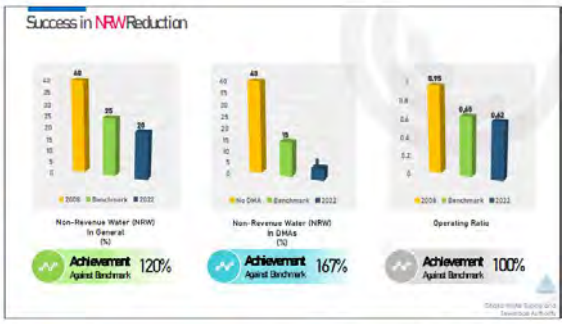

Water Operator Partnership
Vitens Evides International
K water
Kathmandu Upatyaka Khanepani Limited
BUDAPEST WATERWORKS
IHE DELFT
MWA


Development Partners
ADB
KFW
AFD
AIIB


Non-Revenue Water Sources & Reasons
Technical Loss
Commercial Error
Lack of Market Spread
Water Theft
Leakage


Approach in Reducing NRW
100% Billing
Strict Monitoring against Water Theft
Introducing District Metered Area (DMA)
Online Billing
Sustainable Pipe Materials and Joints
Bringing the Low-Income Community under Legal Water Connection

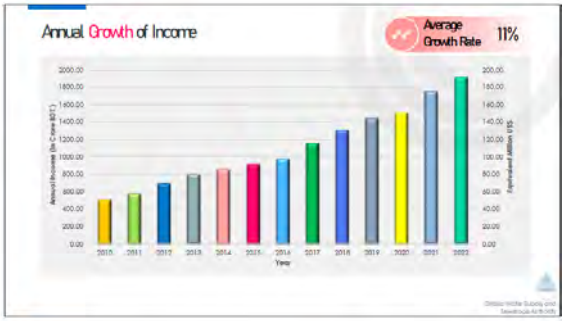

Reduction of Non-Revenue Water (NRW)
MODS Zone-6 Area (ICB-02.7)
District Metered Area (DMA)


Success in NRW Reduction
Achievement Against Benchmark 120%
Achievement Against Benchmark 167%
Achievement Against Benchmark 100%

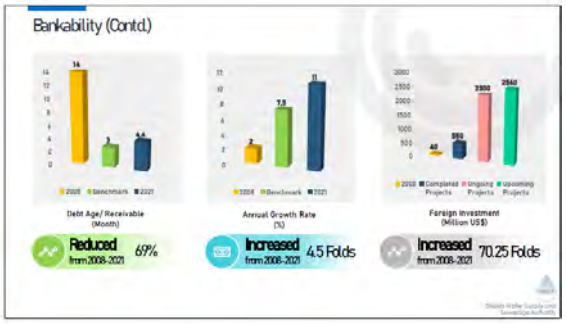

Ensuring Legal & Billed Connection to Low Income Community (LIC)
6 CLEAN WATER AND SANITATION


Water ATM
Safe drinking water for all
Easily Accessible Drinkable Water
Card Punching System
One Stop Service
Extremely Cheap

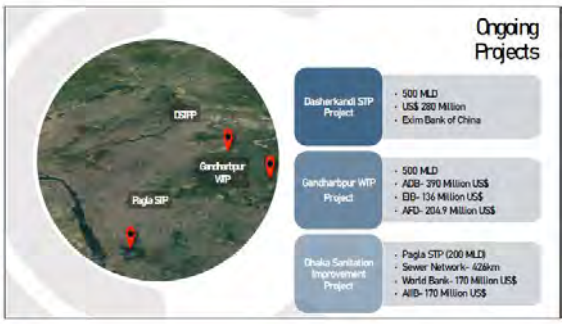

Financial Management
Strong Auditing (External & Internal)
Proper Supply Chain Management
Electronic Financial Governance
Appropriate Budgeting & Monitoring
Financial Expenditure Monitoring & Controlling

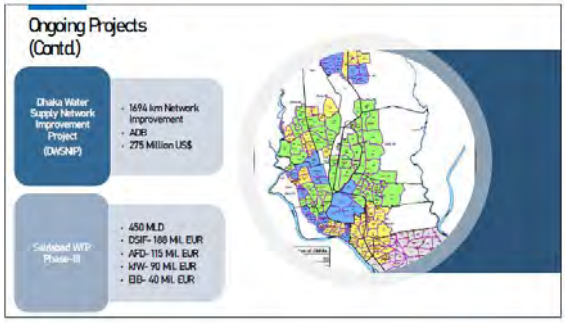

Annual Growth of Income
Average Growth Rate 11%


Bankability (Contd.)
ROCE (Return on Capital Employed) (%)
Increased from 2017 1.6 Folds
Current Ratio Current Assets/ Current Liabilities
Increased from 2017 3.4%

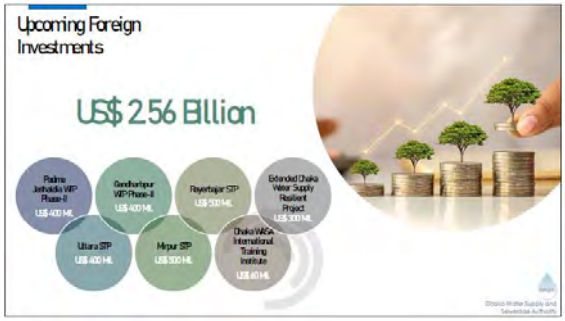

Bankability (Contd.)
Debt Age/ Receivable (Month)
Reduced from 2008-2021 69%
Annual Growth Rate (%)
Increased from 2008-2021 4.5 Folds
Foreign Investment (Million US$)
Increased from 2008-2021 70.25 Folds


Bankability
"Dhaka WASA is converted from a dysfunctional utility to one of South Asia's best public water utilities"
-Asian Development Bank (ADB)
Dhaka WASA has turned itself around from a financially unsustainable utility to a Bankable Organization.
HE Sheikh Hasina
Honorable Prime Minister of the People's Republic of Bangladesh


Ongoing Projects
DSTP
Gendaripur WTP
Pagla STP
Dasherkandi STP Project
500 MLD
US$ 280 Million
Exim Bank of China
Gendaripur WTP Project
500 MLD
ADB- 390 Million US$
EIB- 136 Million US$
AFD- 204.9 Million US$
Dhaka Sanitation Improvement Project
Pagla STP (200 MLD)
Sewer Network- 426km
World Bank- 170 Million US$
AIIB- 170 Million US$

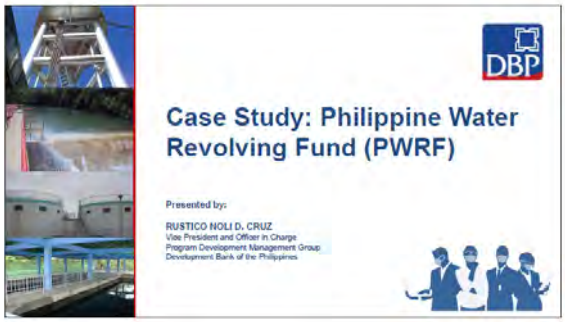

Ongoing Projects (Contd.)
Dhaka Water Supply Network Improvement Project (DWSNIP)
1694 km Network Improvement
ADB
275 Million US$
Saidabad WTP Phase-III
450 MLD
DSIF- 188 Mil. EUR
AFD- 115 Mil. EUR
KfW- 90 Mil. EUR
EIB- 40 Mil. EUR

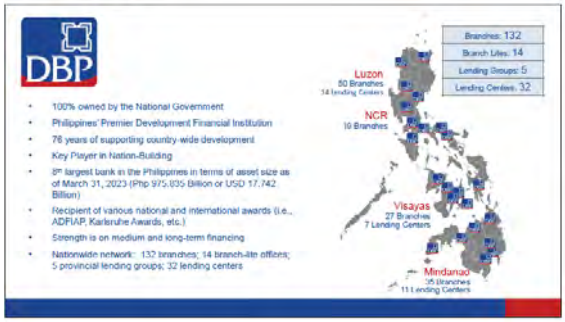

Upcoming Projects
Padma Jashodal WTP Phase-II (400 MLD)
Gendaripur WTP Phase-II (500 MLD)
Rayerbajar STP (200 MLD)
Dhaka WASA International Training Institute
Uttara STP (200 MLD)
Mirpur STP (200 MLD)
Extended Dhaka Water Supply Resilient Project

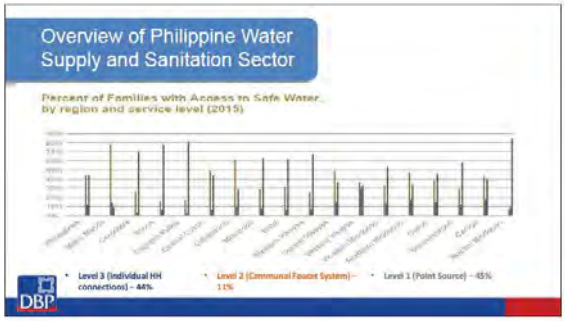

Upcoming Foreign Investments
US$ 2.56 Billion
Padma Jeheklia WTP Phase-II
US$ 400 ML
Gandharipur WTP Phase-II
US$ 400 ML
Rayerbajar STP
US$ 500 ML
Extended Dhaka Water Supply Project
US$ 300 ML
Uttara STP
US$ 400 ML
Mirpur STP
US$ 500 ML
Dhaka WASA International Training Institute
US$ 60 ML

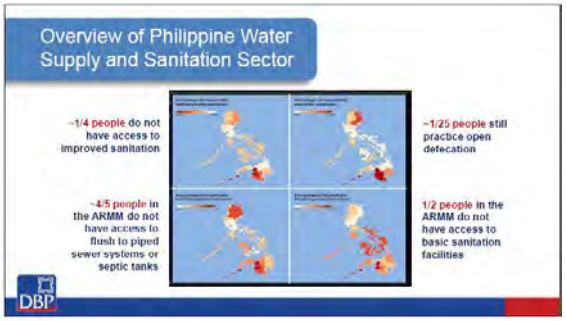

THANK YOU

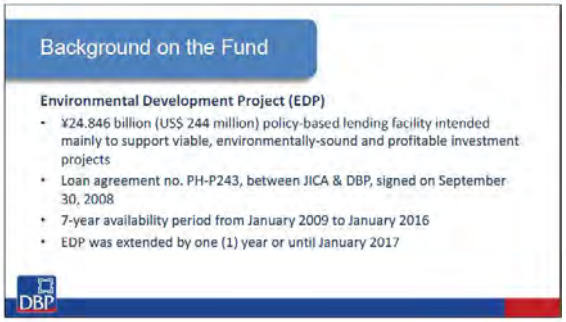
11-4-15 Day 2: Case Study: Philippine Water Revolving Fund (PWRF) (DBP)







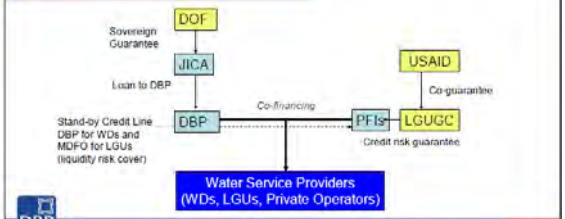




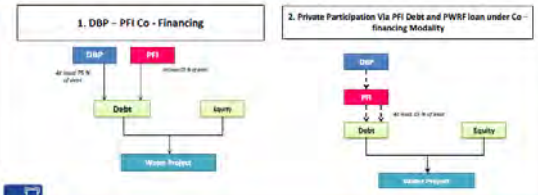
PWRF Context

- Millennium Development Goals for Water Supply and Sanitation – Gaps on service provision and funding
- Executive Order No. 279 – Government Financing Policy – Leveraging Public Fund with Private Fund to mobilize additional resources
- Clean Water for People Initiative – U.S. Government and Government of Japan collaboration for MDG targets

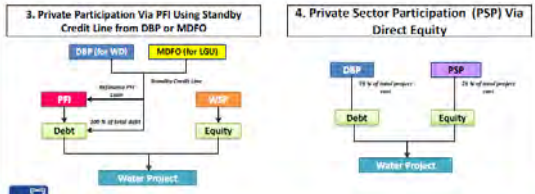
PWRF Design



PWRF Modalities



PWRF Modalities



Projects Funded and Impact

- Water abstraction or extraction for water supply
- Water supply transmission and distribution
- Water supply treatment
- NRW reduction
- Expansion, improvement/rehabilitation of existing water supply systems
- Development of Sanitation services/facilities
- Collection, treatment and disposal of wastewater

Projects Funded and Impact

- At project close, PWRF total loan amount reached USD 75 million. Project impact are as follows:

Operation Indicators	Target	Actual
Increased Water Production (m^3/year)	247,014,080	118,155,160.18
Pipe Network / Rehabilitated / Improved / Replaced / Installed (meters)	1,932,945	1,872,790.10
Effect Indicators	**Target**	**Actual**
Increased in Service Connection	409,473	324,560
Reduction of Non-Revenue Water (%)	17 (average)	26 (average)
Water Conserved from NRW (m^3)	5,909,064	9,640,084.47

Challenges and Opportunities

Challenges
- Building DBP and PFI Partnership
- Competition from GFIs
- LWUA Issues
  - ✓ Financing waivers
  - ✓ Direct competition

Opportunities
- Keen interest of PFIs
- WSPs growing interest on PFIs
- Liquid market
- Low interest rate regime
- Basic need for water supply

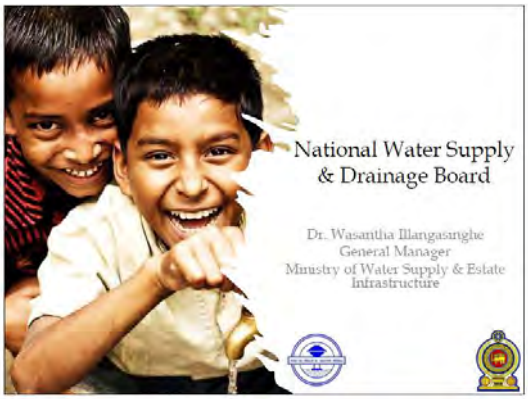
Lessons Learned

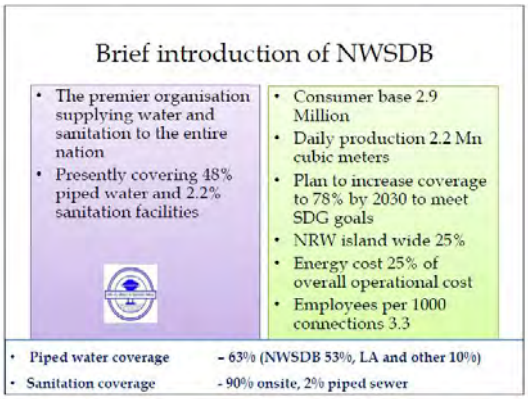
- Availability of long-tenor loan is key to attracting investments in water supply and sanitation sector as it addresses access and affordability.
- Applicability of PWRF co-financing modalities has limitation particularly on the size of the loan for co-financing.
- It is not enough to put up the fund and investment for the project to materialize. Technical assistance is equally important as an enabler to ensure project success.

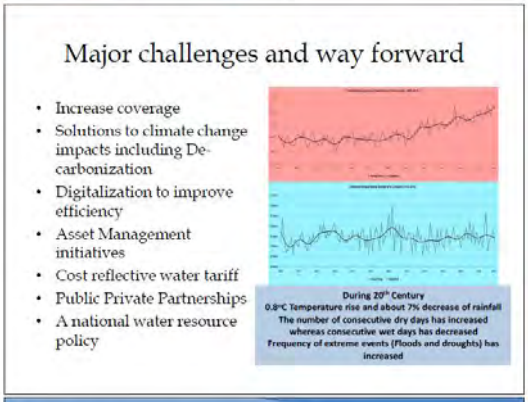

PWRF Contributions
• Improved investment appetite in the water supply and sanitation sector by PFIs and Water Service Providers
• Private banks now lend directly to credit worthy utilities without co-financing from the government financing institution; some lend without the guarantee
• Private banks are offering longer tenors and at a more competitive rates
• Private developers for bulk water supply and concession agreements source financing from the market
DBP

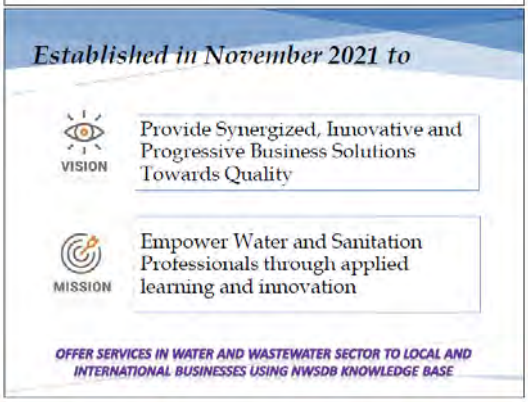

Thank you
DBP
We Build Possibilities.

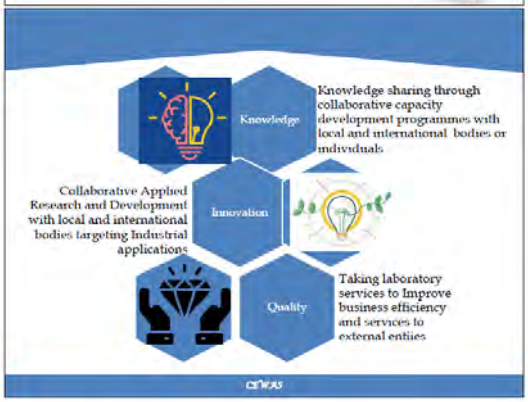
11-4-16 Day 4: "Center of Excellence for Water" Initiative (NWSDB)









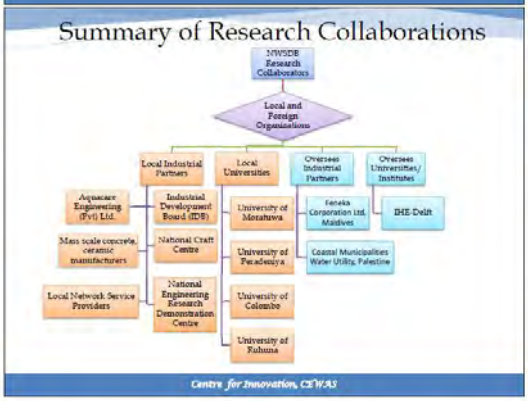


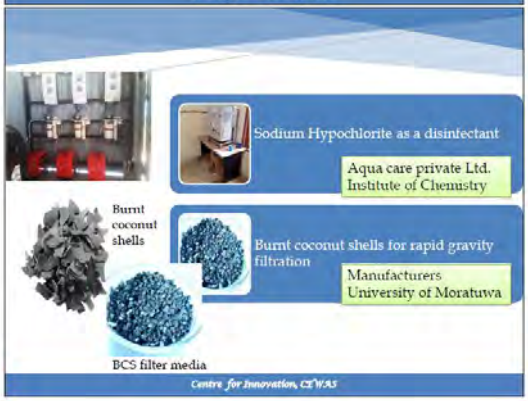

Local/ International Capacity development in water & sanitation sector
MoUs with local and international acadamic and industrial bodies
Skill upgrading and employment foreign/local
cewas

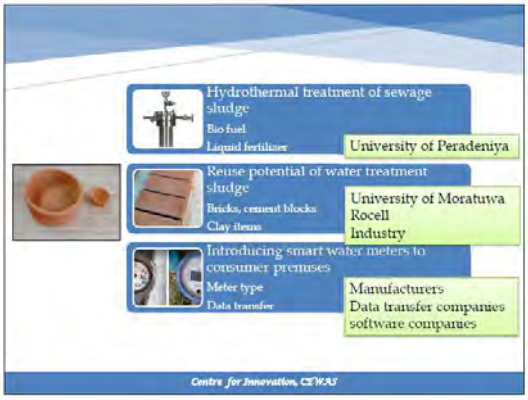

Summary of Capacity Development Collaborations
NWSDB Collaborators
NWSDB & KDU
Local Industrial Partners
Local Universities and tertiary education institutes
Overseas Partnerships
CIDA
Licensing of Plumbers
Nepal – (JICA)
National Water Supply & Sanitation Centre
Water Operator Partnership
Indian Plumbing Association
Support on developing the plumber training unit
FEB
Plumber training for overseas employment
Kotalawala Defense University
Joint Course on Wastewater Management for plant technicians
Government of Maldives
MoU ready to be signed for collaboration in water and wastewater management consultancies, construction and training
TVEC
Issuing NVQ3/4 for plumbers and fitters
IHE Delft
MoU signed for joint training programmes
TVEC
Development of Curriculum for Wastewater Mangement for National Tertiary Education
CEWAS

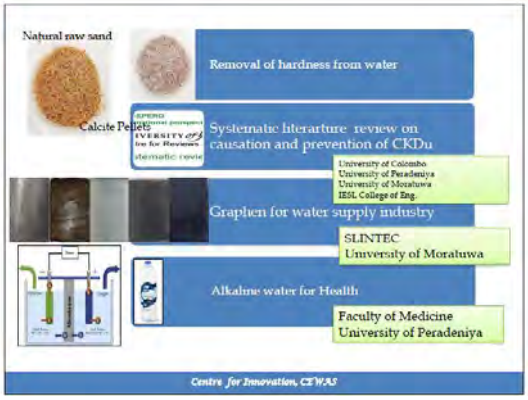

Innovation
Centre for Innovation
cewas


Centre for Innovation - Objective
Applied research and development;
Reuse and recycle waste generated at water/ wastewater industry for generate additional income
Utilization of local material in water industry to reduce/avoid imported items
Optimum use of available resources
Adaptation of new technology in local context
Finding innovative solutions to general problems in water/wastewater industry
Centre for Innovation, CEWAS


Summary of Research Collaborations
NWSDB Research Collaborators
Local and Foreign Organizations
Local Industrial Partners
Local Universities
Overseas Industrial Partners
Overseas Universities/ Institutes
Aquacare Engineering (Pvt) Ltd.
Industrial Development Board (IDB)
University of Moratuwa
Feneka Corporation Ltd. Maldives
IHE Delft
Mass scale concrete, ceramic manufacturers
National Craft Centre
University of Peradeniya
Coastal Municipalities Water Utility, Palestine
Local Network Service Providers
National Engineering Research Demonstration Centre
University of Colombo
University of Ruhuna
Centre for Innovation, CEWAS


Sodium Hypochlorite as a disinfectant
Aqua care private Ltd.
Institute of Chemistry
Burnt coconut shells
Burnt coconut shells for rapid gravity filtration
Manufacturers
University of Moratuwa
BCS filter media
Centre for Innovation, CEWAS


Hydrothermal treatment of sewage sludge
Bio fuel
Liquid fertilizer
University of Peradeniya
Reuse potential of water treatment sludge
Bricks, cement blocks
Clay items
University of Moratuwa
Rocell
Industry
Introducing smart water meters to consumer premises
Meter type
Data transfer
Manufacturers
Data transfer companies
software companies
Centre for Innovation, CEWAS


Natural raw sand
Calcite Pellets
Removal of hardness from water
Systematic literarture review on causation and prevention of CKDu
University of Colombo
University of Peradeniya
University of Moratuwa
IESL College of Eng.
Graphen for water supply industry
SLINTEC
University of Moratuwa
Alkaline water for Health
Faculty of Medicine
University of Peradeniya
Centre for Innovation, CEWAS

International Water Conference & Annual Research Symposium

2022

2023

Centre for Innovation, CEWAS

Consultancy Service (OCS)

- Local and foreign consultancy services for water and sanitation projects
- Feasibility studies, design, construction
  - Board of Investment
  - Hospital sector
  - Schools
  - Industries

cewas

Collaboration & Co-creation

- Cewas invites all Asian partners to join hands in
  - Capacity development throughout the region in water and sanitation sector
  - To address current global scenarios, climate change, net zero, achieve SDG goals
  - To carryout collaborative research leading to appropriate technology & new inventions using local resources and traditional knowhow
  - Participate in annual water congress
  - Introduce new technology to the sector

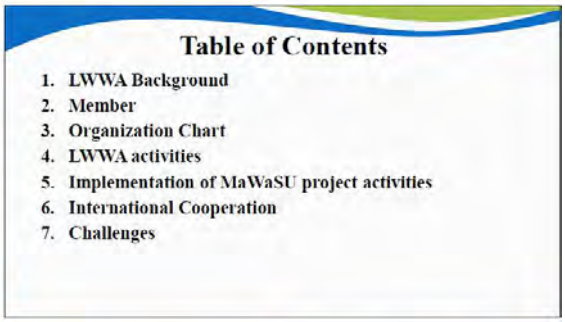
cewas

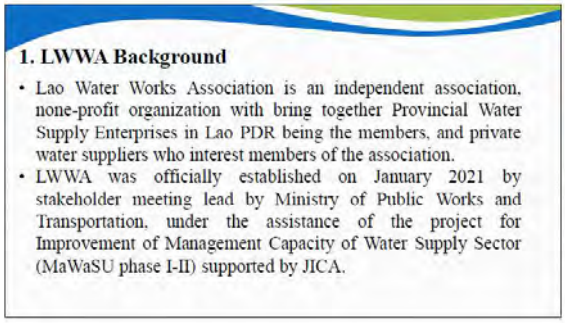
Thank You

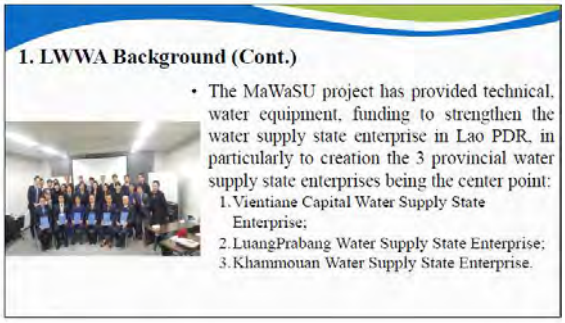
cewas

cewas

11-4-17 Day 4: Lao Water Works Association (LWWA) (NPNL)







4. LWWA activities

✓ **Board Of Director Meeting**

LWWA Board of Directors Meeting
September 2022

The content of the meeting includes:

- ✓ Activity report for the first 6 months of 2022
- ✓ Approve the name list of Honorary Members
- ✓ Report the activities related to the MaWaSU
- ✓ Presenting the detail of the LWWA mutual aid fund agreement
- ✓ Propose the improvements of LWWA organization chart to suit the activities of each sub-committee of MaWaSU which will become the sub-committee of LWWA

✓ Visiting Ordinary Members

To collect the situation of water supply business operation

- The difficulty
- The challenge
- Proposal to LWWA and related Dept.

Visiting Ordinary Members

Visiting Supporting Members, Sep 2022

✓ LWWA 2022 Annual Meeting (January 2023)

The content of the meeting includes:

- ✓ Annual activity report 2022 and Planning of 2023
- ✓ Report the draft the role of the Ministry of Home Affair, Ministry of Public Works and Transport, Department of Water Supply related to the activities of the LWWA
- ✓ LWWA Honorary Members Approval
- ✓ Giving certificates of appreciation to members who support the activities of LWWA in 2022

Assist members

- Meeting to exchange lessons water works among LWWA members to provide technique, OJT, support small funding and water equipment as necessary to Water State Enterprise where has impact from natural disasters.

Saiyabuli WSSE, Jan 2022

Exchange lessons on water works and handing out aid to members who have been affected by natural disasters

Oudomxay WSSE, Sep 2022

- Encouragement and handing out aid to members affected by natural disasters at the Oudomxay WSSE
- Supporting the technicians from Luangnamtha WSSE

- **Houaphanh (WSSE), Dec 2022**

Visited, to exchange lessons and research solutions regarding the effects of natural disasters on the water supply system in the districts of Houaphanh WSSE; to provide training (OJT) and including:

- The management of NRW in the pipeline system;
- Checking the stability of the water meter;
- Maintenance of electrical system in WTP and water pump.

- **Xiengkhuang WSSE**

Maintenance of Electrical system and Water pump in WTP (Feb 2023)

Water Quality Management (May 2023)

5. Implementation of MaWaSU project activities

Participated the 4th dissemination conference on WQM in the Southern region Savannakhet province, Feb 2022

Participated the 2nd conference on WQM at Vientiane Capital, Mar 2022

Participated the Water Classroom activities 2022

- At Kaiydeng village, Hatsayfong District, VTE
- At North-South Sammino village, Hatsayfong District, VTE
- At Nongbuthong temple, Parkngeum District
- At Mesaungnoy secondary school
- At Donsuoon secondary school

5. Implementation of MaWaSU project activities (Cont.)

Participated the training to become an **OBE trainer / Create a Training Course Syllabus and Outcome-Based Education** to create a teaching plan for construction management in water works in the MaWaSU 2 project

23-25 August 2022

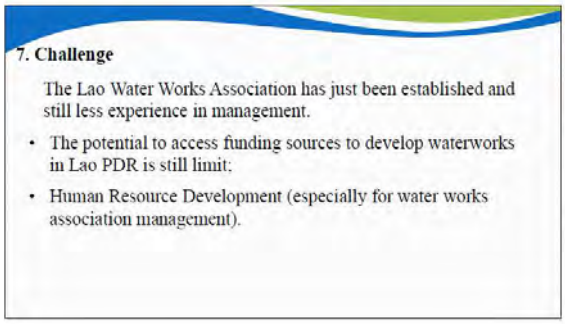
- Construction planning
- Designing/As-built designing
- Construction picture album making

04-06 October 2022

- Pipeline installation
- Service pipe/water meter installation
- Material storage management

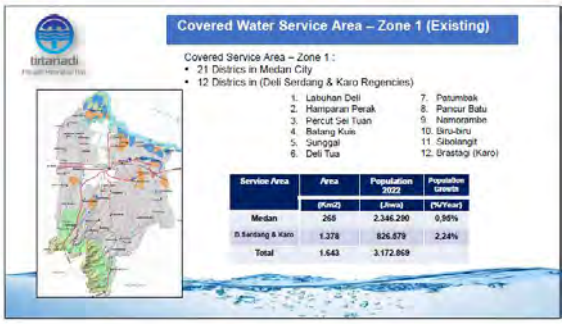

5. Implementation of MaWaSU project activities (Cont.)
Participated the Mini-Workshop of SC3 (Planning), SC4 (Finance)
Participated the Mini-Workshop of SC2 (Customer Relation)
North region at Saiyabuli WSSE (7-8/9/2022)
South region at Attapu WSSE (15-16/9/2022)
Central region at NPNL (20-21/9/2022)
South region at Sekong WSSE (22-23/2/2023)
North at Luangnamtha WSSE (1-3/3/2023)
Central region at NPNL (15-16/3/2023)

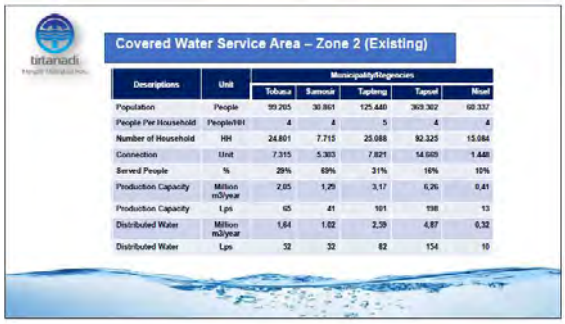

6. International Cooperation
Participated the Indonesia Water and Wastewater Expo and Forum (IWWEF) and Southeast Asia Water Utility Network (SEAWUN) during 6-8 June 2023


7. Challenge
The Lao Water Works Association has just been established and still less experience in management.
• The potential to access funding sources to develop waterworks in Lao PDR is still limit;
• Human Resource Development (especially for water works association management).


Khop Chai
Thank you for your attention

11-4-18 Day 4: MANAGE WATER & SANITATION AND BOOST COOPERATION IN NORTH SUMATERA PROVINCE – INDONESIA (Perumda Tirtanadi)



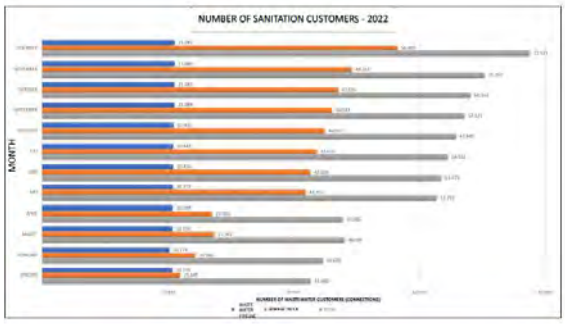


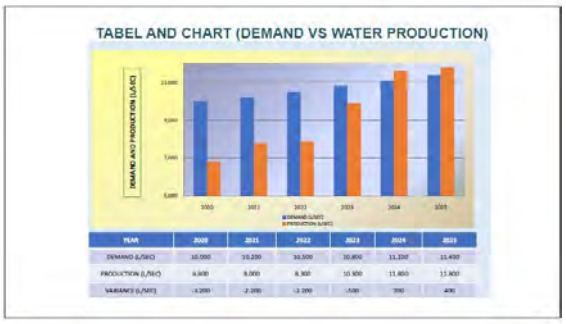

OPERATIONAL – ZONE 1

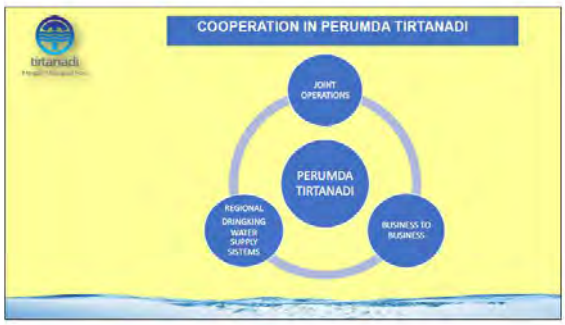

OPERATIONAL – ZONE 2


PRODUCTION CAPACITY
ZONA 1
ZONA 2


NUMBER OF CUSTOMERS
2018
2019
2020
2021
2022


NUMBER OF SANITATION CUSTOMERS - 2022
MONTH


TABEL AND CHART (DEMAND VS WATER PRODUCTION)

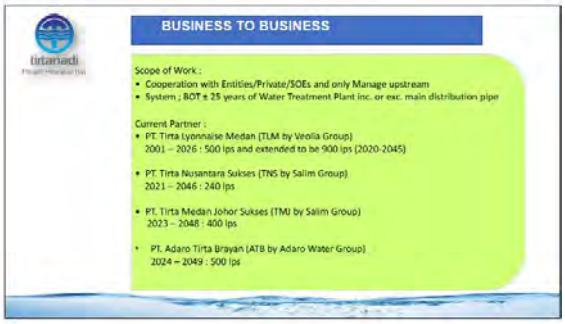

COOPERATION IN PERUMDA TIRTANADI
JOINT OPERATIONS
PERUMDA TIRTANADI
REGIONAL DRINKING WATER SUPPLY SISTEMS
BUSINESS TO BUSINESS


JOINT OPERATIONS
Scope of Work :
• Cooperation between Tirtanadi (Owned by Province) with Cities / Regencies
• Manage upstream and Down Stream
• Asset owned by Cities / Regencies
• Operation by Perumda Tirtanadi
• Tariff (Cities/Regencies and Tirtanadi)
• Construction of Water Treatment Plant :
- Central Government
- Province Government
- Local Government (Cities/Regencies)
• Construction of Pipeline : Local Government (Cities/Regencies)
• All documents for Construction of Water Treatment Plant and Pipeline, including FS and DED will be financed by Tirtanadi

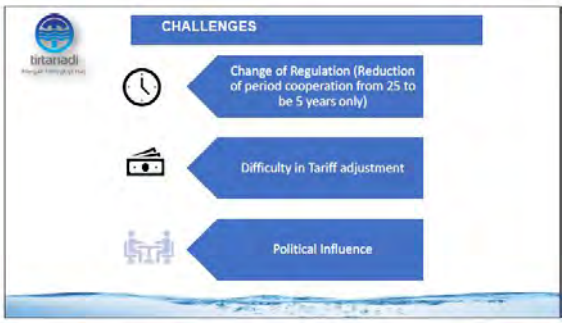

JOINT OPERATIONS
1. Tapanuli Selatan Regency
• 1999-2024, will be extended
• Served for 5 Districts
2. Padang Sidempuan City
• 1999-2024, will be extended
• Served for 2 Districts
3. Paluta Regency
• 1999-2024, in discussion for extention
• Served for 2 Districts
4. Toba Regency
• 1999-2024, will be extended
• Served for 6 Districts
5. Samosir Regency
• 1999-2024, As informed by Local Govt. No Extention
• Contract of IO will be extended
6. Tapanuli Tengah Regency
• 1999-2024, will be extended
• Served for 4 Districts, and will be extended to be 6 Districts


JOINT OPERATIONS
7. Deli Serdang Regency
• 1999-2024 terminated in 2017
8. Tanah Karo Regency (Berastagi)
• As this area was the Tourism area, so we has serving this area since 1905 up to present
9. Nias Selatan Regency
• 1999-2024, will be extended
• Served for 1 Districts and will be extended to be 2 Districts
10. Nias Utara Regency
• 2023-2028
• Served for 4 Districts
11. Nias Barat Regency
• 2023-2028
• Served for 2 Districts
12. Humbang Hasundutan Regency
• 2023-2028 (in discussion)


BUSINESS TO BUSINESS
VEOLIA
TIRTANADI
adaro


BUSINESS TO BUSINESS
Scope of Work :
• Cooperation with Entities/Private/SOEs and only Manage upstream
• System ; BOT ± 25 years of Water Treatment Plant inc. or exc. main distribution pipe
Current Partner :
• PT. Tirta Lyonnaise Medan (TLM by Veolia Group)
2001 – 2026 : 500 lps and extended to be 900 lps (2020-2045)
• PT. Tirta Nusantara Sukses (TNS by Salim Group)
2021 – 2046 : 240 lps
• PT. Tirta Medan Johor Sukses (TMJ by Salim Group)
2023 – 2048 : 400 lps
• PT. Adaro Tirta Brayan (ATB by Adaro Water Group)
2024 – 2049 : 500 lps

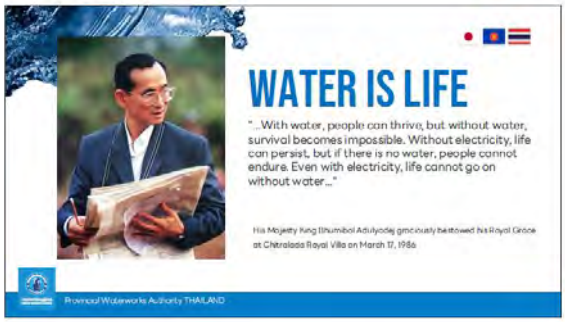

REGIONAL DRINGKING WATER SUPPLY SISTEMS
ME-BI-DANG
MEDAN
BINJAI
DELI SERDANG
tirtanadi
As Operator
Cap. 2x1.100 lps
• As Offtaker in Medan
• Cap. 2x750 lps
TIRTA SARI
• As Offtaker in Binjai
• Cap. 2x150 lps
PDAM TIRTA DELI
• As Offtaker in Deli Serdang
• Cap. 2x200 lps

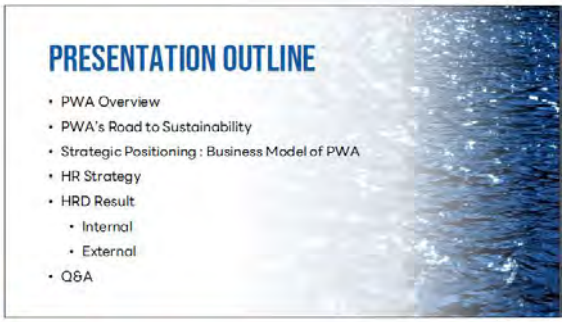

CHALLENGES
Change of Regulation (Reduction of period cooperation from 25 to be 5 years only)
Difficulty in Tariff adjustment
Political Influence

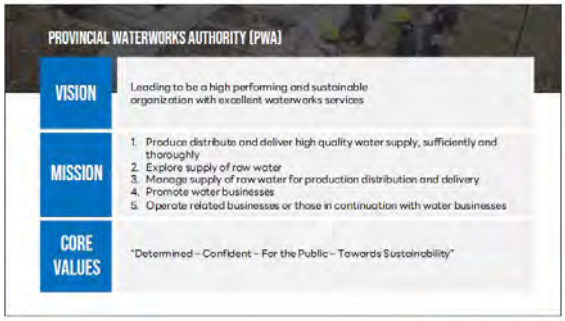

EFFORTS
Coordination with central government through Ministry of Home Affair and local government, and to explain clearly that the investment in water project mostly for long term
Through Indonesian Water Supply Association to encourage central government to approach the local government to monitor the implementation of Home Affair Regulation No. 20 Of 2021, in order all cities/regencies to review their tariff annually
Coordination with Executive and Legislative to make sure all related parties involved and seriously support the cooperation to speed up coverage rate in those cities/regencies.

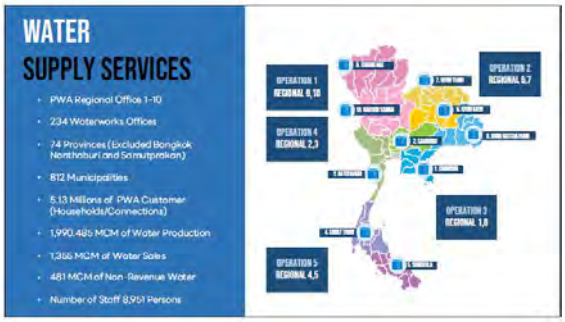

THANK YOU
tirtanadi
PERUMDA TIRTANADI Provinsi Sumatera Utara

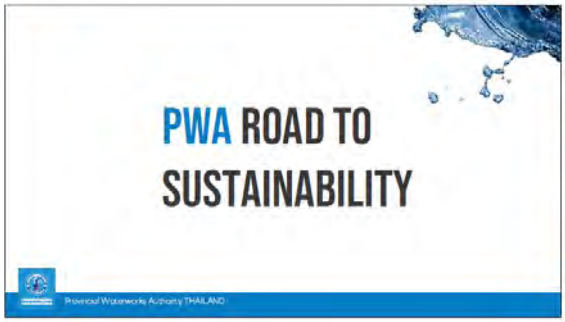
11-4-19 Day 4: Human Resource Development Initiatives (PWA)

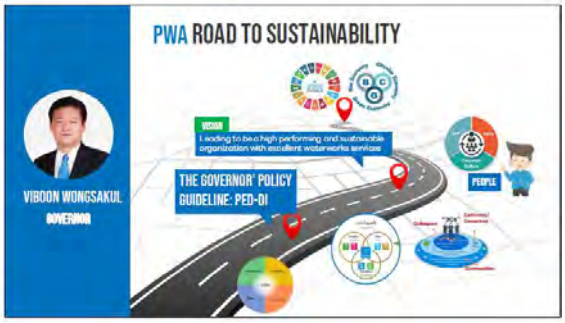










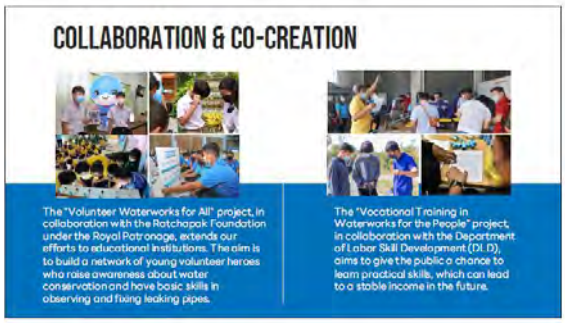



THE GOVERNOR' POLICY GUIDELINE: PED-DI
P
E
D
DI
Partnership & expansion
Expanding non tap water portfolio
Develop high values products and services
Digitization and People


COLLABORATION & CO-CREATION
Provincial Waterworks Authority THAILAND


COLLABORATION & CO-CREATION
Customer
Consumer
Community
Participation
The public
Society
Environment


COLLABORATION & CO-CREATION
The "Father's Land" project, in cooperation with the Office of Bio-Economy Development (a public organization), works on creating community forests and green spaces. This initiative aims to restore and conserve watershed areas as a way to give back to the environment.
PWA aims to improve the quality of life for the public by giving them clean and safe drinking water, making sure there's enough water for everyone to use, and helping communities affected by public disasters.


COLLABORATION & CO-CREATION
The "Volunteer Waterworks for All" project, in collaboration with the Ratchapak Foundation under the Royal Patronage, extends our efforts to educational institutions. The aim is to build a network of young volunteer heroes who raise awareness about water conservation and have basic skills in observing and fixing leaking pipes.
The "Vocational Training in Waterworks for the People" project, in collaboration with the Department of Labor Skill Development (DLD), aims to give the public a chance to learn practical skills, which can lead to a stable income in the future.

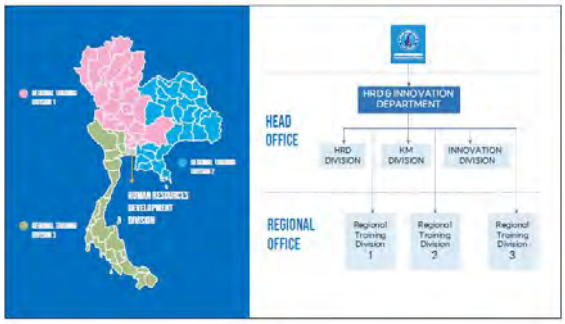

HUMAN RESOURCE DEVELOPMENT STRATEGY
Provincial Waterworks Authority THAILAND


"5 RIGHTS" HUMAN RESOURCE DEVELOPMENT STRATEGY
PRODUCTIVE WORKFORCE
RIGHT STRATEGY
Agile & Dynamic
Integrated Strategy
RIGHT SKILLS
RIGHT THINKING
RIGHT STRUCTURE
RIGHT VALUED
Employee Experience & Engagement


PWA PERSONA 2027
CORE VALUE
EMPLOYEE
MIDDLE MANAGEMENT / BRANCH
LEADERS / SENIOR
Attributes
Professional
Agile
Up-to-date
Digital Savvy
Productive
Engaged
Use KPC
Digitalization work and decision-making
Agile / Up-to-date
Innovative and continuous work development
Change Leadership
Business Entrepreneur
Innovative & Digital Transformer
Role
Solvers for Stakeholders
Innovation to increase organizational efficiency in a flexible and dynamic way
Transformational Leader for Excellence and Sustainability

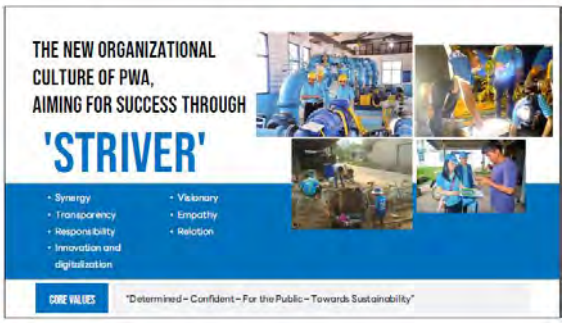

PWA HRD INITIATIVES
Internal & External
(JICA, NEDA, Water for People, Innovation, and the public)
Provincial Waterworks Authority THAILAND


INTERNAL
DEVELOPMENT EFFORTS
Provincial Waterworks Authority THAILAND


HRD & INNOVATION DEPARTMENT
HEAD OFFICE
HRD DIVISION
KM DIVISION
INNOVATION DIVISION
REGIONAL OFFICE
Regional Training Division 1
Regional Training Division 2
Regional Training Division 3


PWA SUSTAINABLE DEVELOPMENT
Customer & Branding
Career Path & Succession Plan
Essential Training Leadership
Design Thinking
Innovation & Digital Transformation
Reprocess for 4 Saves


CONTINUOUS FOCUS
ON PERSONNEL DEVELOPMENT WITHIN PWA
BIG DATA IN GIS
BUSINESS PLAN
smart metering system

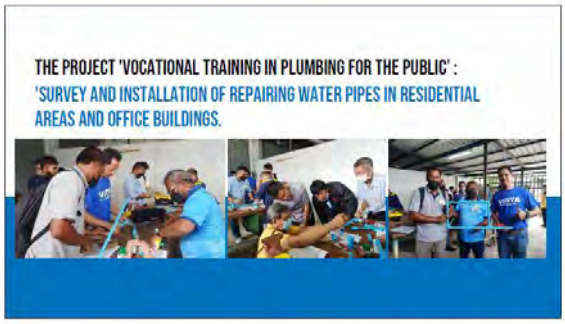

THE NEW ORGANIZATIONAL CULTURE OF PWA, AIMING FOR SUCCESS THROUGH
'STRIVER'
Synergy
Transparency
Responsibility
Innovation and digitalization
Visionary
Empathy
Relation
CORE VALUES
"Determined – Confident – For the Public – Towards Sustainability"

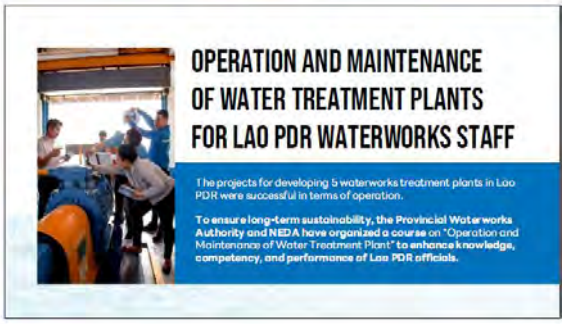

PWA KAIZEN
Communication/PR
Promote/Elevate
Results/Achievement


LEADER & PEOPLE DEVELOPMENT
Training Programs
70
58
35
31
22
7
3
226
ENGAGEMENT LEVEL
4.45
2023
AWARENESS OF VALUE AND CULTURE LEVEL
4.30
2022
SATISFACTION OF CUSTOMER LEVEL
4.32
2023

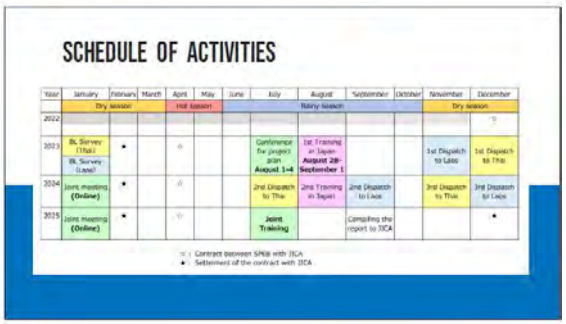

EXTERNAL
COOPERATION INITIATIVES
Provincial Waterworks Authority THAILAND


"WATER FOR ALL PROJECT"
BY PWA - LGOS
Activities
Challenges and obstacles
Lesson Learned


THE PROJECT 'VOCATIONAL TRAINING IN PLUMBING FOR THE PUBLIC' :
'SURVEY AND INSTALLATION OF REPAIRING WATER PIPES IN RESIDENTIAL AREAS AND OFFICE BUILDINGS.


OPERATION AND MAINTENANCE
OF WATER TREATMENT PLANTS
FOR LAO PDR WATERWORKS STAFF
The projects for developing 5 waterworks treatment plants in Lao PDR were successful in terms of operation.
To ensure long-term sustainability, the Provincial Waterworks Authority and NEDA have organized a course on "Operation and Maintenance of Water Treatment Plant" to enhance knowledge, competency, and performance of Lao PDR officials.


PWA AND INTERNATIONAL COOPERATION
TO ENHANCE HUMAN RESOURCE DEVELOPMENT
PWA collaborated with SPEB arranged the JICA Partnership Program for "Enhancement of Human Resource Development for Waterworks in Thailand and Laos" between January 9 to January 20, 2566 (2023).
The event Objectives:
1. To assess the operation and management status of the water supply system of municipalities in the Khon Kaen province area.
2. To evaluate the water quality management status of municipalities in the Khon Kaen province area.
3. To evaluate the operation and management status of water production plants of PWA in Khon Kaen province.
4. To assess the energy consumption of water production plants of the PWA in Khon Kaen province

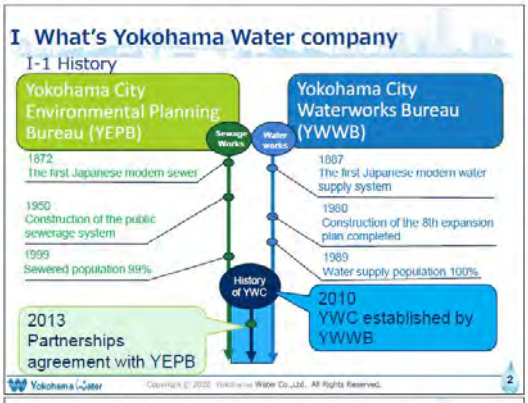

SCHEDULE OF ACTIVITIES
Dry season
Hot season
Rainy season
Bk. Survey (Thai)
Bk. Survey (Lao)
Joint meeting (Online)
Confirmance for project plan August 1-4
1st Training in Japan August 28- September 1
2nd Dispatch to Thai
2nd Training in Japan
2nd Dispatch to Lao
1st Dispatch to Lao
1st Dispatch to Thai
Joint Training
Compiling the report to JICA
Contract between SPEB with JICA
Settelment of the contract with JICA

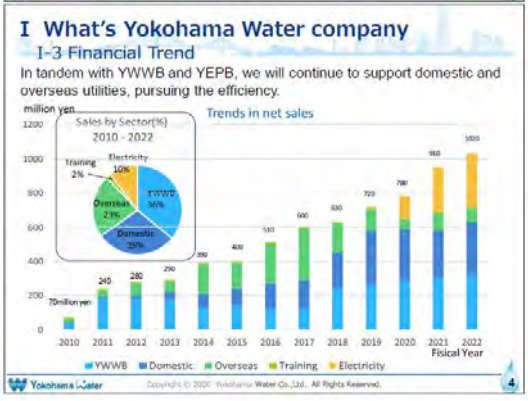

CONCLUSION

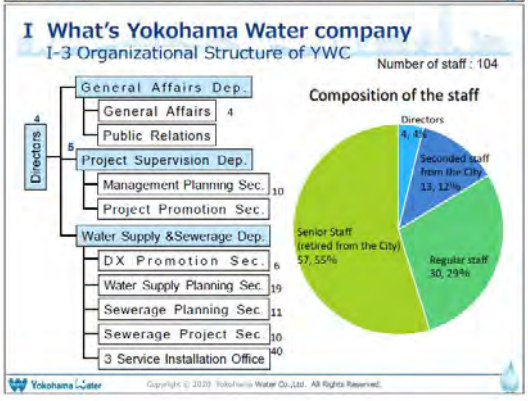

Q & A

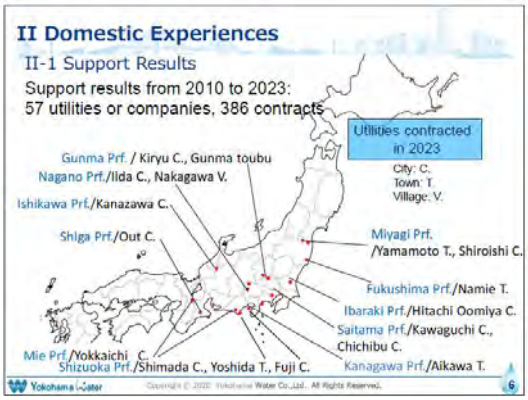

THANK YOU
Provincial waterworks authority

11-4-20 Day 4: Waterworks technologies and knowhow; transferred from Yokohama to the world ~Yokohama Water Company walks with water utilities domestic and overseas (Yokohama Water Co., Ltd.)



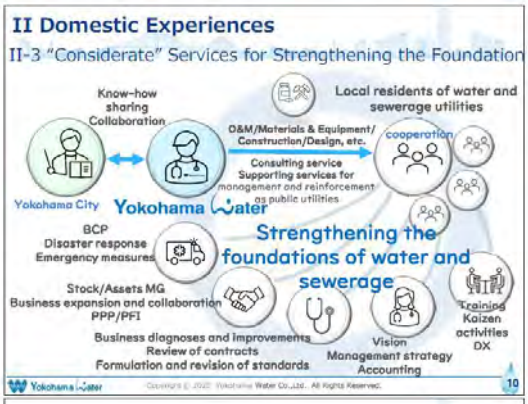







II Domestic Experiences
II-2 Domestic Support Project (Case of Yamamoto-cho)
Damage to the water pipe bridge caused by the tsunami
11 March 2011:Water suspension
11 April 2011: 78% recovery
11 April 2011:100% recovery
Leakage investigation and water flow work
8


II Domestic Experiences
II-2 Domestic Support Project (Case of Yamamoto-cho)
Collaboration to build a foundation for sustainable water supply and sewerage management
Yamamoto-cho (Town)
Sustainable and integrated business operation of water supply and sewerage
Business support through technical cooperation related to water supply and sewerage works
Agreement in 2013
Three-parties collaboration
Reconstruction
Restoration
Yokohama Waterworks Bureau
Yokohama Water Company
9

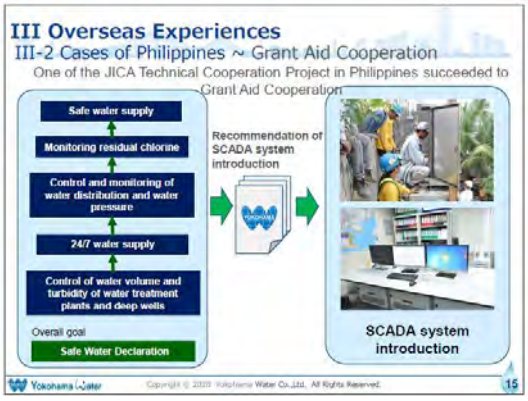

II Domestic Experiences
II-3 "Considerate" Services for Strengthening the Foundation
Know-how sharing Collaboration
Local residents of water and sewerage utilities
O&M/Materials & Equipment/ Construction/Design, etc.
Consulting service
Supporting services for management and reinforcement as public utilities
cooperation
Yokohama City
Yokohama Water
BCP
Disaster response
Emergency measures
Strengthening the foundations of water and sewerage
Stock/Assets MG
Business expansion and collaboration
PPP/PFI
Training
Kaizen activities
DX
Business diagnoses and improvements
Review of contracts
Formulation and revision of standards
Vision
Management strategy
Accounting
10


III Overseas Experiences
25 Countries, 93 Projects
Implemented from 2010 to 2022
11


III Overseas Experiences
III-1 Variety of Services
Varied services for water supply and sewerage works implemented with YWWB's know-how
Training and Human Resources Development
Technical Cooperation under JICA schemes
Problem Solution
Consulting and Advisory
Technology proposal (Riyadh, Saudi Arabia)
O&M Management Support
Japanese Technology Transfer
JCM
(Joint Crediting Mechanism)
12


III Overseas Experiences
III-1 Variety of Services ~ Training
Providing flexible curriculums to meet the participants' needs in tandem with Yokohama Waterworks Bureau (YWWB)
Observing a PR activity for school children "raising awareness for water"
Meter inspection training
Discussion with YWWB staff for problem solving
Leakage detection training
13


III Overseas Experiences
III-2 Cases of Philippines ~ Human Resources Development
Various activities aiming at "Safe", "Secure" and "Stable" 24/7 water supply in tandem with Yokohama Waterworks Bureau (YWWB)
Jar test
Filter sand rehabilitation
Leakage detection training
Back wash test
Trial production of mixer
Customer service survey
14


III Overseas Experiences
III-2 Cases of Philippines ~ Grant Aid Cooperation
One of the JICA Technical Cooperation Project in Philippines succeeded to Grant Aid Cooperation
Safe water supply
Monitoring residual chlorine
Control and monitoring of water distribution and water pressure
24/7 water supply
Control of water volume and turbidity of water treatment plants and deep wells
Overall goal
Safe Water Declaration
Recommendation of SCADA system introduction
SCADA system introduction
15


III Overseas Experiences
III-3 Cases of Pakistan ~ Consulting and Advisory
Water Pressure Survey
0.0bar
1.3bar
0.3bar
1.0bar
1.2bar
1.5bar
Solution under JICA Technical Cooperation
Building a water distribution management system
Improve customer satisfaction
Customer meter installation
Increase in customers
Adjusting fees
Financial improvement
Problems
*No water at the end of pipe network
*Use customers' own groundwater
*Incorrect drawing of pipe network
*Contamination due to insufficient pressure
*Low awareness of local staff
*Customers' dissatisfaction
Pakistan's first high quality water supply service (quantity, quality, pressure)
16


III Overseas Experiences
III-4 Providing Yokohama's Know-how
Preserving water resource forest
Hydropower/solar power generation
Water distribution management
Tariff collection/ Customer service
Business management
Integrated Water Resources Management
PFI (ceramic membrane purification)
100% recycling of sewerage sludge
17


Yokohama Water
Our Credo
Behavioral guidelines
1. Think & act positively
2. Stick to three "reals"
3. Be conscious to "Why?
4. Blush up techniques
5. Cooperation & respect
6. Be conscious to information
7. Speed up
8. Promote marketing
9. Be innovative
10. Build partnership
Our Mission
YWC's original Service
Varied services with additional value for sustainalbe water/sewage management
Our Value
Pursuing the best
Valuing reals, be creative with hands-on approach, share the satisfaction towards strengthening public capacity.
Our Vision
Become "your" technology
Continue to contribute to local society with our original and considerate water management service.
18


With water for the future and beyond
水とともに その先へ
Yokohama Water

11-5 Records of Group Discussions

The minutes of each group discussion for each session are given below.

11-5-1 Session 1 Group A

Record of Group Discussion	
Session	Session 1 (Day1)
Program	Group Discussion
Name of the Group	GroupA Day1
Recorded by	IIZUKA Masanobu (MR.)
Theme of group discussion	Towards Water Utilities Resilient to Risk and Change
Facilitator Sub Facilitator Accelerator	Mr. Sherwin Mendoza (Maynilad, Philippines) Mr. ITAYA Hidefumi (Waterworks Bureau, the City of Yokohama, Japan) Mr. Nguyen Thanh Su (SAWACO, Vietnam)

Mr. Sherwin Mendoza (Maynilad, Philippines)

- We will begin the group discussion, but first I like to explain about Action Plan. In this forum, you will be asked to create an Action Plan through the three sessions of Day1, Day2 and Day4, and present in the summary session. For Day1 and Day2, each participant will take notes on the first and second pages of the Action Plan. Make sure that you draft your own action plan. You have already brought sheets of action plan. Participants will take notes on the first and second pages of the Action Plan Sheets, that are on hands of each participant. On the final day, Day4, each participant will gather by country to discuss to compile into its country Action Plan and to make presentation. So, as discussed before, each country on the Day4 will present it and will combine it all.
- During this session on Day1, you are requested to write notes on the first sheet of Action Plan anytime by yourselves. So anytime you can write it. In relation to the theme of Session 1 which is: "Towards Water Utilities Resilient to Risk and Change," please consider and describe your organizations' goals, challenges, Action Plans to fill the gaps.
- Because those guests from Vietnam are speaking via interpreters, make it slow for interpretation. As we continue, we have set aside about 10 minutes after the end of this group discussion to fill in the Action Plan, but since the time is limited, please use the time during and after the group discussion to make your own notes.
- In an era of highly dynamic business environment, water supply businesses need to appropriate these funds to various risks such as infectious diseases, climate change and population concentration for the population to continue their business operations.
- In session one from the group, presentations were made by Group A, which is MWA from Thailand, whose contents were the efforts to secure raw water, HueWACO whose contents were measures to ensure a safe water supply at the event of natural disasters and spread of infectious diseases, and SAWACO whose contents were measures against climate change, which is sea level rise, extreme weather etc.
- We like to deepen the discussion on the Action Plan. We will use your presentations to be our background or as a baseline then each country or each agency, organization can also do the same to identify these risks and challenges.
- First, I like to ask SAWACO to comment on their efforts and challenges for their topic. After that, I have one question on SAWACO's presentation, then share it also. This is quite more on discussion so we can share each other's perspective.
- For SAWACO, you have solutions in water interruptions, during water interruptions. I just want to know if the water interruptions become longer, is delivery by a truck necessary? Anything that is more permanent on that solution?

[Accelerator]

Mr. Nguyen Thanh Su (SAWACO, Vietnam)

- This is my first time for our company to join this meeting today. I will appreciate your question about climate change. Our revision last time about climate change, and we just know that problem. Now we just to try to manage that. About the quality of water that is changed in HCMC, we have two locations that can supply water, that are Dong Nai River and Saigon River. Sometimes, we find less water resource and cannot supply enough for our customers, and we also find salt water. About infrastructure of HCMC, we don't have facility enough to supply water.
- Another problem we are facing now is populational increase/change. Every year in HCMC we have received immigrants, from near cities, about 200,000 people.
- However, under such situation, we still have good predictions, and that's why we have good plans.
- We have so many plans, like short, mid-term and long-term plans. So, we have prepared for five years, from 2023 to 2028, thus we have some solutions, too. Firstly, we will monitor the quality of raw water on-line.
- The second solution is that we need to secure water quality for example by chlorination. It means in distribution network we install some facilities to secure water quality, such as pressure, flow, and even if distribution network lacks the amount of chlorine, we will add some more chlorine.
- We also have solution of an additional dam to store enough raw water in case that a dam has a problem in its water quality. Dam is like a reservoir, so we have pollution of salinated water and fresh water that are mixed altogether, reducing the amount of water. We have a long-term plan longer than five years. We are supported by JICA to install storage stations to store water in emergency cases, and now we are continuing with that JICA project. It means that in the project we will identify how many safe water supply stations shall be installed. We try to look for new reservoirs apart from the existing ones.

[Discussion]

Facilitator

- Before I move to other participants, just a simple recommendation for the one I saw this morning. Maybe instead of providing water tank to the customers, we can also install a temporary water tank, because that is what we are using in Manila. Whenever we have interruption longer than what we expect, we can install water tank where any people can get water at any time. So, we didn't just feel water on those area on those towns so that customers can get water at any time. Those are for specific location only without water for longer period. Is that recommendation OK for all other participants? Do you have any question before we move to other participants who can share their insight?
- Maybe we can move down to one of our presenters, MWA from Thailand. Good afternoon. Do you have any Dean that you can share about? I also want to ask because of the main challenges in your water which is bigger; to challenge the salinity or the water quality, and my question now is like on how long you take this planning for the solution of this problem, because in our country we can find so many solutions, but the problem is how we implement it. It takes so much time to install all the versions of all the facilities again asking for the permit. So, in your case, how do you manage to cope up with those challenges?

Mr. Pornsak Samornkraisorakit (MWA, Thailand)

- Thank you for your patience. MWA review, manage for salinity intrusion on the land is lacking, lacking in the future. We have a tough time, meeting time and had a long time. Nowadays, sometimes we have fancy relation with users by mail for public announcement and prepares to respond to user, and we develop digital tenure system in terms of the data providing and PDF notice for ease, depending on water usage. (We do) Research during the crisis and if we had personnel to attend meeting with living party for MWA Office, we do not ask drinking water in the affected area and serve off treatment water to have the water tap directly to the affected area, installing water filtration, reverse osmosis mobile system.

- Nowadays in our master plan, commencing around 2026, and if this improvement plan is done, salinity impact is reduced because raw water is far away from the Gulf of Thailand. We expand water production capacity as much as our water treatment plants allow, 800,000m3 per day) and now is to start construction. We also build a supply canal from the west coast to the eastern coast, with maximum capacity to allow 100,000m3 per day, a big canal supply from a wastewater treatment plant across Chao Phraya River.
  (Details of many projects)
- 480,000m3 pumping station is in mid-term, and there is a master plan. After that we start topping water capacity to 800,000m3 per day. We have more ideas. We build water treatment plant at a water source whose capacity is 800,000m3 per day.
- Nowadays we can store water at raw water canal, but it needs a big budget. 42,000billion Barts, (which is a) very big budget. For the next project, Project 10, we need help of JICA.

Mr. Nguyen Thanh Su (SAWACO, Vietnam)
- I found that from MWA we find similarity with SAWACO and in VN. You just shared with us about financial problems. For the solution to address waterworks accidents, we share similarities amongst countries. Regarding funding SAWACO also established long term plan to move water source to some other place, that requires a big fund. It also is related to institutional policies of the government. For enterprises like ours, it is one of difficulties.
- My question is how can we protect our raw water source? Because raw water source will flow into many cities, provinces. How do you solve this problem? Do you have same problem, not only in Thailand but also in the Philippines?

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- In Thailand, MWA cannot control water in places like dam, because it is controlled by another office, Royal Irrigation Department is taking charge of it. Then the water salination is found, the capacity of official is not enough.

Facilitator
- Maybe my colleague here can share also because we have the same problem in the Philippines because we share the same reservoir, the same dam.

Ms. Sarah Monica E. Bergado (Manila Water, Philippines)
- OK, maybe before that, I could pick it back first with what was said earlier by the string we advanced through the similarities that we have as well as I guess everybody's issue and the funding. Please save this for the similarities.
- I feel that we have all these risks that was mentioned as well on climate change, typhoons and natural disasters, problems on salinity and raw water quality.
- So, I guess I could just jump to the probable solution that we could have like in Asia, like a reference, and for all these risks, and somehow embedded into our short term, medium-term and long-term plans.
- In Manila Water, we are looking at the World Economic Forum for the risk, but how good it is, if we have this kind of forum and with an output, that would really be a reference for all our countries, especially on the similarities on the risk that we are all encountering.
- So, it's a suggestion so that they can also go to top management and say, "Hey, this is the risk that we are all having," and of course, a venue such as this one to tackle solutions.
- On to the second, which is really on fire, by the way handled sustainability in Manila Water, and really the issue and the biggest challenge for me is to encourage the leaders and management to look really long term, because everybody is busy with short, three to five days (even) shorter, that's because of crisis because of the current issues.
- So, I guess the perspective at present is short term. It's really bringing leadership in top management, especially the general managers in our subsidiaries to also think long term, especially if climate change in terms of adaptation and mitigation are not really felt at present.

- For instance, they do not yet build that scenario for the sake of coastal flooding or salinity. They cannot yet see that far into the future.
- I guess with that, the challenge is also for the regulators, because they're also looking that at present Manila Water is very highly regulated company.
- So, it needs to be justified in the business plan so that it will be considered for the tariffs setting. Having those conversations with regulators not to just look three, five or seven years from now, but also 2030, 2040. Net Zero, climate change is in 2050, the very deadline for the net zero.
- If we do not do something right now, of course, big issues, big problems in the future. Those conversations, especially with our regulators, I don't know for the issues for the others, but it needs to be funded right now, so that we could make those solutions.

Facilitator
- Thank you, Sarah for your input. I can also share some recommendation because I just noticed that most of our topic right now is more on the solution on how to get water to minimize risk, but our real problem is how to minimize the cost.
- What causes that is, for me, I am not from sanitation or sewerage department, but I just noticed that we have problem mostly in raw water, which really has a very bad quality of water.
- I just noticed that also in this information of KPIs we are not more on the target on the sewerage or the sanitation which is all wastewater that is part of our big problem which is water pollution.
- Maybe in the future, we can also include that in our planning or our assessment because if we will dump our wastewater directly to the water, whether river or lake, that is another source of our problem, which we are solving right now. So, maybe we can also look on those issues. Also, a part of our next KPIs is to include our sewerage and sanitation coverage, though just a suggestion, thank you.
- OK, moving forward for the third topic, a while ago from what HueWACO said, I just have one question before you can proceed, about your challenges in sourcing of chemical materials; I think it is part of the preparations that we are doing to minimize risk, but as you can see, during the COVID crisis, we have problems in supply chain management. So, how do you cope up with those problems especially in sourcing materials during pandemic?

Mr. Le Quang Minh (HueWACO, Vietnam)
- Good afternoon, everybody. HueWACO has some plans to adopt climate change for dry and wet seasons. We have two plans. For example, as in the presentation, during flooding time, in Phuong Trung Water Treatment Plant, one of our water treatment plants, we have stand-by power generator in case that we have no power during accident, and in Vietnam we mainly face with salinity intrusion problem.
- We need to install booster pump to increase pressure to address pressure problem. We have advocacy program to train and to raise awareness of people to protect our raw water source, and for long term plan, we will develop a plan in accordance with a long-term plan of the province, especially for water supply together with the development plan of the province, including that of new water treatment plant and distribution network.
- Some solutions are already implemented, and other solutions are similar with other countries.

Ms. Sarah Monica E. Bergado (Manila Water, Philippines)
- How do you actually raise awareness on raw water sources?

Mr. Le Quang Minh (HueWACO, Vietnam)
- We have already carried out two solutions. First is in upstream of the river; we tell people living around there about a limit to use chemicals in the upstream, secondly is to try to buy up lands around upstream of river, and to give bonus to those reporters of violations. Those who are receiving bonus by such reporting are very happy with that.

Ms. Sarah Monica E. Bergado (Manila Water, Philippines) & others

- Good solutions, thank you.

Mr. Le Quang Minh (HueWACO, Vietnam)

- We have some question for us. Especially those who are living in upstream areas, if we have found some cases that residents in upstream of river discharge dirty water to water source, we give bonus for those who report any such case it's not one time, but by the end of the year. Because, we have, in total, about 30 water treatment plants, so we need to have good relations with the governments of sub-urban areas.

Mr. Edgar H. Donoso (MCWD, Philippines)

- Good afternoon, my name is Edgar. I am representing Metropolitan Cebu Water District from the Philippines. Although my colleagues from the Philippines are in the same water company but they are run by a private entity while my water district is run by a government entity.
- Financing is our number one priority. We have no support from the local or national government, so we are standing with our own feet, of course 100% depending on our tariff from internally generated revenue.
- Even if you have more projects, if we cannot implement correct pricing for our water, we cannot improve the services for our people. Hindrance, politicians, highly regulation of the operation. That's why maybe one of my recommendations is for our government to support, meaning the national government to provide budget for water source development.
- Water source development in the Philippines is not easy. It's not small amount, it costs us billions of Pesos just to relate to saltwater intrusion.
- In Metropolitan Cebu Water District, we are not exempted to that. It's good, I think, that our colleagues from VN and maybe from Thailand, their water source is a surface one, but ours in Cebu, I think 85% is underground source, and it is also contaminated by salt water, plus nitrate contamination; 90(%) of nitrate is coming from chemicals coming (originated) from septic tanks.
- That's why we are very thankful to JICA because JICA provided us water septic facility worth one billion Pesos and can accommodate about 450 cubic meters per day.
- But going back to the salinity is the water from Thailand and Vietnam coming from surface, because I think salinity will not be so much a problem unlike underground. If our technical team detected that our source is contaminated by salt. We will stop the operation because it is referred irreversible. We cannot correct that. So, we stop operating and we will look for another source of water.
- That's why (in) Metropolitan Cebu Water District, although groundwater is the most cost efficient, easy to access, we need to depart from that deeper water source. We are now embarking on a desalination project which is more costly, but readily available, and even if there are typhoons, there are crisis, seawater is there for us to process. Thank you very much.

Facilitator

- Thank you, Edgar. Any input or any comments? Maybe our government (Philippines) is making solutions for the problem because they are planning to have the Department of Water.

Mr. Edgar H. Donoso (MCWD, Philippines)

- That's another issue, because even control of our water source, I think, there are five (organizations) that are controlling our existing water sources. (1) Local government (2) the province, (3) irrigation, another, NWRB (National Water Resources Bureau), maybe the national government, so there are five, and the Water District has nothing to do with it, has nothing like no role in regulating or controlling our water sources even if it is within our backyard.

Facilitator

- Maybe we can ask our colleague from Thailand, if you have the same situation with Metro Cebu?

Mr. Nithit Thongsa-ard (PWA, Thailand)
- Yes. It's a big problem. Likewise, MWA is (in) the same country, Thailand, but in PWA, water supply operation (is) first challenge. Nowadays the challenge is climate change and impact from climate change, draught, flooding, and water source. We don't have water source, we don't have storage, we don't have money for invest to our own water storage for supply. It's a big question. It's a big problem in our organization. I think this water source, one day it's (should be) the agenda for the government; water source, water supply, quality of water. Besides (that) is the challenge of finance. Funding is too big, too big problem, but mega projects want to block grant from the government. We don't have funding from my own (government).

Facilitator
- Maybe that's the reason why we are here. JICA is here to assist us, all of our fund.

Mr. Nithit Thongsa-ard (PWA, Thailand)
- Another problem is digital technology. In digital economy, it's a big problem. Digital transformation (DX) to support water supply, (and) to support NRW is a big problem. Support to one big data, one big IT can solve many problems.

Facilitator
- That again requires funding. (Laughter by all)

Mr. Le Quang Minh (HueWACO, Vietnam)
- I want to share one financial strategy of HueWACO. We have financial strategy until 2030. We divide into different sources: first, we'll have a loan. As you know, we have very high demand in getting loans, but the source is limited. Therefore, we had to arrange priority of investment, including water treatment plant and pipelines. From that financial source, we'll distribute appropriately. That plan is for every source for every year. I think that any company will meet those difficulties.

Facilitator
- Thank you. Any more?

Ms. Sarah Monica E. Bergado (Manila Water, Philippines)
- Question to the group as well. Has anyone considered water reuse as well, or "new water" similar with Singapore, because I know that the issue is really water resources, so another issue is of course fund, but I'd like to know if you've ventured into this space as well.

Facilitator
- Anyone?

Mr. Nguyen Van Thien (BIWASE, Vietnam)
- My name is Thien from a new water supply company, and you will have our presentation tomorrow, but we want to say today that our Binh Duong Province is really far away from Ho Chi Minh City about 30 Km, and recently our production capacity is around 760,000 m3 per day. We are behind (smaller than) Ho Chi Minh City and Ha Noi.
- Same as Sai Gon (HCMC), we are using the same water resource, but we are upstream of Sai Gon River. (repeat) We are located upstream.
- Even Dong Nai River or Sai Gon River are in Bing Duong (Province). We are about upstream to compare with the water resources of Sai Gon (HCMC). We are using the same resource, but

BIWASE is getting from the upstream and Sai Gon (SAWACO) from downstream of both Dong Nai and Sai Gon River.

- We understand that raw water is very important, and we try to protect the raw water as much as we can. Recently in Binh Duong, we have four wastewater treatment plants with the treated wastewater in Binh Duong Province before discharged into the river.
- We try to take the wastewater to meet the "Column A" according to the VN regulations. Sometimes quality of wastewater after treated is a bit higher than river source, such as PH, BS, purity (speaker probably said "turbidity"), BOD, COD. So, thinking about reusing of water is most important and very challenging to us, but so far reusing of water, now they get it for construction and other kind of material which is served for constructing infrastructure.
- Mostly wastewater treatment plants are OK in downstream, very far away from clean water treatment (plants). So, the volume of reusing (reused) water is not high to count it, but we understand that we need to protect our friend. We see Binh Duong and Sai Gon (HCMC) are neighbors and we are proud to share. JICA is the main sponsor for wastewater treatment for urban use, and for wastewater treatment plant sponsored by JICA.

Ms. Sarah Monica E. Bergado (Manila Water, Philippines)

- Thank you. It's very interesting and indirect reuse.

Facilitator

- But that is true. Even in the Philippines, our raw water in one of our treatment plants is worse than our wastewater treatment plant effluent. So, that's the reason why we grabbed this idea of using it. In the Philippines we have already two water treatment plants using wastewater, but it's a small portion only; about one MLD (million litter per day) and the other one is five MLD.
- At first, we had a mental or psychological effect on the mind only of the people, but right now we are putting it in the raw water to make sure that it is blended. OK, it's all blended because Manila Water has that kind of pilot (project).
- Maybe beginning now, we can also think of that solution to make it a permanent on our planning moving forward, because I think that is better than the quality of course of our water. Funding maybe OK, maybe JICA will help us.
- Any before we move to our friend from VN from SAWACO, any more comments or any input?

Mr. Ho Huong (DAWACO, Vietnam)

- Da Nang is a sales city (wanted to say "trade & commerce city"). The main water treatment plant supplies water for 90% of the city. It is 10km away from the coastal line. Upstream water resource is below many provinces, and have many hydropower plants. Therefore, when climate change occurs, we luck water source in upstream.
- Salinity and the contamination of water is found in 2017 and 2018, in which we lack (faced shortage of) water. For solution, we cooperate with the government and relevant units to increase flow rate of upstream area so that supply of raw water should be done for downstream.
- At a committee, we control the dam, to prevent salinity from the main water treatment plant. When salinity is found we stop the water intake from the water treatment plant and open the intake from the dam. DaNang Government will build another water treatment plant in northern area for storage of raw water, and in the future, Da Nang Government will build a dam in the northern part of the city to build a reservoir for storage of raw water for use of the whole city, and all the province(s) in the upstream build processing plant(s) to protect raw water resource in the upstream. In the company we review installation of a new pump station by help of JICA.

Facilitator

- We still have 15 minutes to discuss. Anyone who would like to share more for our discussion?

Mr. Pornsak Samornkraisorakit (MWA, Thailand)

- Another topic from Mr. Itaya for Japan. I like to know about in Japan, how do you increase water charge, or water bill? What is the reason, or method to increase water charge or water bill, not water tariff? (Note: It took time to clarify meaning of his questions involving all participants, but in the end, the point was about raise of tariff.)
- For example, in Thailand we have the water bill 8 (eight) Bahts per m3, and nowadays we want to increase, not the tariff, increase the water charge for instance 10 Bahts per m3, in Japan what is the reason, because in Thailand very difficult, we cannot increase around 25 years, and you can see nowadays, chemical cost, electrical cost increase, but bill stable. We send letter to the government. Politicians are stable, and I will let you know about your country…

Sub Facilitator
- Thank you so much. Water tariff is very common in Japan, I think. It is not fixed but each water utility can decide the contents, (by) communicating with the city councils or something. In case of Yokohama, we have two categories of water tariff. First is basic tariff, and additionally, we charge to the customer some price according to water use (pay as you use). We have two layers.

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- Do they have public hearing? It's a lesson, one method.

Sub Facilitator
- In some case, other water utilities in Japan, not Yokohama, they hear (from) customers, but in case of Yokohama, we communicate the City Council. I understand that we communicate with our customers through City Council (assembly), therefore all water supply utilities in Japan communicate with customers, and the tariff is not fixed but they can decide.

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- In Thailand, we have many lessons. We have energy cost increase. We have chemical cost increase, but politicians keep cost.

Sub Facilitator
- Totally (as a whole), it's similar to you. It's not so easy to change our tariff.

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- You inform it to the public?

Sub Facilitator
- But according to our law, our tariff would be flexible according to our conditions.

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- OK, thank you. You are kind.

Mr. Edgar H. Donoso (MCWD, Philippines)
- Allow me to share our experiences, not with a private sector but with a public sector water district. Before you can increase your tariff or water price, you must serve notice and public hearing.
- For MCWD (Metropolitan Cebu Water District), we have eight LGUs (Local Government Units), four cities and four municipalities. So, in each unit we conduct public hearing. After we comply that, we will submit to local water utilities administration; (for) this, about half of building (full of) documents to prove that we really need the increase.
- Basically, we are doing full cost recovery, meaning whatever the operations need, we will pass it on to our consumers, but we have another formula for flexibility. We also present a formula that in case electricity (bill) will go up we have an automatic formula that will pass on the

difference between the base price or the base cost and the future increase of electricity; it means to automatically pass it on to our consumers.

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- You have legal (procedure)?

Mr. Edgar H. Donoso (MCWD, Philippines)
- Yes, we have it approved by our regulatory board. Another is, because we have a lot of bulk water suppliers, there's a portion in our operations that we need the private sector participation, especially for supply of water.

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- You mean you have regulatory committee, right?

Mr. Edgar H. Donoso (MCWD, Philippines)
- Yes. Local water utilities, administrators, and not only electricity, we also have adjustment in inflation, and third is adjustment in bulk supply cost or we call that "purchase water cost." So, there are three components that we can pass on immediately to our consumers aside from, I think, there's a percentage tax that we also pass on immediately to our consumers.

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- How about your consumer if you increase?

Mr. Edgar H. Donoso (MCWD, Philippines)
- We inform them about this during the public hearing and this is also approved by our regulatory (board).

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- How many percent for pass(ing) the case?

Mr. Edgar H. Donoso (MCWD, Philippines)
- The maximum that we can avail is only 60%.

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- 60%?

Mr. Edgar H. Donoso (MCWD, Philippines)
- Yes, 60%.

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- Wow, in Thailand 60% is really big.

Mr. Edgar H. Donoso (MCWD, Philippines)
- That's the maximum, but there's a collateral. There's additional requirement as far as it does not exceed the disposable income of marginal community.

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- Really? Thank you.

Mr. Nguyen Thanh Su (SAWACO, Vietnam)
- As for water tariff, we also had similar policy. We really don't have enough money to invest for water supply. So, for water tariff, especially in Group A, just like you had shared, we don't have enough money to invest. For climate change, it does not only affect water utilities, but also other industries in other countries.

- With Mr. Pornsak from MWA to share, for water tariff, we need to get from many sources for many costs. Before we submit documents to the government, we need to make a roadmap, the tariff roadmap for each year. It also has to go through so many different departments in the government and we have to have a public hearing as well. We cannot say "due to some reasons, we have to increase the water tariff." Why? Because if we just say, "certain reasons," the public will never agree with that.

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- What is the reason for water cost (raise)?

Mr. Nguyen Thanh Su (SAWACO, Vietnam)
- Expectation for the agreement from the government is just a part. The most important thing is that we need to show that our water quality is the best so that people see that increase of the water tariff deserves it.
- For example, NRW ratio (was reduced from) 47% down to maybe more than 10%. However, that shows the communities that we try our best to improve water supply systems. That will show this is a very good point to persuade the government to increase the water tariff. Another tool we are applying is that we are trying to use media to advocate people about our water quality.
- More issue is that we need to advocate the government that "increase of water tariff is not bad at all times." "Lower tariff is not always good". If the water tariff is so low, people will consume a lot, because it's so cheap. I like to share my experience with you today; it's not like a prominent, but that's what I would like to share with all of you, which is one of the activities that we are planning now.
- The big issue now is that we are sitting here to talk about how to react to the climate change. So, in the plan, short or mid-term, we have some solutions to what the company will do and what the government should do.

Facilitator
- Thank you, Mr. Su. We're running out of time. Maybe we can now end our discussion. Thank you very much for all of you. We will now wrap up our discussion. Maybe we can ask everyone one minute on your view or input of what we have discussed. Starting with Ms. Sarah.

Ms. Sarah Monica E. Bergado (Manila Water, Philippines)
- Very interesting discussion, thank you for sharing all your insights and I guess my key takeaway here is again hammering the point that we have several similarities that we are all impacted by climate change, drought, extreme weather conditions, so I stand by my suggestion to have this consolidated. I guess reference for how climate change impacts us.
- That tariff discussion also inspired me to; if we have this common reference, it's something that we can really include into our short, mid-term and long-term plans. For our part, we need to submit it to our regulators so that we could get the tariff to fund our infrastructure. I also think that we also need to influence the decision makers to really think long-term on climate adaptation and after we've achieved that certain stability, to also think about how to help in climate change mitigation.

Facilitator
- Thank you, Ms. Sarah.

Mr. Edgar H. Donoso (MCWD, Philippines)
- I believe we achieve same level of understanding about our common problems, and maybe we can come up with collaboration, cooperation with common solutions. Perhaps there's a little difference in terms of country and the nature of the water company, but I think that the solution will certainly be the same.

- Hopefully we can develop that in more details, so that each participant can bring that home and apply, develop a very workable solutions for our problems. Thank you very much. I don't have to emphasize again about our hardship in financing implementation, and I think nowadays, I am more focused on how to implement (develop) an infrastructure for water system that can address any kind of calamities, crisis, etc., and that again needs funding. Thank you very much.

Facilitator
- Thank you, Mr. Edgar. Now Mr. Pornsak.

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- For this topic about climate change, I think it is important for all countries, because in Thailand, everywhere, (we) cannot shut down the water treatment plant. We supply (in) autumn. We supply (water to) customer (in) autumn (even) if the climate change impact for the raw water in the parameter is salinity. It is important. Then if we have the Master Plan, Master Plan for efficiency, it will push (down?) the salinity, and I think in the future we don't know about climate change, we don't know, but if we have the Master Plan, efficiency (in the Master Plan?) will solve this problem. (Note: Only in the way that the Record Keeper can understand)

Facilitator
- Thank you very much, thank you, Mr. Pornsak. Mr. Nithit (please).

Mr. Nithit Thongsa-ard (PWA, Thailand)
- One thing that is very, very important about water resource and sustainability is a concern about water resource and problem with it. Everybody is concerned with climate change, water resource, concerned about carbon credit, and what about water credit? I think everybody, government, population (should) think about water credit, water resource. Thank you.

Facilitator
- Thank you, Mr. Nithit. Mr. Ho (Mr. Huong, DAWACO, please).

Mr. Ho Huong (DAWACO, Vietnam)
- Through today's discussion, I found that climate change already affects all countries and all companies. According to different situations, we have different difficulties and challenges, but what I do is through the group discussion today, I can learn a lot from you.

Facilitator
- Thank you, Mr. Ho (Mr. Huong). Mr. Minh from HueWACO (please).

Mr. Le Quang Minh (HueWACO, Vietnam)
- We found three most important things. The first one is human resource. The second one is the policy, and the last is investment in technology. We can never omit these three factors.

Facilitator
- Thank you, Mr. Minh. Mr. Thien (please).

Mr. Nguyen Van Thien (BIWASE, Vietnam)
- Most of the opinions are concerned about water resources. Those are very clear for all water entities and countries. Now we need to race with climate change situation. It seems that it has already come, but yet waiting list. In order to have enough raw water sources for sustainability, just imagine that raw water source is like raw material, raw materials for water treatment plants. Without that, water treatment plants cannot be operated, and in case that water treatment plants are closed, hour human resource (staff) will have no job. As Mr. Su from

SAWACO just shared, to develop sustainability (sustainably), we need to make sure that we have enough raw water source.

- For raw water source, we need to differentiate the function from the role of the government and the role of the companies, because you know that the raw water is not only for water supply field, but also for other different fields.
- About tariff, it's also similar with that of Thailand and the Philippines. Mr. Su from SAWACO has just emphasized that low tariff is not always good, because if the water tariff is so low, the water service is not good.

Facilitator

- Thank you, Mr. Thien and Mr. Su. (Those VN people were trying to speak out more) I know you already give your interview (prepare for interpretation), but one more, one more.

Mr. Nguyen Thanh Su (SAWACO, Vietnam)

- Last but not least, that the government needs to have a policy that water law is necessary, because water is a must for our life.

Facilitator

- Thank you, Mr. Su. Maybe from me, we all know that the climate (change) is already there. The race is already here. Everyone based on the discussion, we have all our long-term plan, we already have all our solutions, but the common problem for most of us is the funding. So, that's our key take-away. OK, that concludes our session.
- We have individual words. We have assignment. Based on the discussion and wrap up of this session, please write notes on the Action Plan Sheet on the page #1 in relation to the team of Session #1, "Towards Water Utilities Resilient to Risk and Change." Please consider and describe your organizations' goals, challenges, and Action Plans to fill in the gap. When considering these items, please do not simply make a list of ideals and challenges, but rather organize them from the perspective of what are the most fundamental and important items, what are the root causes of the problems you are facing, and what are the items that should be prioritized.
- OK, and that concludes our session. We now take a ten-minute break. Please return to the main venue on the 9th floor during this break. Thank you for all. Thank you to all the participants!

(End of Group Discussion of Group A, Day#1)

11-5-2 Session 1 Group B

Record of Group Discussion	
Session	Session 1 (Day1)
Program	Group Discussion
Group No.	GroupB Day1
Recorded by	Ms. Emily Wathen
Theme of group discussion	Towards Water Utilities Resilient to Risk and Change
Facilitator Sub Facilitator Accelerator	H. E. Chan Sengla (SRWSA, Cambodia) Mr. Hiroshi Hirowatari, Kitakyushu Water Services, Japan Mr. Arief Nasrudin *Changed to Mr. PHILAVONG Ladda (NPLP, Laos)

H. E. Chan Sengla (SRWSA, Cambodia)

- Good afternoon to the members. I am serving as your facilitator, my sub facilitator is Mr. Hirowatari, and our accelerator is Mr. Arief Nasrudin.

Mr. Hiroshi Hirowatari (Kitakyushu Water Services, Japan)

- I will briefly explain about the action plan. In line with our theme, we would like each organization to consider and document their thoughts, the challenges they face, and the action plan to bridge this gap.

H. E. Chan Sengla (SRWSA, Cambodia)

- Facilitators requested each participant to introduce themselves and began the discussion.
- Do you have any risks or challenges you would like to discuss?

[Accelerator]

Mr. PHILAVONG Ladda (NPLP, Laos)

- I hope we can have a productive discussion. In this session we are also talking about the risk from infection.
- Located in the center of South Asia, Laos is not close to the sea, so we don't have the salination issue. We have problems in Laos due to climate change, including large sudden amounts of rain in a short time causing flooding.
- We have many dams and reservoirs in Laos, if the dam cannot conserve the water it needs to drain this to the rivers, but during floods the water level increases quickly, 5-10 meters in 2-3 hours. We are monitoring the dams to address this issue, and any dam must inform us before it can be drained.
- Typhoons in Asia and southeast Asia cause flooding in Laos. This is a problem in Luang Prabang and causes lower water quality so I would like to discuss this with you.
- During COVID-19 people could not go outside, and Luang Prabang also relies on tourism revenue, with only 80000 locals to 1 million guests. I hope we can find a way to fight this issue in the long or short term.
- We have ongoing issues from the pandemic and inflation, with increased prices for everything, including electricity.
- I hope to cooperate as a water family to discuss and find a way to solve this for the near future. Thank you JICA for this opportunity.

[Discussion]

Facilitator

- Sim Reap is also a tourist area impacted by COVID-19 like Luang Prabang. Climate change is also a major topic, with many ideas discussed and implemented to mitigate effects of storms floods etc., on water supply and sources.
- In Sim Reap, we use surface water and also pump underground water. In Tulisa water levels are impacted by climate change. Levels are shallow in the dry season, with lower quality, and

there is more of a smell from the water source due to NTU around NTU 25. Tulisa's water level is decreasing year on year due to climate change, and turbidity increasing.

- How could this smell be reduced for our customers?

Sub Facilitator

- Does anyone have a similar experience with climate change impact?

H. E. Long Naro (PPWSA, Cambodia)

- We should work together and focus on how we participate in climate change, especially flooding that affects our business as operators.
- Cambodia uses the water from the Mekong River that flows from China, though Thailand, Laos, Cambodia, and Vietnam. We use around 1% of the Mekong total flow to the sea per second.
- We do not have an issue with the sea or water quality, but we have had misunderstandings or lack of discussion in the past 5 years with the upstream source, causing lower levels in the river, and difficulty in our supply.
- Our investment in construction was based on the monitored level, but for the past 5 years, the water has dropped around one meter vs a normal season. We need to find a backup solution. E.g., to pump the water from the river to the treatment and adjust our pump intake stations. This increases energy consumption and costs.
- Increased discussion between the countries around the Mekong has led to a better situation than in previous years. I hope we can continue to cooperate with upstream countries.
- Flooding outside the city of Phnom Penh does not affect our propensity. However, we still use a combined sewage system, with sewage in the same pipe as rainwater and we do not have a sewage water treatment plant. Water quality is lowered during floods, and we need to increase our chemical treatment to produce a clear water supply.
- We established a risk management team, to forecast and establish an action plan for emergencies, and discuss with the international Mekong community.
- For resilience, we must communicate among each other in our "water family," country to country to share experience and knowledge and achieve MDG 6.
- We have an investment program SOP and require participation of around 21% to address climate change through installation of water supply infrastructure.

Sub Facilitator

- How about Indonesia?

Mr. Arief Nasrudin (PERUMDA PAM JAYA, Indonesia)

- PAM JAYA is managing water supply in Jakarta. We have been self-operating for six months since February 2023. For the 25 years prior to this, assets were owned by PAM JAYA but privately managed.
- We cover 65.8% of a 12 million population of two million households. We have treatment plant capacity of around 20,000 liters per second, with pipeline over 12,000 kilometers. We need to find another solution for non-revenue water, which is at 46.6%. The 2030 SDG for water supply for all people is only six years away. We have some corrective actions, but we are still planning/implementing these.
- We are an old company with old infrastructure. Jakarta is a former capital city, and the population is a challenge.
- In six years', time, we will need another 7000km of pipe in Jakarta despite increased traffic and crowds, and we are moving from a low economic mode to a high economic model.
- We have raw water resource challenges. We have rivers but cannot escalate use of these, due to ecological and environmental maintenance requirements. We have a mountain resource, the large government built Jatiluhur dam.
- We are close to the sea, and would like to implement desalination, which was successful in Singapore, but the technology is expensive. This would improve our resource issues.

Mr. Kabir Bedi (PERUMDA Tirtanadi, Indonesia)

- In Medan, North Sumatra, there is a lack of raw water. We use five rivers as a raw water source, but the water treatment plant was built by the Dutch in 1905, using water from the mountains. Due to deforestation and climate change the flow of water flow rate can reduce from 600 liter per second to 400 liter per second.
- We have five other treatment plants for surface water that we treat. Sometimes during the dry season and El Niño from July to end of the year, flow goes down from 600 to 100, causing supply issues.
- The raw water from the five rivers, also has a quality issue. Ammonia used in fertilizers by farms and rice paddies upstream means we need to add more chloride to stabilize the ammonia, especially during dry season. There is also very high turbidity in the rivers due to deforestation.
- Last week we had raw water turbidity over 20,000 due to a suspected landslide upstream, I had only ever seen numbers in the 10,000s before.
- Some of our facility piping is over 100 years old so we have issues with non-revenue water, raising from 29% to 34% in the past few years. As raw water gets disturbed, we require more chemicals for production, causing price increases.
- The tariff is decided by the local government which changes often, making it difficult to increase our tariff, which has not changed since 2017. In 2024 onwards we can discuss raises with the new government.
- It is difficult to renew infrastructure without raising the tariff.

Sub Facilitator

- Climate change generates issues like floods, affecting water quality, the cost of production etc. Good resilient facilities require backup systems and problem prevention.
- It is key to create an SOP for risk management. Does Laos have backup or preventative systems for fluctuations?

Mr. PHILAVONG Ladda (NPLP, Laos)

- We only have 20% flat area, 80% is mountainous.
- The government is trying to address protection through the Mekong Commission, as the effect on the people is rising every year.
- In Luang Prabang we have around seven dams, for the Mekong River and other rivers. These reserve rainwater to produce electricity, without rain they cannot produce anything. The commission will make a plan to address this.

Mr. Khamphouvong Sikholom (DWS, Laos)

- In Laos we have a mountainous zone, a flat zone, and a flat/mountainous zone in the south with different issues due to the hot climate. In the rainy season there are landslides upstream, in the south the river source is not adequate during hot season. We have many rural areas, and while we have enough water in the rainy season there is not enough infrastructure.
- We will share ideas with Cambodia, as we have similar issues. The government policymaking for the tariff is similar, and difficult.
- We have loans for treatment plants from other countries, and commitment from our side, but if financial estimates for a long period and the business plan are not made, funding cannot be allocated.
- I would like to hear any recommendations.

H. E. Long Naro (PPWSA, Cambodia)

- Today, we spoke about disasters, especially COVID-19. Water Utilities have a target to assist customers on time, and we need to consider action plans for unexpected disasters. This could be included in the climate change action plan.

- In Cambodia, we worked closely with the municipalities, to create color zones based on COVID-19 statistics to identify where we could enter to read water meters etc. Or to allow grace periods for people to pay their water bills in times of disaster.

H. E. Sreng Sokvung (MISTI, Cambodia)
- We learn from each other and know the solution, issues, risks and solutions. Often the solution cannot be solved by one government, and we need intergovernmental collaboration. For example, the Mekong River situation cannot be fixed by one government alone.
- We have too much water in rainy season, no water in dry season. How can governments manage this? This depends on each government and their awareness about tariffs. Higher tariffs are required to invest in recovery and renewal. Either the government or the people needs to pay for sustainability and resilience. Japan in the 1990s had more risks than other countries, but still built a resilient system.
- Governments and Utilities need to be committed, while we can get funding and loans from JICA etc., the issue is whether the project can be implemented by the people in charge on the local side.

Mr. Dwike Riantara (PERUMDA Tirta Mayang Kota Jambi, Indonesia)
- We are talking about supply improvement, sustainability, infrastructure, financing etc. Our challenges are not limited to these. Can we discuss political situations within this forum? We should discuss more about water governance, cooperation and how the state plays a role in developing the water system.
- H. E. Chan Sengla talked about water sector leadership in a changing world. If governments make water the top priority and provide their best support, we will succeed. 2023 and 2024 are election years in Indonesia which will lead to regional, local, and national turbulence, but we are hoping for the best in terms of interest in water supply.
- How do we manage water governance despite our respective political environments?

Mr. Ade Syaiful Rachman (Ministry of Public Works and Housing, Indonesia)
- The ministry distributes water from mobile water treatment plants in times of disaster with small capacity of one to two liters per second, requiring smaller sources such as rivers or wells. Our ministry has created special plans for each region, to supply equipment, treatment plants, and sanitation equipment. These are flexible and easy to operate, with minimal maintenance and chemicals needed. They are useful for emergency response.

Facilitator
- Do any other countries have a response?

Mr. Arief Nasrudin (PERUMDA PAM JAYA, Indonesia)
- We need to improve financial competence because water is not cheap by investment value. Issues such as disasters are worsened by lack of preparation. Because the tariff does not recover costs, it is a challenge to get return on investments. As tariffs are based on regional policy, even if national political leaders are interested in water, this should also be explained to the people as it can have a big impact.
- Raw water is also a common issue. We cannot depend on our resources if there is not enough water present.
- The price of water will rise in future. Some countries like Japan have succeeded, and we need to hear their solutions. Mr. Nagoya spoke earlier, but who decided on the grace price of two months? This was a good solution, but how was this agreed within the government? COVID-19 as well, some of the chemicals were provided to mitigate the disaster.
- Can JICA also provide more guest speakers, so we can hear about how the government is involved in Japan, or Europe or an Asian country like Singapore that has achieved 99% supply?

Facilitator

- Thank you for sharing the issues regarding the tariff. We cannot increase this by ourselves, but through government, this is the same for Cambodia.

Sub Facilitator
- We must prepare backups for natural disasters or pandemics. In order to correspond with this, we need to prepare action plans or money, with financial recovery as a key point. To raise water tariff awareness, we need big intentions.

H. E. Long Naro (PPWSA, Cambodia)
- Nobody can live without water, so the government has needed to support our utility's activities until now.
- Management companies of utilities also need to show commitment, and fight to optimize and run the water supply system sustainably, to benefit the company. We have a board of directors that check and advise on operational requirements, so that we will satisfy our development partners and pay back our loans.
- We also require support to make financial projections to identify when we need government support through increased or revised tariffs to ensure we can fully plan for disasters. We should have a social fund in the SOP created from a portion of year-on-year profits that can help the poor to access water and to prepare for disasters. For example, the colored zones I mentioned, as a program to support payments for water in areas most effected by COVID-19.
- We need to show the government our commitment to help the people through water supply.

Mr. Siphanh Inmouangxay (NPNL, Laos)
- Laos has provincial governments, and even during COVID-19 we needed to survive by ourselves and report to the central government to ask for support and commitment. There was also government pressure to reduce water prices during the pandemic, which we were required to cover this ourselves. I will present our corporate plan and revised water tariff tomorrow. It is not easy to increase the tariff, we need to present this to the local and central governments many times, and they only agree sometimes, often asking us to wait. But water is needed for life, so if the governors think we need to lower prices for the people we need to try first. It is important to support ourselves as well as receiving government support.
- We applied for adjustment before COVID-19 and this was luckily approved, but there is still the cost increase due to inflation etc.

H. E. Long Naro (PPWSA, Cambodia)
- It isn't that local governments have no initiatives to support us, water utilities need to be prepared, sustainable and able to make financial projections to be self-sufficient, but they can also receive support from developing partners to fully meet requirements.
- For example, support on how to meet requirements, compromise between operator and customers, pay back loans, and meet commitments sustainably.
- We cannot help each other to be competent directly, as we have different governments, however we can help each other negotiate effectively.

Mr. Arief Nasrudin (PERUMDA PAM JAYA, Indonesia)
- Do we have any business plans or financial plans between us for water supply? We cannot just leave it to PPP.

H. E. Long Naro (PPWSA, Cambodia)
- We have three masterplans we created with external development partners like JICA with a financial analysis to show what must be achieved first to meet requirements. These are key to success. I work as a counterpart with the masterplans. The documentation must show in the master plan the main objectives to tackle to reach the target in time.

Mr. Khamphouvong Sikholom (DWS, Laos)

- We have a water tariff policy. For operators to increase the tariff, they must be able to explain clearly to the government the costs and their reasoning.
- Utilities must meet goals like product cost, nonrevenue water amount etc. to be allocated a tariff raise equal to a certain amount of profit, and include in the masterplan the breakdown estimates for future years. A problem is utilities cannot clear these as salary, material, input, admin etc., must also be paid. This is a big problem for the situation in Laos.

H. E. Long Naro (PPWSA, Cambodia)
- We have different governments, but we had a similar situation, in 1993 we had 72% leakage, now we have reduced this to 8.5% over the years. Staff percentages are also down.
- You can ask us about this, and we can teach you. I have just become Director General in 2021, and I am trying to apply additional ideas to adapt to the external environment.
- Government support and commitment and external support, based on clear objectives, a mission and vision are needed. You should ask an external developer such as JICA to help you develop a master plan of what to do depending on your situation.
- I don't know about the financial models, but the loan provider should also help with this and analyze the financial model as part of their loan governance

Facilitator
- Thank you for sharing. We must be thinking of water for all, that is priceable and sustainable with 24-hour, 7 day per week supply.
- We have learned a lot about each country, giving us more ideas for our discussion.

Sub Facilitator
- Our key words were risk, change and correspondence.

11-5-3 Session 1 Group C

Record of Group Discussion	
Session	Session 1 (Day1)
Program	Group Discussion
Group No.	GroupC Day1
Recorded by	Ms. Etsuko Mitani
Theme of group discussion	Towards Water Utilities Resilient to Risk and Change
Facilitator Sub Facilitator Accelerator	Mr. Waruna Samaradiwakara(Ministry of Water Supply and Estate Infrastrucgture Development, Sri Lanka) Dr. Ryuji Ogata (Global Environment Dept., JICA) Engr. A. K. M Fazlullah (CWASA, Bangladesh)

[Accelerator]
Engr. A. K. M Fazlullah (CWASA, Bangladesh)
- I work for the Chattogram Water Supply and Sewerage Authority under the same ministry as the DWASA.

[Discussion]
Sub Facilitator
- This session is "Towards Water Utilities Resilient to Risk and Change." We should hear from you about what kind of risks and changes you are facing and countermeasures.

Facilitator
- We face various challenges, including sanitation, infectious diseases, and survival during the economic crisis. This summer was especially difficult to survive in Sri Lanka as our water tariff is really low, and we are having difficulty managing the organization.

Dr. Wasantha Kumari Illangasinghe (NWSDB, Sri Lanka)
- Now, we are greatly affected by drought. The whole country is affected. We depend on 25% of the water source on groundwater. Its water quality is an issue.
- We can't operate treatment plants normally. Electricity is quite high.
- In the southern area, the water source is saline, so we request people to use it for spare.
- In the northern and central provinces, we are experiencing electric power down. Our ministry needs coordination among agencies to regulate water supply. It's good to say that the other three parties have realized drinking water should be given priority.
- Climate change. As our intakes are sometimes inundated, we have to prepare thoroughly.
- The economic crisis. We get a bunch of letters asking for drinking water, but we cannot accommodate users' requests. We need to raise tariffs to construct infrastructure.
- Another problem is aging infrastructure 100-year-old pipelines. Again, we need a good tariff for rehabilitation work.

Sub Facilitator
- As for the declining groundwater level, you mentioned the water quality problem. How about water quantity?

Dr. Wasantha Kumari Illangasinghe (NWSDB, Sri Lanka)
- The water quantity is definitely reduced.

Sub Facilitator
- Regarding financial difficulty, is it possible to raise the tariff rate?
  Is there some political issue?

Dr. Wasantha Kumari Illangasinghe (NWSDB, Sri Lanka)
- Sure, we held a tariff revision in 2012, but the production cost is still not covered by tariff.

Facilitator
- Adding to it, we have experienced water-borne diseases. We have started many projects. Our health system has spent lots of money.
- NRW is also really high, around 32%, because of aging facilities. Fortunately, after conducting a project in the city, we could reduce NRW from 32% to 15%.

Engr. A. K. M Fazlullah (CWASA, Bangladesh)
- We've found that people die of water-borne diseases due to water pollution because they don't clean the water tanks, so cockroaches are generated.
- Salinity is also a problem. It is from Oct to May or June. The capacity of the lake is not much due to less rainfall. High tide also just came.

Sub Facilitator
- Is it because of climate change?

Engr. A. K. M Fazlullah (CWASA, Bangladesh)
- Yes, and the rise of seawater as well. We are facing no rain and no good water.
- People do not like the taste of the water, so we blend water taken from other water treatment plants.
- From Oct to May, we calculate how much water is salinated. We are still looking for a solution. We should watch the water intake points.
- We are trying to serve 92 % with surface water and 8% with groundwater.
- Tariff is also a problem. The cost is going to be high. With financial capability, people will enjoy a non-saline water supply. Let's think about change together, financial capability. If we do not pay, there is no future.

Engr. Taqsem A Khan (DWASA, Bangladesh)

- One of the risks is Covid-19. It has given a very good lesson for a water utility to learn. It gave us the opportunity to think differently.
- Another risk is the economic impact of an external factor. It has no relationship with our country, but the war between Russia and Ukraine is still impacting our economy. How can we mitigate this?
- The biggest challenge is climate change, seasonal drought patterns, cyclones, and rainfall change. Typhoons come in different seasons, affecting our water supply.
- The groundwater level is going down, but unfortunately, we still depend on the groundwater. Countermeasures: We are going for surface water and reducing dependence on groundwater. That will mitigate the impact of climate change.
- The population is also challenging to be sustainable. Our city has an area of 400 ㎢ with a population of 22 million. It is highly populated and considered a giga city.
- Tariff is another challenge. We have to be sustainable and bankable. Nowadays, our organization is bankable. That also changed some areas that were dependent on groundwater. We are mostly dependent on surface water now.
- To make our water utility resilient, we learned digitization. We can solve problems without visiting the site through the Internet, saving labor and time. That is how we try risk management.
- We are making a billing system, a manless, paperless billing system.
- Also, we are trying to make SCADA. We are trying to maximize automation.
- We have a different model of tariff. We are trying to introduce an Area-Based Tariff System. We had a 2-year experiment, and it was successful. The government agreed, and we are waiting to introduce it. Each area has a different tariff depending on the cost of the land, household income, and apartment size. We are going to introduce five categories of tariffs. We are going to have cross-subsidy. Poor people are charged less, and affordable people are charged double.

Sub Facilitator

- How do you distinguish if people in the area are best suited for the tariff?

Engr. Taqsem A Khan (DWASA, Bangladesh)

- 1. Cost of land. 2. How much area your apartment occupies. 3. Land, household number, income. These are used to computerize tariffs. We held many workshops. So, people are not very unhappy. After reforms, we will be a profitable organization capable of paying back loans to development banks.

Sub Facilitator

- How many times is the tariff different between the lowest and the highest?

Engr. Taqsem A Khan (DWASA, Bangladesh)

- Almost double.
- Union wants more people in the workplace. We could work on the union issue. We are going to introduce paperless. Everything will be computerized. Mobile banking will be more popular in Bangladesh. Anyone can pay anywhere, anytime.

Dr. Usman Latif (WASA-F, Pakistan)

- If you decide you will charge extra, someone who inherited the property from their parents wouldn't be able to pay.

Engr. Taqsem A Khan (DWASA, Bangladesh)

- You can find out everything except the land value goes down. There are four parameters. If one parameter matches but the other three do not, we won't charge him for the highest category.

Dr. Usman Latif (WASA-F, Pakistan)

- If someone goes to court and challenges the difference in the tariff, how does the court react in this matter?
-

Engr. Taqsem A Khan (DWASA, Bangladesh)
- First, we have the right to change because the government agreed.

Dr. Usman Latif (WASA-F, Pakistan)
- How do you handle the union?

Engr. Taqsem A Khan (DWASA, Bangladesh)
- It's a long process. Union people are not the wage worker but the salaried worker. We made it clear. We are going to fight in the court as well.

Mr. Tiresh Prasad Khatri (Ministry of Water Supply, Nepal)
- Due to climate change, not only infrastructure has been damaged, but water quality has also deteriorated. One area of the country recently saw groundwater depletion due to the monsoon. The water level went down and became saline, forcing people to use arsenic-contaminated water.
- Three years ago, when our project was underway to serve water in a valley where 3.5 million people lived, debris came and caused damage.
- We're working on policy development. We will be able to provide it in two months. The act has many provisions, including licensing for groundwater sources and service providers.
- The tariff for water and sanitation is very low.
- Capacity building.

Mr. Gyanendra Bahadur Karki (KUKL, Nepal)
- Tariff is very low all over the country. Surface water charge is very low. We are supplying water at a very low price.

Sub Facilitator
- How about the situation of electricity costs in Nepal?

Mr. Gyanendra Bahadur Karki (KUKL, Nepal)
- 6 rupee per unit.

Engr. Taqsem A Khan (DWASA, Bangladesh)
- What is the impact on the water supply? Is it increasing frequently?

Mr. Gyanendra Bahadur Karki (KUKL, Nepal)
- It is subsidized.

Engr. Taqsem A Khan (DWASA, Bangladesh)
- Sounds good. We get the manufacturer's rates.
- How much is the surface water, and how much is the groundwater?

Mr. Gyanendra Bahadur Karki (KUKL, Nepal)
- Sixty percent is surface water, and 40% is groundwater.

Sub Facilitator
- I want to add one important point. People are getting surface water, but this is very difficult because they had to dig a 20 km water tunnel for 20 to 30 years. Digging groundwater is much easier.

Mr. Gyanendra Bahadur Karki (KUKL, Nepal)

- Salinity is very high.

Dr. Usman Latif (WASA-F, Pakistan)

- The river water is blackish. We catch water from the source 30km away. We provide the city with almost 90% water from the ground and 10% from the surface. We are investing in a surface water treatment plant to increase capacity. We are shifting from groundwater to surface water treatment.
- Another major project underway is 20 million gallons capacity per day of sewage treatment. Because we get water from the irrigation department from a canal, the irrigation department mentioned that they provide water to farmers for irrigation. We lack water and can't provide it for treatment. With the help of the Danish government, we provided a sewage treatment plant. After treating the sewage water, we will dispose of it into the canal. We can get a similar amount of water from the irrigation department.
- We have launched an awareness campaign with JICA regarding efficient water use because people usually take it for granted.
- We are shifting from the flat tariff to the metered tariff. We installed only 20,000 meters this year and will make it double in the next five years. We have 200,000 connections, so it will take time.
- We have slum areas, and it is difficult to launch this kind of thing in the slum area.
- We are experiencing an increasing rate of electricity frequently, every 2 to 3 months. Our tariff has been frozen since 2007. We are negotiating with the government to increase the tariff, and they gave us consent. We will increase the tariff, but still, it is a flat tariff.
- Another area for improvement is miscommunication between the departments, which disturbs our service. We are trying to improve the inconvenience.
- Groundwater recharge. We should adapt the groundwater resource technology and recharge it using rainwater.
- We faced much difficulty in our water supply during Covid-19. If the SCADA system is installed in all the cities, we could manage water supply easily and maximize customer service during Covid-19.

Mr. Bahadur Karki (KUKL, Nepal)

- The major challenge is groundwater depletion because Lahaul, the 2nd biggest city, depends on groundwater 100%. All the industries depend on groundwater. The main recharge body is the Ravi River, and we were getting a good amount of water, but after India built a dam, the river almost dried up, and we could get water only during the rainy season.
- We have a very minimum-meter water connection. Non-meter-connection users are charged on an area basis. People don't care how much water they use when they are charged a flat tariff. We will bring surface water by canal and have a treatment plant to address the issue.
- Meter installation is very important. We've done it successfully through PPP. One Chinese company established an assembly unit of water meters. We don't produce water meters. Hopefully, we will be able to install a water meter in all the properties.
- The distribution network is so interconnected that it is not easy to stop water flow when leakage occurs. A surface water project is being developed.
- We want to know the sustainability of groundwater, that is, how much groundwater exists.
- Quality of parameters is highly expected. The arsenic level, once considered high, is not high now.
- Tariff issue. Water is taken as a free commodity. We could luckily make some changes this year, but the root cause is a lack of autonomy. It requires legislative changes. JICA diagnostic reports have recommended that.

Mr. Zeeshan Bilal (WASA-L, Pakistan)

- Climate change. We are going to have a surface water treatment plant. If monsoon comes, the water level will be high. So, it needs to be addressed.

- We realized that there was no emergency response mechanism when Covid-19 occurred, but we learned we can do many things online.
- Financial and economic issues, but we also learned about digital systems such as online payment and digital banking.
- Geopolitical risk in a border city. Any regional instability can cause incidents like a large-scale blackout three months ago, but we had no backup plan. We can consider a mobile treatment plant for emergencies.

Dr. Usman Latif (WASA-F, Pakistan)
- We completed a feasibility study to install a 20-megawatt solar power system to make our utility self-sustainable.

Mr. Zeeshan Bilal (WASA-L, Pakistan)
- We have converted three pumping stations solarized and proposed a 150-megawatt solar system to PPP. We are also looking for cheaper electricity because electricity is a significant issue.

Dr. Usman Latif (WASA-F, Pakistan)
- Solar system can be countermeasures for power outages.

Engr. Taqsem A Khan (DWASA, Bangladesh)
- The water utility has to be autonomous. There was debate before if water is government sector or public sector. Water is a human right, but it doesn't mean the government will give you free water. Providing it is the government's responsibility, but buying it is your responsibility. Privatization is risky. In most cases, it is directly under a government agency. This is a core issue. If it cannot be decided, we will be discussing the same thing at many conferences in the future. We think unities should be autonomous.

Dr. Usman Latif (WASA-F, Pakistan)
- Even Japan is following suit. They decide things at their level.

Sub Facilitator
- Japan’s waterworks belong to the municipalities.

Facilitator
- In Sri Lanka, we have a different model for rural areas. The government provides capital cost for a water project and transfers it to a community organization that runs the utility.

Engr. Taqsem A Khan (DWASA, Bangladesh)
- My conclusion is to do the less for which you don’t need to discuss.

Mr. Zeeshan Bilal (WASA-L, Pakistan)
- I can't entirely agree because rural water utilities always lack finance.

Engr. Taqsem A Khan (DWASA, Bangladesh)
- What is the worst situation when autonomy happens? It destroys the whole system. Autonomy sometimes creates monopoly and corruption, so there are pros and cons.

Mr. Zeeshan Bilal (WASA-L, Pakistan)
- But you have a simple management principle: responsibility should accompany authority.

Sub Facilitator
- Let’s hear the conclusion.

Facilitator

- Common points: Climate change directly affects water supply. Clone and flooding and so many others are climate-related issues—salinity and depletion of groundwater.
- Bangladesh: Digitalization, non-revenue water, infectious diseases, changes in rainfall pattern and population growth.
- Nepal: Flat rate tariff, low-rate tariff, climate change related issues, depletion of groundwater, and giving license for groundwater resource.
- Pakistan: Transportation of water from the source to the consumer, tariff mechanism, miscommunication between different departments, groundwater recharging, mitigation measures in tariff mechanism, digitalization and lack of autonomy, shifting from groundwater to surface water, lack of emergency measures, and aging of infrastructure.

EOT

11-5-4 Session 2 Group A

Record of Group Discussion	
Session	Session 2 (Day2)
Program	Group Discussion
Group No.	GroupA Day2
Recorded by	IIZUKA Masanobu (MR.)
Theme of group discussion	Towards Achieving SDGs Goal 6
Facilitator Sub Facilitator Accelerator	Mr. Edgar H. Donoso (MCWD, Philippines) Mr. SUZUKI Chiaki (Japan Water Works Association, Japan) Mr. Nguyen Van Thien (BIWASE, Vietnam)

Mr. Edgar H. Donoso (MCWD, Philippines)

- Good afternoon, everyone. We will now begin group discussion. By the way, my name is Edgar. I'm from Metropolitan Cebu Water District in the Philippines. I'm honored to be the main facilitator of this group discussion. The Assistant facilitator is Mr. Suzuki.

Mr. SUZUKI Chiaki (Japan Waterworks Association, Japan)

- Good afternoon, I am Chiaki Suzuki from the Japan Waterworks Association, and I am very glad to be here with you. With some of your countries, we have very good relationship; between the Philippines Waterworks Association, or Vietnam Waterworks Association…I look forward to deeply talking with you. Thank you very much.

Mr. Edgar H. Donoso (MCWD, Philippines)

- By the way, the member of this group, from the Philippines, Vietnam and Thailand; first I will briefly repeat the explanation of the Action Plan that will be developed and presented at this forum. In this forum, you will be asked to create an Action Plan through the three sessions: Day#1, Day#2 and Day #4 and present it in the summary session. On the Day#1 and Day#2, each participant will make notes on the first and second pages of the Action Plan that are on hand at each participant. On the final day, Day#4, each participant will gather by country to discuss to compile into a country Action Plan and make a presentation. So, on Day#4, the presentation maybe on the General Assembly will be by country. You can choose your good presenter and I think JICA will follow up on the Action Plan that we are going to do in our country.
- To achieve our Goal #6 (of SDGs), which is "universal and equitable access to safe and affordable drinking water for all," it is necessary to secure financial resources for the investment.
- So, what is important in this discussion is really securing financial support to implement water infrastructures that will improve our customer service; the financial resources for investment and to make actual investment through various means such as improving water services, improving communications with customers, revising water rates appropriately and raising funds outside the water rates revenue.

- I think the most challenging part or component in this is revising water rates appropriately and raising funds outside the water rates revenue. This morning we just hear top presenters from our group, and it is much frustrating for us who are not private entity because their numbers were all good; their non-revenue is a single digit and they have no problem on their infrastructure development, but I don't know with other members in Vietnam. For us in MCWD, we have a big problem for that.
- Number one is the social and political acceptance of our water rates or water rates adjustment. Second, our non-revenue is 32 and their non-revenue is 6.58, and Manila Water is 13 but our non-revenue is 32(%). So, what I'm trying to point out here is that we would like to focus our discussion on securing financing anyway, and on improving non-revenue water. Because for me, if we can improve non-revenue like in my case, for example, if I can recover even 10% of our non-revenue and we are producing about 300,000m3 per day.
- That's already 30,000 m3 per day additional supply to our water district. By doing so, maybe providing more available water to our consumers is on way of improving our customer service.
- Let's now start with our discussion from, I think, Vietnam, the one presented this morning.

[Accelerator]

Mr. Nguyen Van Thien (BIWASE, Vietnam)

- Recently you found out this morning that we were saying non-revenue water is 5%. To compare with our colleagues, let's say about Bunh Tau, Hue, it's 10% of non-revenue water, a bit higher province, like Phu Tho and others, is about 12%. Non-revenue water is the main point of the Vietnamese government's policy. The lower non-revenue ratio you can get (achieve), the lower you are required for the years after. Let's say for the period of 2023 and 2024, the requirement is about 14%. The lower percentage that your company can make (achieve), you can keep the profit from non-revenue water you earn. If the company's non-revenue water is about 25 or 27%, the government will require you to make it lower to meet about 17%. The minimum requirement by the government of Vietnam is 15%. Starting from 2013, the company who make (achieve) global non-revenue water, you can keep the profit.
- In BIWASE, in the past ten years our non-revenue always was lower than the requirement of the government. In our financial report of the year 2022, we asked for an external auditor to make (work with) accounting (to see) how much we earn from our non-revenue ratio. It's about nine million USD (converting from VND), and the year before that is about eight million USD.
- If we do not minus the amount of water that's allowance from the government, we cannot make any profit from that allowance, and then the government will ask us where this came from our total revenue.
- If you make (set up) water industry in Vietnam, if you make the profit over 10% it will make your colleague hard time. It's one of our main points to ask for the water tariff in risk. Allowance is only 5%. Allowance for profit is 5% and then they will be happy. This is a very important scenario that we need to ask our external auditor to separate it and we can keep the remaining profit for a re-investment. That's it.

Facilitator

- Let me clarify. If you can achieve a good non-revenue water (ratio), you have an incentive, "reward"?

Mr. Nguyen Van Thien (BIWASE, Vietnam)

- I think it depends on province. Local PPC (Provincial People's Committee=equivalent to provincial government office in a socialist republic) will discuss and have an approval from different provinces, because now in VN, different province has (sets) different tariffs.

Facilitator

- Your tariff covers all the costs that you invest?

Mr. Nguyen Van Thien (BIWASE, Vietnam)

- The tariff needs to be viewed by our BOD (Board of directors), plus a consultant to compare the pricing; let's say, if this time the price of electricity is increasing, we need to add it on, like you said earlier yesterday. You have formula and then if one part of the formula is increasing, the price will be needed to increase, but then we need to make (work with) a paperwork and submit to the higher level, let's say, the PPC (Provincial People's Committee).

Facilitator

- So, it's not automatic to adjust the pass-on formula. Any further question? Any more clarification from the group?

Sub Facilitator

- OK, I give you some comment regarding non-revenue water reduction. I think that the final solution of non-revenue water reduction is replacement, but in Japan, almost all leakage, I mean, 95% of the leakage occur from (in) service pipes. So, the Tokyo Metropolitan Waterworks Bureau has decided to change the material of the service pipe to stainless steel pipes. After that, the non-revenue water ratio was going down around 3%, has changed very dramatically, but the customer pays the cost to (change) to the stainless-steel pipe. That's a problem. So, our budget is always limited.
- Yesterday, we discussed that we should decide the priority; which is the first? Yesterday, Professor Takizawa also told us which is first, to improve the commercial loss or physical loss? Physical loss replacement needs a lot of cost, big budget, but (as for) commercial loss, how much is the assemble fee or how much is (for) water meter? Water meter is cheaper than replacement (of pipe). So, it depends on your organization. It depends on your budget. You will decide the priority of each activity to reduce, but of course we recognize some of organization or water utility have a problem of water shortage. Non-revenue water will be a second water resource. So, you should compare, which is the most important for your utilities. Thank you very much.

Facilitator

- Your current non-revenue water is 5%. What is your plan; are you going to reduce it further or just maintain it? What's your plan for that?

Mr. Nguyen Van Thien (BIWASE, Vietnam)

- We understand that to keep this is quite hard, but we do want to keep it. To make it a little lower is even harder. Water meter is very important; it needs to be more accurate to count the leaking water, and the water pressure inside the transmission (pipe) is another point of importance. We need to maintain the water pressure.
- Another point is physical impact to water transmission network, I mean water pipeline network. We are trying to reduce the risk as much as we can for physical incident. If anything happens, we do have a connection to the community, so they will notice us, and we will have our expert staff fly away to visit.

Facilitator

- So far, you are going to maintain your non-revenue water at present level and the strategies, plans and activities may be the same that you are now implementing?

Mr. Nguyen Van Thien (BIWASE, Vietnam)

- Correct.

Mr. Le Quang Minh (HueWACO, Vietnam)

- Now the non-revenue water in HueWACO is 10%, and other water companies also want to reduce this amount. However, we also calculate economical rate, and it should be about 8.5%.

We would like to keep this ratio as 8.15%. We don't want to get lower because one dollar that invests to decrease this ratio is more expensive than the other one. Thank you.

Facilitator
- You've presented your non-revenue water. You are from SAWACO?

Mr. Le Quang Minh (HueWACO, Vietnam)
- No, HueWACO.

Ms. Sarah Monica E. Bergado (Manila Water, Philippines)
- Probably I could also share; I do agree that we also need to compute for the economic level of leakage, maybe you could have a side discussion on how you came up with that 8.5% is the best rate for you. In Manila Water, we still have at 13% but volume-wise, it's still a lot. So, (there is) room to decrease but up to how much? Not yet.

Facilitator
- Can you say something about reaching that economical level of hopping to 8.5%?

Ms. Sarah Monica E. Bergado (Manila Water, Philippines)
- I don't know. How do you compute for the optimal level of non-revenue water? Increasing it further is more expensive.

Mr. Le Quang Minh (HueWACO, Vietnam)
- To make this formula, we need to make calculation about the cost of labor, cost for investment to equipment and facilities, then we compare with the non-revenue water savings. The database statistics was taken since 2018. This is the way HueWACO is calculating.

Facilitator
- Thank you. For Metro Cebu, we're also thinking to calculate deficit to see the non-revenue water, because for us, by decreasing 1% of non-revenue water, it costs us a lot, but the revenue that we derive out of 1% outweighs the cost for reducing the (non-)revenue, but you know, we appreciate so much, especially the presenter for this morning, that they have very good numbers.

Sub Facilitator
- So, Sarah, you are right. It depends on the production cost. If your water utility has a lot of raw water, you only inject chlorine to supply the water. It's not so big issues for non-revenue water, but the raw water is very, very limited, and its treatment costs very much, too. It is the case in which we need to reduce non-revenue water more than before.

Facilitator
- In addition, that will be the challenge of MCWD in the future, considering that we are now tapping desalinated water. So, desalinated water is, I think, 3.5 times of our existing cost to produce water. So, we are buying desalinated water in Pesos. It's about 73.86 Pesos per m3. This percentage already shows about the economic rate.

Mr. Le Quang Minh (HueWACO, Vietnam)
- It's based on the case of each company; the non-revenue water is not same for all the companies and all the nation. It's not the same. In HueWACO, 8.5 is suitable, but in Da Nang or in BIWASE, it's different.

Facilitator
- Any more about non-revenue water from that side?

Mr. Pornsak Samornkraisorakit (MWA, Thailand)

- Thank you very much. In the morning, we were talking about water sustainability, right? from the United Nations. Now we are talking about non-revenue water. It's a subject for water sustainability. In MWA, nowadays we have the number of non-revenue water around 27%. For the year 2027, we set (target) for non-revenue water from 27% to 25% reduced by 2% by 2027. As Mr. Suzuki talked, we may use different material, to reduce non-revenue water. In the way we study, it is about different materials. Currently inside business areas, we use PVC but nowadays we change the new material for households, HDPE.

Facilitator

- So (it means) before you were using PVC and now it's HDPE?

Mr. Pornsak Samornkraisorakit (MWA, Thailand)

- HDPE in some area.

Facilitator

- In some area. High density…

Mr. Pornsak Samornkraisorakit (MWA, Thailand)

- Yes, high density. Some area: why? Because in the area, this possibility for anyway, we have area for business. We have area for factories. We have area for households. We set high quality for replacement of pipeline, a new pipeline. Why? Because (of) different water cost; water price is different. The factory (industrial area) is high, and household (area) is low. We change the pipeline for high cost from this area, factory area and business (area) are high. Water price is high. We set where it is for the revenue.
- I compare about the budget for the change/replace, new pipe and make new water treatment plant. The cost is equal. You know, it's the same cost. It's important for MWA. We have the target. Now we have the budget for repairs, not income from bank (bank loans). Now we have budget for ourselves, you know, it's only 1% is really budget (1% of general account, probably). Really more (in reality, we need more, maybe).

Facilitator

- It's very difficult to understand. How?

Mr. Pornsak Samornkraisorakit (MWA, Thailand)

- In the morning, some countries shown the news. 8.5%. Oh, really! Really how? In Thailand, 27%.

Facilitator

- Another strategy that you are going to implement introducing (for improving?) non-revenue, you mentioned already that you are upgrading your pipe system or by changing the material of your pipe from PVC to HDPE. What are the other activities that you want?

Mr. Pornsak Samornkraisorakit (MWA, Thailand)

- OK, lately we have our latest non-revenue water of two years ago. The non-revenue water is around 30%, two or five years ago. After that, we control about the company for repairs. We had the method statement for control (of) the company in step- by-step repairs, you know, step by step, and after that, we revise and modify this method. (With) This method (we) can review non-revenue. We control. We have the method statement, standard statement for the company to repair into new pipe.

Facilitator

- Thank you.

Ms. Sarah Monica E. Bergado (Manila Water, Philippines)
- But I have a question. May we know what is the root cause for your non-revenue water? Because sometimes it could be like measurement, sometimes it's in the service pipe, so that we could consider what is the right solution.

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- Yes, yes. (About) This solution, we have some special department for research and study non-revenue specialties, yes, financial, material…and make a statement for control income of company for repairs.

Mr. Le Quang Minh (HueWACO, Vietnam)
- How about the root causes that cause higher non-revenue water ratio?

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- Root cause? (He did not understand)

Mr. Le Quang Minh (HueWACO, Vietnam)
- The main reason(s) that cause high non-revenue water ratio in MWA.

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- Oh, the reason! OK, in the past, we didn't around ten years ago, we didn't have the method statement for control (of) the company's income for repair, new pipe, and nowadays we have the method statement for control, the company income to repair. Because we are a state enterprise and step-by-step for control, the company repairs. We have step-by-step for control.

Ms. Sarah Monica E. Bergado (Manila Water, Philippines)
- So, it's physical losses, physical by breakages and leakages in the system?

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- But in the past, we had the material, material for PVC. PVC material is loose (low?) cost. It costs less. Then we study for change (of) the material.

Facilitator
- Maybe we should change the issue.

Mr. Le Quang Minh (HueWACO, Vietnam)
- He (Mr. Minh) said that maybe because of the pressure differences…

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- Yes, I know. I know about urban area. We set the pressure for end users. We set it around six to 10 meters for the end users. We mean pressure in tunnel, in a big tunnel, in distribution pipe for control. We have problems about broken pipelines.

Facilitator
- But did you happen to like, or attempt to quantify non-revenue householders? How much for physical loss and how much for commercial loss? Yeah, because like in Metro Cebu, we already determined that most of our losses, water losses, are really for physical loss, meaning leaks, but for metering it's very minimal, only seven per cent.

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- In physical loss it's like, I think around 20 to 30%, oh, no, no, 10%, and commercial loss is around 90%.

Sub Facilitator

- In the morning session of yesterday, someone told, maybe Professor Takizawa who told us, if you reduce the water pressure, the total volume of non-revenue water is going down, but still, big leak. The situation is the same. So, you should take off the cause, the reason of the leakage.

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- Yes, yes. This is reason for reducing the revenue, but the idea is that the pipeline is around 200,000km, more than 20,000 kilometers long. It's difficult to control the pressure.

Sub Facilitator
- Only two per cent.

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- But the average amount of MWA is huge and also for the length of distribution. Yes, it's very long, very difficult.

Sub Facilitator
- Yeah, year, and how about the case of PWA? PWA sometimes consists very small waterworks.

Mr. Nithit Thongsa-ard (PWA, Thailand)
- It's the same problem of non-revenue in Thailand. MWA, PWA. Government policy commands 25%. It's so difficult for us. In MWA area three points, 74 points in my area. It's so expanding and complex(ed) problem in my area. Old pipeline, depth (of) pipeline…too difficult for quick repair. It's a root cause of non-revenue water.
- So far, it's so lost (helpless?). So far for repair. Change(changing) pipeline is so expensive and big investment. Pressure control has some problems: consumer satisfaction in the end of pipeline. Meter is so expensive to invest, change (changing) meter. It's so difficult, but we try so much for non-revenue water. In the past, it's for efficiency of our organization, and in present, it's sustainability. One of sustainable organization to think about non-revenue water.

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- I have other (solution) for non-revenue. We, MWA have the technology to find out the point of leakage. We have takeaway, but we have the problem about how we fix the broken pipe quickly. It's a big problem because in Bangkok area, it's traffic. It's very difficult. The local government does not allow experts to repair. You know in MWA, distribution pipe is OK, short time for fix(ing) the broken, but in the big tunnel, long time.
- We only have time at night, only during night. It's a big problem for non-revenue. The technology I think has many, many trouble to find the broken point, but the problem for fix(ing) broken, how we quickly fix this broken, I think the same. Same in (different) countries. Technology to find the broken point is OK, we have, but we have problems about how we fix quickly.

Facilitator
- Thank you very much. Any more about non-revenue? Because otherwise we will proceed to the next topic, which is the water tariff adjustment.

Mr. Sherwin Mendoza (Maynilad, Philippines)
- OK, I just add more on MWA, thanks. I know we have the same situation with Thailand, and this morning I acted with our presenters because they have a single-digit non-revenue water. We are in fact, as I checked the profile, Maynilad has the highest non-revenue water among all the participants at 42%. It's 31% for the DMA, District Metered Area, 42% for total non-revenue water. To give you background for Maynilad, in 2008 before new Maynilad came to take over the old Maynilad, we had the biggest, we consider it the biggest or largest non-revenue water management program in Asia.

- We need to manage, to reduce non-revenue water from 69% to 20%, that is our goal at the time. We even acquired consultant, technical assistant, NIEA of Israel (record keeper tried hard to find any such name in "Israel Water Technology Company Directory" in vain), help(ing) us to reduce our non-revenue water. We manage, we strategize it to form 1,6000 DMAs. We replace all our meter from velocity to volumetric, all our meters. We have a cycle of replacing it five to 10 years every year, even if it's not yet defective, to make sure that all our water meter is doing well. We installed 1,500 pressure regulatory valves (PRVs).
- We also have 1,500 pressure monitoring points to ensure that we manage all our DMAs. We have 30 leak detection teams and 30 leak detection equipment. We also have our integrated meter management, and yet we haven't met the single digit non-revenue water.
- In fact, we manage to reduce it to 30 for the DMA, to 30 but during pandemic goes up again. Even we haven't met yet our target, our extended target is to reduce it to 20% by 2030. The bottom line is, it is very hard to bring down non-revenue water, but it is harder to maintain it.
- That is what we saw in this non-revenue water program. Again, we are looking back to what happened to non-revenue water of Maynilad. We have managed to reduce our non-revenue water by 600 MLD, but still we are looking for 1,100MLD, million liters of water being lost again in our system.
- So, I also took into consideration the presentation yesterday that Yokohama took it 49 years to reduce non-revenue water from 69% to 11%, and even Tokyo Water by 40 years from 30% to 10%. So, I am really amazed how we passed this one because our regulatory office is mandating us to fast track our recovery.
- That's why we really need to meet our 20% non-revenue water by 2030. So, that is our challenge, major challenge in Maynilad. What we are doing now, since we have now all the infrastructure as presented this afternoon by AGS (an affiliate of MARUBENI Co.), we are using all our infrastructure to check or to look for any possible process or technique to further reduce our non-revenue water.
- We also look for other type of diagnostic which we developed by our in-house team to look for the possible ways to further reduce it, and even we are engaging again for our technical advisor, which is Yokohama Water, which hopefully by this coming month they will sign the agreement.
- So, the bottom line here is that it is really hard to maintain it, and this is all our source of water right now. 1,100 MLB if we manage to recover this non-revenue water, we certainly don't need another dam which is being built in the north of Metro Manila, in north of Luzon. We will no longer need that. So, that is enough, give more water for 1.1 million Manila in use. I just share our predicament on reducing non-revenue water.

Sub Facilitator
- When I first visited Manila, I saw many "spaghetti distribution pipes," and MWSS supplied water intermittently. So, in that case, there are many leakages, but the contaminated water going into inside of the pipe through leakage, through hole or leakage crack. So, it was a very dangerous situation. Now it needs to be improved for the situation.

Mr. Sherwin Mendoza (Maynilad, Philippines)
- Yes, we already have got out of those spaghetti connections. We have these, I think also Manila Water what we call it "Meter Banking." With "Meter Bank," all our service connection in one area going to a specific location, most people in the depressed area. So, we have that.

Facilitator
- OK, are we done? OK, last for non-revenue water.

Mr. Nguyen Thanh Su (SAWACO, Vietnam)
- I realized that many water companies in the world are having concerns about how to reduce non-revenue water ratio, and in some provinces, we also implemented some methods, some solutions to reduce this ratio. From this point, if the cost is expensive and I think that is not

really that if we just look about the amount, the number of that water company already get because it's different about the companies. For example, if we compare small city and big cities, it's not comparable. What I want to say here is we need to look for the reasons causing the non-revenue water and then we will have possible solutions for that.

- In SAWACO we experienced that. Some years ago, we also outsourced to (different) companies, and they did very well, and they can (were able to) reduce the amount of non-revenue water. However, after they stop contracting, they hand over for our staff to do it, and it's not successful anymore. Non-revenue water ratio still increased again. A lesson learnt from that is that we need to make a total of comprehensive assessment on the characteristic of the population, geographical characteristics, etc. so that we can have an overview assessment. Based on the overall assessment, we will have the reasons. We have different reasons that cause water loss, and then we prioritize what should be done to be applied for each area, not for everywhere.
- For example, if we identify old pipeline, I mean for transmission pipeline with diameter from 2,000 to 2,400 millimeters, we need to have a quick replacement of that big pipe because if leakage happens in this big pipe, it will be a big problem.
- We need to identify the main reasons that caused the leakage later, and we found that the leakage happened mainly on the service pipeline due to technical fault by construction staff, when they construct pipeline, the skill whey they lay the pipelines, so it's not correctly done. To that end, that is an example, when we found that reason, we focus on training the staff, how to have a correct and appropriate methods of laying the pipelines, then we can reduce the possibilities of leakage.
- Then we can balance our finance because we can focus on the right actions. Those are what we like to share with all of you.

Facilitator

- OK, thank you so much. Mr. Ho Huong, do you have something to say about non-revenue?

Mr. Ho Huong (DAWACO, Vietnam)

- In Da Nang, in DAWACO we identify three main attributes (obligations). The first attribute is to maintain safe and sustainable water for the people, and next, we need to secure the profits for both outsiders and insiders, the company staff and for big investors from outside, and thirdly, we need to secure the income of the staff. Then based on those three attributes, we consider how to reduce non-revenue water and other costs, like operational costs, and the national policy for non-revenue water ratio until 2025 is that all companies would reduce non-revenue water ratio from 15% and now this is the percentage of DAWACO, and we would like to remain (maintain) this ratio.

Facilitator

- Come again? The present non-revenue water, what is the present ratio?

Mr. Ho Huong (DAWACO, Vietnam)

- 15%, one-five.

Facilitator

- 15%, and you're planning to reduce, or to maintain?

Mr. Ho Huong (DAWACO, Vietnam)

- Maintain.

Ms. Sarah Monica E. Bergado (Manila Water, Philippines)

- I have a last comment, probably to add from sustainability perspective that non-revenue water reduction is really, really critical because we are cognizant that water is a finite resource and

even in our sustainability reports and disclosures for our investors, they also now track the amount of water that is abstracted from the environment.

- It's not usually regulatory indicator for us but other stakeholders would like to know the amount of water abstracted, and if you are expanding and yet you are expecting that the water abstracted from the ecosystem remains the same and if you increase, there's your ESC rating because we are a publicly listed company, in ESG rating there's a minus points also, so it's additional pressure on non-revenue water reduction.

Facilitator

- OK, let's proceed to water rates. I don't know whether socially or politically acceptable to introduce or to request for rates adjustment if our non-revenue water is like MCWD which has 32% , and no, MCWD only, so I don't know if the people in Cebu or the politicians will accept our request for water rate increase to sustain the operations of the water district if we have that high non-revenue water, so how to address the financial viability of the water district to improve our customer service, at the same time reducing or seeing the revenue at that level, so can we have anybody?

Mr. Nguyen Van Thien (BIWASE, Vietnam)

- Now, the water tariff in Binh Duong is 42 Cent per cubic meter.

Facilitator

- The issue that we are going to address here is whether what is your strategy, how you want to proceed to get the water rates increase from your regulator, or is there a regulator in your country that will review your request for water rates adjustment?

Mr. Nguyen Van Thien (BIWASE, Vietnam)

- Before we move to your question, we would like to ask Maynilad and Thailand about your water tariff. Recently, our tariff is 42 Cents per cubic meter.

Facilitator

- 42Cent?

Mr. Nguyen Van Thien (BIWASE, Vietnam)

- In USD, 42 Cents per cubic meter.

Facilitator

- Our target structure is different. We have minimum fee of 152 Pesos, no, 162 pesos for the first 10, zero to 10. So, 152 that is how much in dollar? It's around three dollars for the first 10 cubic meters, and then beyond 30, it's about one dollar. Production cost is about 26 Pesos, but that is excluding water supply.
- In Metro Cebu Water District, we have different use rate of water. Let's say the first 10 cubic meters is USD3 and then the next will be…no, it's a ladder rise. No, another 11 to 20, there's a separate meter, separate rate. 11 to 20, another rater per cubic meter, and then 21 to 30 is another ladder rate, but beyond 30 is about USD1.

Mr. Nguyen Van Thien (BIWASE, Vietnam)

- Beyond 30 is USD1. So, how about in the middle. In the middle from 10 to 20?

Facilitator

- It should be less than 50 Cents per cubic meter.

Mr. Sherwin Mendoza (Maynilad, Philippines)

- To add more to Metro Cebu, because Maynilad and Manila Water, we have differences in the case because we are private entities. We are private companies being governed, being

administered by the government. So, whatever we invest, every five years we have the business plan review. So, every time we invest approved by the regulatory office or by the headquarters office, it will be back through tariff, but this year, with our new concession agreement, we need to satisfy different service obligations first to get that done. So, our tariff is lower than what Metro Cebu (said), because we have a bigger population base, which is about one point five million customers. So, we need to divide all our investment to the number of customer and then divide it with the number of concessions, not years in concession, and then get our approved tariff.

- So, we have every year tariff and for next year we need to attain our service obligation because if not, the highest tariff being given by the MWSS in our regulatory office will not be given to us. That's our challenge for this.

Mr. Nguyen Van Thien (BIWASE, Vietnam)

- About that, recently how much is the tariff that you get?

Mr. Sherwin Mendoza (Maynilad, Philippines)

- For increase in tariff? For next year it's about six Pesos, six Pesos is around 15 Cents. That is per cubic meter, (and) additional 15 Cents per cubic meter, we really need that, multiply to the number of cubic meters that we are saying. It's a huge amount of money.

Facilitator

- What we are saying here is that even in our country, I am from the government and they are from private. There is a regulatory body that reviews our water rates obligation. So, in the case of private, they have their own body that will review and for the water utilities of water districts, we have also local water utilities administration that will supervise and review our water rates.
- I don't know with other countries if you have also like reviewing body of your water rates?

Mr. Pornsak Samornkraisorakit (MWA, Thailand)

- In Thailand, we have one for the households that (is) around 25 Cents per cubic meter, and the factory and commercial price around 42 Cents per cubic meter, and average 29 Cents per cubic meter.

Facilitator

- Is that flat rate?

Mr. Pornsak Samornkraisorakit (MWA, Thailand)

- No, no, average.

Facilitator

- Is it ladderized also?

Mr. Pornsak Samornkraisorakit (MWA, Thailand)

- Household, commercial…

Facilitator

- Commercial? Your structure, if it is commercial, types too. How about if it is commercial?

Mr. Nguyen Van Thien (BIWASE, Vietnam)

- Around 59 Cents.

Facilitator

- For commercial….

Ms. Sarah Monica E. Bergado (Manila Water, Philippines)
- In Manila Water, starting this year, 26 Pesos, so that's around 0.46USD or 46 Cents, that we have planned to increase in the next um… up to 50 Pesos so that's 0.62USD or 62 Cents.

Facilitator
- For Metropolitan Cebu Water District, there's no pricing for commercial; we have single rate based on consumption that's why we consider beyond 30 cubic meters consumption, higher rate over less than 30, so if you consume more than 30, your rate will be USD1 per cubic meter.

Ms. Sarah Monica E. Bergado (Manila Water, Philippines)
- The one I mentioned was residential: domestic, so higher rate for…let's say, business ….

Sub Facilitator
- (Trying to interrupt and say something to her, but the voice was not clear)

Ms. Sarah Monica E. Bergado (Manila Water, Philippines)
- …and also at least, yes, definitely depend on the results of public consultation.

Mr. Nguyen Van Thien (BIWASE, Vietnam)
- We 've been working with ADB over 20 years, so, we heard about Manila Water, especially in the non-revenue water management, and I attend(ed) a lot of conferences for non-revenue water sponsored by ADB. Since We've got several project funding from ADB and JICA, you see this morning we got a technical assistance that supports BIWASE to make a water concession agreement with Binh Duong Province People's Committee (PPC) to secure the water tariff.
- Sponsor highly recommended that the water tariff is a part of component that will have the company to get back the income and then make a repayment, and we understand that not only BIWASE but there are several of our colleagues, our neighbor provinces having a higher tariff. Some different provinces have (set) a higher water tariff as well.

Ms. Sarah Monica E. Bergado (Manila Water, Philippines)
- Good suggestion on the sponsorship. I was going to ask that you mentioned earlier in your presentation that you have grants for your solar panel.

Mr. Nguyen Van Thien (BIWASE, Vietnam)
- The grants are not on us for solar panel. We use the TA funding for IFRS software training, (an) international accounting system, because recently in Vietnam, there are not a lot of Vietnamese companies applying IFRS for our financial report. Normally we use Vietnamese accounting.

Ms. Sarah Monica E. Bergado (Manila Water, Philippines)
- That's for financial disclosure.

Mr. Nguyen Van Thien (BIWASE, Vietnam)
- Yes, yes, and the water concession agreement.

Facilitator
- My next question on water is whether our existing tariff is sufficient to sustain the operation. As far as Metro Cebu Water District is concerned, at this point, no longer sufficient. That's why we requested that our water (rate) is increased last year, July of 2022. Until now, it is not approved. So, maybe we are giving until December to have it, because supposedly that will be approved (in) July, otherwise we will stop operation by December if that will not be approved.

I don't know whether other water utilities, if your existing tariff is already sufficient for a sustainable operation. How about you, sir?

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- I talked yesterday about the water price, because up to the political man. Because we have many reasons for making the document sent to the central government. We have increase of capital cost, chemical cost increase, energy cost increase, but we send the document for the central government to accept increase of the water price. No.

Facilitator
- So again, there is social and political acceptance of our proposal for the rate increase.

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- Yes.

Facilitator
- That is the primary consideration, but I think the other requirement for sustainable operation, like improving communication will help us explain why there is a water rate increase.

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- Yes, we explain the reason.

Facilitator
- Another is, what are other options if we cannot have the water rate increase? Are there available options for like us, a government entity to borrow money, to issue bonds or whatever, sourcing that tare available for a government entity? I think (for) private entities, (it's) not a problem for them, because they have investors.

Ms. Sarah Monica E. Bergado (Manila Water, Philippines)
- They are still a problem.

Facilitator
- Because they have investors, unlike government entities.

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- You have a regulator, right? A regulator committee. Do you have a regulator committee?

Facilitator
- Yes, that's why in the Philippines, although we are in the same country, but different regulator for our tariff. Ours, for water district in the Philippines, there is local water utilities administration that will review, and for private, no, especially Maynilad and Manila Water, it's also separate, but for other private water utility, there is another body that will review, the National Water Resource Board.
- So, there are three bodies reviewing water rates for different applications. Water is the piece. From you, from Thailand, no regulator?

Mr. Pornsak Samornkraisorakit (MWA, Thailand) / Mr. Nithit Thongsa-ard (PWA, Thailand)
- Yes (meaning "NO"), we don't have.

Mr. Nithit Thongsa-ard (PWA, Thailand)
- Awareness of operation in Thailand in demand-side management, eco-efficiency, it's about concern of water resource. It's important for population. They use too much water in household.

Mr. Le Quang Minh (HueWACO, Vietnam)
- In Vietnam, provincial government will decide the water tariff, regardless of whether they're private companies or governmental companies.

Facilitator
- So, one regulator for private and governmental companies?

Mr. Le Quang Minh (HueWACO, Vietnam)
- This is under the Price Management Law of Vietnam.

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- You mean in Vietnam, you have the regulator committee?

Mr. Le Quang Minh (HueWACO, Vietnam)
- In Vietnam, we have different provinces, and each province has its Department of Finance, and it is the Department of Finance that appraise the price. They just give advice to the upper authorities.

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- You make (work with) public hearing?

Mr. Le Quang Minh (HueWACO, Vietnam)
- Yes, we have.

Mr. Pornsak Samornkraisorakit (MWA, Thailand)
- How many percent in the past for the people to accept?

Mr. Nguyen Thanh Su (SAWACO, Vietnam)
- There's only one regulation from the Vietnamese government. There is an instruction for different local Provincial People's Committee. Then let's get back to the material or the main component to make our water production cost. Let's say, raw water, chemical, and the labor cost and electricity or other, you know. So, if the electricity price and then chemical cost is increased, and it's already increased this year. Then every single water company needs to hire an expert to review a proposal and bring to the local PPC, that this tariff is not covering enough, because the price of these components (are) increasing over 5%, and the government only allows the company to make 5% profits on the produced water cost.
- Like this, it depends on different province. The local authorization will be approved for the water tariff, but before getting an approval, there are five different departments to support and to review if the evidence that you put out in your proposal is true. Also, public hearing is as a part of this, but not under our job, it's under the local PPC job. They contact with different districts and conduct a survey.

Sub Facilitator
- I want to ask something regarding procurement of finance. When you would procure finance from ADB or World Bank, cooperate governance is required.
- (It's) The relationship between corporate governance and the board of directors of each company. Of course, politicians do not agree to raise, for example, water tariff, but the board of directors has different ideas, you know, and the board directors accept raise the tariff. In that case, how do you do? This is my question.

Facilitator
- You know in the Philippines, especially for Metro Cebu Water District, it's very difficult to secure funds outside (other than) the water tariff. First is, you need to go through the requirements of local water utilities administration, and after that, you need to go to the

Department of Finance. Then, if it is foreign funded, you need to go to NEDA (National Economic and Development Authority), and maybe the Department of Foreign Affairs.

- So, there's no way that the Metropolitan Cebu Water District can directly negotiate funding outside (other than) the water revenue that we have. Immediately from the local bank, we need to seek approval from our regulatory or supervisory, which is slow one, and another, if you can get that loan, they will charge you like supervision fee, 30%. One time supervision fee.

Mr. Le Quang Minh (HueWACO, Vietnam)

- Before we submit the document to the authorities, we need to have internal meetings among the departments inside the company, and each department will submit proposals. So, each time we issue proposals. In Vietnam, there so many companies under joint stock models. So, the decision to increase water tariff depends on the decision of higher executive. It is the board meeting.

Facilitator

- Any more before we wrap up? This afternoon, physically very fruitful discussion coming from different countries. We need to finalize everything on the last day for per-country presentation. At lease we covered non-revenue water, we have expressed comments and insights about how to improve, it's necessary to improve per cost benefit analysis.
- Second, we also discussed water tariff adjustment. If the water tariff adjustment is not enough, how can we secure funds from outside, besides internally generated funds? Another important issue that we are going to, hopefully, address is constant communication information drive to our customers so that they are informed of about our programs, plans and actions.
- Water rates will never be a problem if they are fully informed, including our politicians. Thank you very much!

(End of Group Discussion of Day#2, Group A)

11-5-5 Session 2 Group B

Record of Group Discussion	
Session	Session 2 (Day2)
Program	Group Discussion
Group No.	GroupB Day2
Recorded by	Ms. Emily Wathen
Theme of group discussion	Towards Achieving SDGs Goal 6
Facilitator	Mr. Dwike Riantara (PERUMDA Tirta Mayang Kota Jambi, Indonesia)
Sub Facilitator	Mr. Yoshiaki Yokota (JICA, Japan)
Accelerator	Mr. SINTHEPPAVONG Khamphasith (NPKM, Laos)

Mr. Dwike Riantara (PERUMDA Tirta Mayang Kota Jambi, Indonesia)

- Today's theme is achieving SDGs Goal 6.
- Mr. Kabir Bedi (PERUMDA Tirtanadi, Indonesia) and Mr. Arief Nasrudin (PERUMDA PAM JAYA, Indonesia) are unable to join today.

Mr. Yoshiaki Yokota, (JICA, Japan)

- Thank you for joining us, and I hope we can have an active discussion today.

[Accelerator]

Mr. SINTHEPPAVONG Khamphasith (NPKM, Laos)

- Thank you for giving me the chance to explain about funding in Khammouane from JICA during COVID-19. Laos Khammouane province has 10 districts, the capital is Thakhek where the utility was established in 1998, at first, we used underground water, this project used

funding from the EU and capacity was only 3000 cubic liters per day. In 2014, Japanese government grant aid allowed this water utility capacity to be expanded 15,000 cubic liters per day, which was completed in 2015. Now we can supply quality water to the service area of around 41 villages.

- In 2021 we received further COVID-19 funding from Japan of around one million USD, for network expansion of about 641248 meters. Construction started 3rd Jan 2012 and was completed this June, for 18 months, after this we can establish around 40-50 connections.

[Discussion]

Facilitator

- So, there is a water supply project in Laos that will be completed this year? What will the impact be on water supply services?

Mr. SINTHEPPAVONG Khamphasith (NPKM, Laos)

- Yes, it will be completed this year, and will have a good impact, it will help the problem, as people in the area can receive quality water.

Facilitator

- So, this has increased the service coverage in Laos for the people. How about communication with customers, how did you improve that?

Mr. SINTHEPPAVONG Khamphasith (NPKM, Laos)

- After we have a managing authority for the project, we can have educational classes to explain to the people living in the service area about water quality and our supply.

Facilitator

- Do you mean educational classes at schools?

Mr. SINTHEPPAVONG Khamphasith (NPKM, Laos)

- Yes, at schools for primary age year 5, and for the community. This is after we complete construction, we communicate with the people in the service area.

Facilitator

- Have you developed any mobile applications in Laos like they have in Tokyo? This has become more common for water utilities. We have created this in Jakarta City, to check the bill, make payments and make complaints or get information. I encourage all water utilities to develop these.

Mr. Siphanh Inmouangxay (NPNL, Laos)

- We have nine districts to supply, serving approx. 140,000 registered. We have seven different plans.

Mr. Khamphouvong Sikholom (DWS, Laos)

- There are about 600 staff and capacity about 121,000, around 1500 connections.

Mr. PHILAVONG Ladda (NPLP, Laos)

- In Laos we would like to expand as much as we can based on our funding. We are lacking funds but also have funding from JICA and to lay pipes in Thakhek, and grassroots monitoring projects and education on how to supervise projects supported by Saitama city. We gained this funding from JICA and are constructing expanded pipes in the city.
- More than 3000 people can newly access water, increasing the ratio, even if this is not a big number. Only 20% of the population can access pipes, and the remaining 80% rely on natural water.

- For customer service, we have support through projects from Saitama, Yokohama and Kawasaki for customer support such as call centers, and we also have an app, but these projects are just beginning now.
- We also have Facebook. We use social media to make announcements to customers if turbidity is too high or we need to reduce production. We also have a small call center to take calls, although we are not a large area.

Facilitator
- So, Yokohama has supported this call center?

Mr. PHILAVONG Ladda (NPLP, Laos)
- Yes, just as technical support. They showed us how we could do this, and we implemented it ourselves. This was mainly in collaboration with Saitama, but also some experts employed by Yokohama and Kawasaki. My supervisor Mr. Sonoda is here.

Facilitator
- Let's talk about water rates and tariffs in each country. This is a key factor in sustainable water supply. Please share your experience and situation.

Mr. Khamphouvong Sikholom (DWS, Laos)
- In Laos, there are separate costs because we are not centralized. Each province has their own tariff, but on average it is around 0.3 USD per cubic liter.

Facilitator
- Do you think this is cost recovery or not?

Mr. Khamphouvong Sikholom (DWS, Laos)
- Yes, I think so?

Facilitator
- So, if there is cost recovery from the tariff then there is no problem?

Mr. Khamphouvong Sikholom (DWS, Laos)
- We have a problem, the water utilities with profits are fewer than four, and six water utilities had losses.

Facilitator
- What about in Cambodia? How are your production costs, and how much do you charge the customers?

H. E. Long Naro (PPWSA, Cambodia)
- The water tariff is very important to run a water utility with cost recovery and allow expansion of coverage area, and healthy operation. I presented how we achieved this this morning.
- We prioritize cost recovery. This includes several factors the team needs to work on with support from external developers and donors.
- Sometimes the government will not accept what you propose, but we always have a consultant to help us evaluate our services based on the government's criteria. It is best to have independent auditors and advisors to advise on approaches towards cost recovery. We have achieved our cost recovery with assistance and the help of our board of directors.
- Cost recovery comes from the tariff, and the optimization of production. We are looking at our daily operations to try and optimize and see what we can do to reduce production and supply costs.
- We need to produce and transport the water at cost; this is very important. We need our staff to commit to work with us to achieve our targets.

- In the beginning I thought this would be a problem, but after two or three rounds of sitting down with the government and finding other ways to approach the conversation, it can become easier to convince them to accept a tariff proposal. In 2021 my second tariff approval achievement was very simple, because the external development partners also concluded that to make an investment for sustainable development, the tariff would need to be raised. This has helped convince the government to renew the water tariff every five years. We are also considering when the best timeframe is to review the tariff, for example not before elections.
- It is clear in masterplan number three that to reach SDG 6, a certain amount of money must be spent, and a certain amount needs to be paid back. There is financial governance you need to meet, and you need to review the tariff for this.
- Based on the financial model I discussed, we will review in 2028, after the election. Until 2027, we can maintain our cost recovery including expansion through the tariff combined with investment etc., but after 2028 we will need to review again to meet our cost recovery strategy.
- For investment we are following up what is in the masterplan, taking action according to action plans aiming toward SDGs 6.

Facilitator
- In Indonesia, the central government regulates tariffs on the local and provincial level but does not have the authority to set this in provinces or cities. However, they can control the minimum and maximum tariff settings and tell the local mayors etc. The governor of a province will decide the highest and lowest prices, and then each municipality sets their own tariff within these. This is enforced by the central government according to law.

Mr. Ade Syaiful Rachman (Ministry of Public Works, Indonesia)
- In Indonesia the tariff is lower than recovery costs, and there is not full cost recovery in Indonesia. There are 388 local water suppliers, and 42% still need to improve their financial performance. 58% of local water suppliers have healthy operations but the tariff is not sufficient to cover costs.

Facilitator
- How about in Cambodia?

H. E. Sreng Sokvung (MISTI, Cambodia)
- We have a clear procedure for tariff setting in Cambodia for full cost recovery. The ministry makes this decision, except for in some cases where it needs the prime minister's approval.
- The ministry sets a tariff, and the operator agrees with this, but when they build a system and expand their network, they always expand rapidly which causes tariff setting issues.
- One issue is that the feasibility study by the operator isn't always valid, which effects setting quality. The regulator checks feasibility but they do not go onsite. There are less than 10 regulators setting the rates for over 300 operators, and as they cannot travel around the country, they are not very accurate.
- We have just gained a new government, but we do not know what will change.

Facilitator
- In Laos, is there a role of the central government for tariff setting?

Mr. Khamphouvong Sikholom (DWS, Laos)
- We have government tariff policy. The minister decides the guideline for the tariff, and the operation plant guidelines, because they enact the tariff review policy. Before approval is requested, the utility should follow the water tariff stature, and create an operation plan to submit.
- If they are not sure, the department of water supply can check and assist in the application. This is sent to the local government before they decide whether to raise the tariff and it is signed by the governor.

Facilitator

- As we are talking about lack of funding for water supply infrastructure development, we should talk about opportunities for raising funding or investment.
- How do you get funding in Cambodia?
- In Indonesia this really depends on central government and state budget, and the local government budget for this also depends on central funding to develop water supply networks in the region, however there are opportunities for funding through investment.
- The government provides funding though state owned companies for water infrastructure financing. My city is one of the first utilities to access this option. Without receiving central funding, we lend money to state owned companies at a low rate to develop water treatment plants and distribution networks. For three years we can pay very low installments.
- There must be a number of funding opportunities outside of relying on donors or the central government for full cost recovery. We can achieve this by paying by ourselves, independently.

H. E. Sreng Sokvung (MISTI, Cambodia)

- We aim for full coverage through government policy. Regarding funding, we have two main types of utility, public utility, and private utility. Public utilities get limited funding from the central government, but mainly from development partners, through grants, lending, loans. The central government also lends to the public utilities. Recently the public utilities are as not concerned about financing, as we have plans and projects for achieving the SDGs, but the private sector does not have adequate funding.
- We have some budget and funding projects; The projects provide funding to private operators and cover investment for network expansion and new systems. Recently we tried to work with the world bank, for a government loan to the private sector to support the private sector through the public sector utility. This is the first time to do this so we will see how it works.
- For water loss, we aim to develop a water development fund to support both private and public sectors.
- We can borrow money from the bank, but the interest is high, and many private operators are not bankable.

H. E. Long Naro (PPWSA, Cambodia)

- We depend on external funds from JICA, AFD, OECD, and also the world bank and EDP. We have paid most of our loans back. So now we are supported by JICA AFD and EDCF. Water is a social need, so we look towards development partners to request a lower interest rate, however the government must be a guarantor for the loan.
- The government lends the money from the development partners, and we as a supplier relend from the government with additional interest based on the guarantee requirement to ensure it is paid back to the developer country.
- We also have a special investment program. A SPC. We have two projects now, construction of water plant with a 30,000 cubic liter capacity and 45,000 cubic liter capacity expansion projects using special purpose companies. The Government of Japan gives money through JICA etc., to construct and run the facility for 10 years. The water is sold to supply authority, and we buy this through the special purpose company. After 10 years the assets will be moved over to the authority to continue operations. So, for 10 years, water will be bought from the special purpose company. We have three projects like this. This is a good system, without giving you grant aid, they will show you how to go about construction and operation together with Japanese partners.

Facilitator

- We also have this experience in Indonesia. In the 1980s, 1990s, there was a lot of funding through the Indonesian government from the world bank, the ADF and foreign banks to help develop infrastructure, but the utilities could not afford to pay their debt, and this became a

large debt gap, with no operator able to pay until 2010, when the minister of finance decided to remove the debt for around 200 water utilities.

- The reason why this happened is that in 1980s, 1990s, and 2000s there were many unhealthy utilities. We have learned from this experience, and no longer have this type of funding.

Mr. Ade Syaiful Rachman (Ministry of Public Works, Indonesia)

- Regarding PPP projects, there are not many PPP schemes for drinking water in Indonesia, as there have not yet been any successful cases. There is a new PPP scheme in water supply with 4000 liter per second capacity, and a supply PPP with 750 liter per second and another in Java for 750 liter per second.

Facilitator

- Does any country have other experiences about PPP?

Mr. Khamphouvong Sikholom (DWS, Laos)

- We have some small PPP but not in water supply as this is under the government, but now we have the policy to welcoming private investment, as we cannot earn money from the funding from other countries. If we have funds from the other partners, we may have issues with the financing in future.
- We also have issues getting loans from other countries. To get a loan we need to talk with the country to get the loan signed off, and then the ministry of finance, who will talk to the government office, we then talk with ministry of finance and investment, and then a round table between the government and MESTI. Then we contact the developer, and we have long term debt and the loan interest. Often the water utility cannot pay back the principal. Other countries may be different but in Laos we have this issue for getting funding.

Mr. PHILAVONG Ladda (NPLP, Laos)

- In terms of funding for water supply development in Laos, the government creates the tariff based on full recovery including investment, If the government makes this high enough, we can carry out the expansion projects in our corporate plan, but if this is lower, we need to cut these.
- The government controls the tariff because each household cannot pay more than 5% of the minimum salary in Laos for water. We are limited in terms of tariff. Setting this at 5% may also be considered too high, and it will end up around 2-3%.
- The funding comes from this tariff, this was set up in in 2020, and calculated in dollars, 0.2/3 USD per cubic meter. But after COVID-19 inflation is up, and the price against USD has changed due to the exchange rate. We need to import chemicals and water meters from overseas, but prices are increased, for petrol too. This has many effects on the corporate plan and cost review. We try to save costs where we can. We also collect investment. Before we had a funding through a fund and could collect profit, but this ended during COVID-19, and the loan ended.
- We would like to expand our supply so are asking the central government which donors could help us, such as JICA or ADP. It is difficult for us to borrow from the bank.
- Regarding cost recovery, we are also asking our central and local governments, the tariff policy is clear, but implementation is difficult. We have five steps, but some steps are hidden and need to be addressed several times over. For example, we have the timetable for the next five years and we update this continuously, but it is difficult to get the government to agree to this.

Facilitator

- Does Cambodia have experience with PPP? In Indonesia we have had this since the 1990s, but its success is debatable. There are impacts of privatization because the private sector sets high tariffs and there is a failure to transfer technology when assets are returned to the public sector.

Mr. PHILAVONG Ladda (NPLP, Laos)

- We have PPP in Laos; in that we have private companies for construction and supply connected to our system.

Facilitator
- How can the government regulate private sector involvement? Like in Manila they had full integration from raw water to customers, Indonesia cannot do this according to our regulations. How can we avoid the downsides of privatization?

H. E. Sreng Sokvung (MISTI, Cambodia)
- We implemented private projects, but they did not go smoothly.

Facilitator
- How does your government regulate private sector involvement? What is the private sector's role?

H. E. Sreng Sokvung (MISTI, Cambodia)
- We regulate them.
- If private companies want to supply an area, they have to make a petition to us, and we can review the petition and feasibility study, and issue a license for a term of 20-year operation and we set the tariff. We also set requirements for water quality as it must meet the national standard.

Facilitator
- By law?

H. E. Sreng Sokvung (MISTI, Cambodia)
- It's a ministry decision. Through regulations. We also have terms for expansion, with regulation requiring the type and amount of network expansion within the area, around 70% usually.

Sub Facilitator
- As Laos explained, their water utilities' coverage is not so high, so they are making distribution improvements, but they are short of funding, they had a grant from JICA for a water treatment plant, but they are short for distribution.
- Funding is important to achieve the SDG goal. PPP projects are one way to get this funding, but this was not so effective in Indonesia. They have established a PPP act, but it is not so active right now.
- The tariff is important in Cambodia, for sustainable operation and to improve the supply services.
- Correct auditing and financial analysis are also important, so Cambodia suggested using professional services, which they are using effectively.
- Laos has also stressed the important of corporate planning. Creating master plans gives a clear plan for future development. This documentation is very important to explain to policymakers and the community.
- Customer communication through mobile apps, social media etc. is also very effective. These are the main points that we discussed.

Facilitator
- We discussed improving water services, communications, cost recovery, water tariffs, and fundraising, these are the key words from this discussion.
- There are several projects in each country, some supported by JICA and other foreign development aid. Indonesia also has Japanese, Korean, Australian, and American support for the development of water services.

- For customer communication, we learned that Cambodia and Laos have community education projects to educate on projects and their impact. Indonesia has developed an active digital information platform, and social media.
- For full cost recovery tariffs, it is important to make sure the government plays a key role in enforcement of the local governments and utilities when making the tariff. for example, through the highest and lowest tariff setting method we have in Indonesia.
- Regarding PPP we learned that each country has experience with this, but it is important to make sure the involvement of the private sector in water supply is heavily regulated to avoid bad effects of privatization such as overly high tariffs or a lack of transfer of technology to the public sector.

Sub Facilitator
- Our friends from Cambodia mentioned the water development that fund they are establishing, and Laos is also preparing to implement a fund. We can learn from the Philippines in this area.

11-5-6 Session 2 Group C

Record of Group Discussion	
Session	Session 2 (Day2)
Program	Group Discussion
Group No.	GroupC Day2
Recorded by	Ms. Etsuko Mitani
Theme of group discussion	Towards Achieving SDGs Goal 6
Facilitator Sub Facilitator Accelerator	Mr. Engr. Taqsem A Khan (DWASA, Bangladesh) Mr. Takashi Dairaku (Nihon Consultants, Ltd., Japan) Mr. Zeeshan Bilal (WASA-L, Pakistan)

[**Accelerator]**
Mr. Zeeshan Bilal (WASA-L, Pakistan)
- SDGS is all about safe water and sanitation for all. In Lahaul, water & sanitation coverage is more than 90%. But the main issue is sustainability.

[Discussion]
Facilitator
- Today, we have seen most of the organizations have common challenges. Let's start with Sri Lanka regarding SDGs Goal 6.

Mr. Waruna Samaradiwakara (MWSEID, Sri Lanka)
- Regarding the commitment of SDGS, we have an issue with revenue collection and the tariff increase. We have to get an approval from several institutions. I see the same situation in other countries. Politicians are always reluctant to increase tariffs. Fortunately, we were able to raise a certain amount of tariff. The problem is that we cannot determine the tariff structure and have to depend on the decisions of other institutions.
- The second issue is water coverage. Fortunately, we are getting some rainwater. But in the Northern part of the country and the Eastern Province, they don't have proper water resources. So, we have to divert some rivers, but it is somewhat difficult. We have to select the high-cost method to supply water.
- Desalination. We had to install the termination plant. The construction of this method costs more.
- We provide water to 60% of the population with the National Water Supply. We have a community water supply that can provide for another 12% of the population.
- We are unable to cover the entire population by 2030. Our target is to apply pipeline water to all the people. But it is somewhat difficult.

Facilitator
- How is the customer service satisfaction?

Dr. Wasantha Kumari Illangasinghe (NWSDB, Sri Lanka)
- We need to do new projects for the uncovered area.
- I want to highlight the water resource policy. Some watershed management must ensure water quality to achieve the SDGs. Also, the water resource policy we can handle is needed.
- We need resources dedicated to drinking water to ensure the amount of water.
- Our corporate plan for the waterboard is to achieve 100% coverage by 2030.
- Much money is needed to cover the whole country. We need to consider how to finance and the tariff issues. With rehabilitation work, we can save some water.
- We should consider the public-private partnership to get further loans for this additional work.
- Some rural areas are topographically challenging to reach by pipeline. We have to find other solutions, like rainwater harvesting. Purchasing water with a credit card will be suitable for some areas.
- The sanitation coverage is only 22.2%. We have a plan to increase it to 4% by 2025 countrywide. The onsite sanitation rate is 90%. With population increase and the migration to city centers, we can't have onsite sanitation in the future.

Facilitator
- I will request to be more specific.

Mr. Zeeshan Bilal (WASA-L, Pakistan)
- Our groundwater is highly stressed. In our master plan, we changed per capita provision from 80 to 50 gallons per day, which is still high. We have a measurement mechanism that requires meters at the bulk and supply levels. We need to diversify water resources to surface water as well.
- For sanitation, we have a piped sewer system. In Lahaul, stormwater channels have been converted into open sewers. Sewage has to be separated from some water channels. We have a plan, but the main hurdle is investment and financing. JICA completed a master plan for this.
- Climate change. In the urban area, flooding is a problem. There was an unprecedented rainfall in 2016, with 300 mm in one day. We do not have storage for floods. Rainwater harvesting could help because we are not utilizing it to our benefit.
- Water will be available all over Lahaul by 2030, but wastewater treatment is an area where we lack at the moment. All the wastewater is being disposed of into rivers. That is a threat to groundwater and public health.

Facilitator
- You don't have any storage or wastewater treatment plant?

Mr. Zeeshan Bilal (WASA-L, Pakistan)
- We are planning it now.

Facilitator
- Collecting and just going to the river
- Now, we are developing two wastewater treatment plants, one with ASP's help and another with Danish's help.

Dr. Usman Latif (WASA-F, Pakistan)
- My first point is to find water resources. We are shifting from groundwater to surface water. But the Irrigation Department is creating a hurdle for us. They are reluctant to provide us with surface water because they claim it is reserved only for the farmers for cultivation. So that's

why water resource policy has to be defined to minimize groundwater use so that we can work on this matter.

- The next point is shifting to surface water treatment plants. We can also extend our services to the unserved areas. We provide water supply service to 70% of the city's population. So, there are still 30% who need clean water. They are buying water from private plants. Some people have installed filtration plants in their houses, like fishing plants.
- Our employees work odd hours for the satisfaction of the customers because whenever we receive a complaint, especially of sewage overflow, nobody wants to wait. That's why we keep engaging our staff at nighttime. But we don't give them any financial incentive or additional leave or anything. They have their families and sacrifice their family time. They should get something so that they can work in a better way. Their efficiency would be improved with incentives. In the end, customer satisfaction will also be improved.
- The next point is an independent governing body or board of directors should be formed so that we could take up our decisions directly to Departments like the Irrigation Department. We have to go to our development authority and present our case in front of the Director General. The development authority then takes up the case to the higher authority. But he is the Director General of the development authority and pays little attention to other's business.
- The next point concerns newly developed areas that fall under our jurisdiction. They get approval from the FDA, not from WASA-F. They don't follow proper engineering practices. Due to the improper length of the sewage line and water supply network, we get extra burden because they push us to resolve their issues. Indeed, customer dissatisfaction increases. Sometimes, we cannot resolve the issue because of inadequate infrastructure.
- The next point is upgrading and construction of new disposal stations. The sewage lines are already overburdened, specifically in the peak seasons of May to Sep. Even drugs remain surcharged during these periods, and we receive powerful complaints. We should upgrade the current disposal station or construct one to pump the maximum water out of the lines and dispose it into channels in a drainage system.
- Lastly, one sewage treatment plant is under construction to increase treatment capacity. Still, we need to catch 250 million gallons directly disposed of in the water body.

Facilitator

- Do you have your sanitation?

Dr. Usman Latif (WASA-F, Pakistan)

- No. That’s all from me.

Facilitator

- It is about a national water policy. There is the Punjab water policy, which is for drinking purposes. It is very complicated because it is not potable water, but it is a water resource, which means river water. It goes transboundary. So, you have to be clear about what water policy you are looking for, whether it is the national water policy for the river and transboundary, and it is for drinking purposes anyway.

Mr. Tiresh Prasad Khatri (Ministry of Water Supply, Nepal)

- Specifically on the sustainability of the services, the latest figure shows 93% of the population has access to basic water supply, but only 20% has access to safely managed water supply. The government is targeted to achieve 90% by 2030, which is quite ambitious. We will not be able to achieve it.
- Our sanitation service was 5-10% in 2019 in the border area with India. The target to achieve 50% in safely managed wastewater by 2030 is very challenging.
- Now, the government has emphasized the need for strategy by strengthening the regulatory framework and investment in technology and infrastructure, promoting knowledge sharing and capacity building, fostering public-private partnerships, and transferring taxes.
- For data management, the government has launched a digital portal system.

Facilitator
- Tariff is determined by the government right now?

Mr. Tiresh Prasad Khatri (Ministry of Water Supply, Nepal)
- Yes.

Engr. A. K. M Fazlullah (CWASA, Bangladesh)
- We used to take groundwater before 2009. Around 92% was from the underground, and the rest was from the surface. The groundwater was mostly blackish and saline. It was difficult to achieve customer relationships. The water level was going down.
- We have built three treatment plants and improved the water supply with 92% from the surface and 8 % from the underground.
- Last year, we had little rain in the dam area, which affected power generation and required us to more efficient water production.
- Another problem is autonomy. Tax income trade is starting. Suppose there are a lot of development partners, but they have to see the economic viability of the organization. They are hopeful that we can pay their money back.
- We made a master plan for six catchments: one taken up by Delta, one by JICA, one by South Korea, and one by Marubeni PPP.
- Tariff. People want to pay for everything except water. They think water comes for free; why do they have to pay? To change people's mindset is a big problem.

Facilitator
- We have heard from everybody about the main three points: Improving our efficiency, getting customer satisfaction, and what is supposed to be the tariff. In addition, we heard how sustainable we are regarding bankability to attract investment.

Engr. A. K. M Fazlullah (CWASA, Bangladesh)
- I faced a problem that people never clean their house tank.

Facilitator
- Make an awareness program. We call it “Beyond the Meter”.

Mr. Zeeshan Bilal (WASA-L, Pakistan)
- You told us DWASA is financially sustainable, but why is CWASA not? What is the difference between these two utilities? I am asking about the tariff.

Facilitator
- We are independent in the decision of tariffs. How about your Opex and Capex? Are you sustainable with your Opex?

Dr. Wasantha Kumari Illangasinghe (NWSDB, Sri Lanka)
- We are depending on the government. We have reduced our Opex.

Facilitator
- Summary: Sri Lanka needs approval for a tariff increase. The city areas have water reservoirs, but many others still need to. NWSDB covers sixty percent of the population, but 12% by local government.
- Pakistan has 90% coverage in Lahaul and has to diversify water resources. Water supply is sustainable, but water sanitation needs to be improved.

Mr. Zeeshan Bilal (WASA-L, Pakistan)

- We charge for collection and transportation separately. The treatment charge is separate. There is no charge for basic water treatment.

Sub Facilitator
- There is no charge now, but are you going to charge in the future?

Dr. Usman Latif (WASA-F, Pakistan)
- Yes.

Facilitator
- Nepal has a basic water supply but no sanitation.
- A common problem is tariffs and dissatisfaction among customers. Sustainability mostly depends on tariffs. First, sustainable management should be established. Then, it should have its autonomy. It should not be a government agency. There is also the Manila Water, a private company. It is also a big experiment. But as far as I know, in countries like Bangladesh, India, Pakistan, Sri Lanka, and Nepal, the governments will never allow the privatization of services.
- Public-private partnership (PPP) is becoming popular. Most of the governments are looking for PPP. It might be one of the solutions, especially in a country that cannot get investment. We did not discuss PPP, but you should consider it.

EOT

11-5-7 Session 3 Group A

Record of Group Discussion	
Session	Session 3 (Day4)
Program	Group Discussion
Group No.	GroupA Day4
Recorded by	IIZUKA Masanobu (MR.)
Theme of group discussion	Collaboration and Co-Creation
Facilitator Sub Facilitator Accelerator	Ms. Sarah Monica E. Bergado (Manila Water, Philippines) Mr. YOKOTA Yoshiaki (Senior Advisor, Global Environmental Department, JICA) Mr. Nithit Thongsa-ard (PWA, Thailand)

Ms. Sarah Monica E. Bergado (Manila Water, Philippines)
- Good morning to everyone. This is the very last day, the Day 4, seeing some smiles across the room. Today we had another interesting conversation. Our theme for today is about collaboration and co-creation. On these three days, we talked about resilience to risk and change in Session 1, towards achieving SDGs Goal 6 in Session 2, and collective impact based on collaboration and co-creation with diverse actors in effective, not just in the efforts of water utilities on their own in Session 3. In Session 3 from our group, presentation was made by PWA of Thailand whose contents were on human resource development efforts.
- We like to deepen discussion on what kind of collaboration and co-relation is possible and what kind of collective impact can be achieved through them, referring also to these presentations as input. So first, probably from Thailand, I would like to ask either MWA or PWA to further share on your existing practices on collaboration.

[Accelerator]
Mr. Nithit Thongsa-ard (PWA, Thailand)
- For Provincial Water Authority in Thailand, I have asked this morning's presentation about collaboration with LGOs (Local Government Offices) in Thailand, cooperate (cooperating) with JICA, Saitama, K-Water, (for) project outputs and activities like human resources

development. I think knowledge-based society towards sustainability is so important for upskill, reskill people for our competence.

[Discussion]

Facilitator

- Thank you. I am so sorry, but I didn't make the introduction first. I will come back to you. By the way, my name is Sarah. I'm so excited to start. I'm Sarah as your facilitator for this morning, and with me is Mr. Yokota as my co-facilitator.

Sub Facilitator

- My name is YOKOTA Yoshiaki. Today, I'm Sub Facilitator and I'm a technical advisor for urban water supply from JICA Headquarters. I'm very happy to join this discussion, thank you.

Facilitator

- Thank you, Mr. YOKOTA, and again, my apologies. Mr. Nithit, you mentioned various collaborations, but I would also like to know probably if there are any challenges that you have encountered in this kind of collaborations.

Mr. Nithit Thongsa-ard (PWA, Thailand)

- First, language. Other countries use English. For Thai people, not English. Two, instruction to technical support. Any country does not like document, to read to use, to work with words, construction; you don't like it.

Facilitator

- We can also relate to that because current younger generation, they go to YouTube and watch "how to do this" instead of reading reference documents and manual. Very interesting. So, the challenges are the language barrier and the method of learning, right? Manual is not so much.

Mr. Nithit Thongsa-ard (PWA, Thailand)

- Yes, language and documents.

Facilitator

- It has to be translated. Thank you for sharing. I'd like to get probably from the Philippines; any collaboration and co-creation experience that you would like to share as well?

Mr. Sherwin Mendoza (Maynilad, Philippines)

- In Manila, Manila Water Academy was established I believe about seven years ago. One of the main objectives is to help or to have good training for different water districts, Local Government Units (LGU) in the Philippines, where trainers mostly come from the ADB back to the country. Also, just like what JICA did, or are doing right now. I also was a member of ADB program myself, of WOP or the Water Operators Partnerships. I was assigned to KULNAWASA in Bangladesh for three years to assist them on their NWR and some problems in water, and some of my colleagues help in Nepal. They also are part of that.
- I think that is a part of our collaboration with other countries. We indeed are the trainers, but we also learn from them. I learned so much from KULNAWASA. I learned how the difficulty in computing NRW because they don't have meter then; they were just relying to the different sizes of the pipes, they don't have standard billing, but it's totally different right now because that was eight years ago. So, I think that experience helped our side as well a lot, not as a part of trainers alone, but we also learn from them.
- From there, we also make sure that we innovate on our trainings. We also make sure that we are not only stuck on this specific training. It is very important have that kind of training and maybe as part of this collaboration, co-creation program or discussion, JICA will also do that

for us in the Philippines. So, I just share you our experience in that collaboration portion of this discussion.

Mr. Edgar H. Donoso (MCWD, Philippines)

- Good morning again. In a few hours, we will say good-bye to each other because today is the last day. Nice to know you friends from Thailand, Vietnam and the Philippines. Just to give you the perspective of our water utility in the Philippines, when we say "Water District," it means that we are run by or we are governed by a set of law which is government-owned and controlled corporation, meaning we are a government entity when we see "Water District."
- So, in the Philippines, we have an association of Water Districts wherein regularly we convene, we meet each other, we have trainings, etc. As far as collaboration within the water districts (are concerned), we don't have a problem, but since we are the one spare heeding the training.
- For example, in Metro Cebu e have original training center, so more or less our practices, our sharing, our experience within the water districts in the Philippines are the same. Maybe that's why our results, our outputs (are) more or less the same; NRW, 30, 25, 20, the best, and then maybe collection efficiency we have, although collection efficiency in the Philippines is quite good, because we strictly implement this connection.
- As far as international cooperation for training (is concerned), we also don't see an issue, because JICA is very cooperative, very helpful to our needs, but my concern is with our authorities; I think that's the issue I will highlight because LGU plays an important role in developing, improving sustainable services for our management and water district. That's why this is a big challenge for the water district.
- If we involve authorities or leaders from our local area because they don't consider water service as part of their mandate, they give that mandate everything to the water district. It seems that co-ownership is a big challenge and that must be developed so that we can have a harmonious, cooperative relationship with our LGUs and maybe national government.

Facilitator

- Thank you for sharing. So, I guess just to summarize: Sherwin shared the Manila Water Academy, and I think it had fruitful results because you were also facilitator or an instructor to other countries, but aside from imparting knowledge, you gained from the experiences. So, it's not one way; there's an exchange of information. I am particularly interested in what Mr. Edgar (Cebu) had shared on the challenges that while there is a network for the provincial water districts, it's bringing other stakeholders, particularly the leadership of the local government, at par with the knowledge on water system management and appreciation of.
- I hope I got your points right. Thank you for that sharing. Now we move on to our friends from Vietnam. Probably could also share your experience in sharing knowledge and collaborating, and it's not just limited to sharing or education, but also on meeting SDG six. Would you like to start with the lowest NRW?

Mr. Le Quang Minh (HueWACO, Vietnam)

- Good morning, everyone. In our company, under support of JICA and Yokohama Waterworks (Bureau), they help us to set up OJT, that means on the job training handbook, and we make many handbooks for each job. For example, installation, repairing or treatment of water in a water treatment plant, and many handbooks. The first and the second, we set up training yards, that means the infrastructure for training. For example, in that site we install many carrier pipelines, the hydro (hydrants), all the equipment in water distribution network. For leakage detection training, we are setting up underground leakage of many different kind for example paver and soaring, sand or concrete.
- So, we usually do train our workers every three months or every six months based on their skill and after the training we will evaluate all the time. For example, the worker with high skill (of) discover(ing) the leakage but they don't repair keep (leakage) existing, so we ask the training to use some equipment. I believe on-site training is very interesting for the workers. They don't want to read all the handbooks to do this, to do that or listening to the teachers

"how can you find?" but on-site, they have (feel) more interesting and the second (is) the language at the first time we proposed very few workers can speak English but through the on-the-job training while they are instructed, they will learn by themselves. Now I think our workers' skill in English is increased. Many workers in our company learn it by themselves and I think that is the case of VN.

Facilitator
- What if they do not pass qualification?

Mr. Le Quang Minh (HueWACO, Vietnam)
- They do it again. The evaluation again more training hours, and after finishing the training, we have the certificate and if they have high skill of course the salary must be higher, though just a little.

Facilitator
- They have incentive reward for upskilling, and then you also mentioned the method that they have to do it, and experience on site, using their hands, not just reading.

Mr. Le Quang Minh (HueWACO, Vietnam)
- The solution from Yokohama was on-the-job training.

Facilitator
- Yes, so on-the-job training was most effective for VN experiences. Would anyone else like to share?

Mr. Nguyen Van Thien (BIWASE, Vietnam)
- In BIWASE as VN company, similar to many other VN water companies. About 15 years ago we had chance of Dr. Ek Sonn Chan of Cambodia through ADB-sponsored training involving VN and Cambodia to share experience of water loss. We learned that back in 15 years ago, ADB funded Cambodia, for a water project in parallel with TA, technical assistance training for NRW, and we thought that this is a very successful project, and after moving back to VN got a fund from ADB following Cambodia. ADB tried to gather us in Cambodia to be a root and learning from the TA support. We all know that back in 15 years ago, the economy was not gaining a very good profit, so we got 100% sponsor from ADB including accommodation and tickets to come to Cambodia. After the training and sharing experience from more than 15 years ago and until now we achieved our NRW and we understand that HueWACO also have a training program with Yokohama Water Company. We also learned that SWACO reduced NRW from 20 to around less than 15%, and some VN water companies also have achieved their goal to reduce NRW ratio. After that we also had made a trip to LAO PDR, and we must say that they also achieve and meet their goal to reduce water loss.
- In training session, we are a bit different from others. The first step is the basic one, therefore it is similar to all of yours.
- We divide into separated areas for monitoring NRW ratio in district from the district work. The lower NRW ratio district got higher revenue they can keep for their own, and the neighboring district whoever cannot reduce their NRW, they need to learn from their neighbor to meet the competition.
- As was mentioned earlier by Mr. Su, they need to learn by themselves, that is most important. District of high NRW ratio is a shame compared with other districts, thus they need to improve themselves and learn by themselves.

Facilitator
- Thank you for sharing. Like carrots and sticks. There's reward, but just quickly, I guess, process everything. You mentioned that it's really effective, the collaboration you've had with JICA and Yokohama, and it has been instrumental over 15 years ago to really reduce your

NRW. You also mentioned about peer learning between districts, one district learning from another, especially those who are still lagging behind on NRW. Thank you for sharing.

Mr. Le Quang Minh (HueWACO, Vietnam)

- In VN, in every province there are one or two water supply companies, and we have VN Waterworks Association, for the south, middle, and north of VN. There are three branch associations of water supply companies in the region, and we usually organize meetings, conferences to learn together because each company always have a strong issue one or two. So, we learn together from other water company. If we see what can be useful for our company, we will apply in our company and other companies, too. Now I think water supply companies in VN step together.

Facilitator

- Help each other through the Vietnam Waterworks Association?

Mr. Le Quang Minh (HueWACO, Vietnam)

- Yes.

Facilitator

- Thank you.

Mr. Nguyen Thanh Su (SAWACO, Vietnam)

- Regarding human resource development training, I would like to share something with you. We all have similarities in conducting cooperative activities.
- The first is language, and the second is the cost. Previously SAWACO and other water companies in VN were very passive, just sitting in a place and wait for support from international cooperations like JICA. We just wait for their support. I also joined training program of JICA/ADB myself. Through those trainings, we felt that we need to change our mindset from passive to active. We cannot just sit in a place to wait any other organizations to help. Regarding our shortcomings and difficulties of languages, we believe that through training and through changing of mindset, we can overcome such difficulties.
- As for difficulties of cost, we need to develop our annual plan for training, so that we can prepare funds of training in each year.
- Through change of mindset, we accomplished some, like implementation of training programs through international organizations in Thailand, Osaka and Yokohama Waterworks Bureau in Japan. We carry out MOU (carry out what is stated in MOU) with international organizations based on win-win mindset. The purpose of this win-win program is to learn from each other. We also are very proud and would like to express sincere thanks to the training programs organized by for JICA, because trainees (participants) of these programs now can change their mindset and actively call for support from other organizations.

Facilitator

- Thank you, Mr. Su, you mentioned barriers to training as well, language and the cost. It's good to hear that it's now done very deliberately, by including it in your annual budget to ensure the continuity of training. That probably leads to my next question. You may also ask each other about your practices. Sometimes technical assistants are for a specific duration, right? Maybe these would run one to two years, but what are your practices to really make it part of your organization to promote continuous learning? Did you have some reorganization, structural changes? How do you make it last beyond the support or assistance that was given?

Mr. Edgar H. Donoso (MCWD, Philippines)

- For Metro Cebu, first is that employees are given chance to determine their training needs. Then, if an employee can be recommended based on the function of the position. The basis for training needs of an employee is, of course, position or work that they are presently doing, and

afterwards there is also a recommendation from his superior. If superiors find it necessary for an employee to be sent for a particular training that the superior deem it necessary for the employee, then again, same with VN, we also develop all the training needs, etc. then the corresponding amount required for that training (shall be allocated). In fact, as a policy, we set a certain percentage of training cost for the total expenses of our company. Let's say, 5% of the total budget shall be set aside for the development of our employees, and that's a continuing process. Of course, there's an evaluation and another rescaling or upscaling if there's a need. That's a continual program of our water utility.

Facilitator

- Thank you for sharing. It's like a bottom-up approach. International institutions have available (resources) to find what they can help, but you also consider individual needs of your workers and employees. I hope it matches.

Mr. Sherwin Mendoza (Maynilad, Philippines)

- With regards to our needs, as I mentioned before this morning, we have our water academy, the Manila Water Academy, and through partnership with the Water Academy, our division has also special training for all of our personnel to make it continuous learning. In fact, we developed this rating system similar with the one today. If you are familiar with the chess grandmaster (a permanent title of chess), like that, each time you perform or you have trainings, you have become a speaker, you become a lecturer of different water district… you gain points to make sure that you have enough. Of course, you will never be a speaker if you do not reach this level.
- The level is starting from a beginner, intermediate, expert level 1, 2, and 3, then at the end of year, we are giving a certificate to those person or engineer, those experts who have reached this level. So, in that case, we know that each of the personnel, each of our NRW specialists or water supply specialists, they make sure that they will continue learning to gain these points, so that they reach to specific level every year. That's what makes sure that their continuous learning comes from the personnel and not from the management only.

Facilitator

- Thank you. There's upskilling and then competency level, until you became a master/expert.

Mr. Nithit Thongsa-ard (PWA, Thailand)

- In PWA, same with the Philippines, we have company-sheet based training besides the competency based, to upgrade our employee level, and we have a career path and succession plan for that upscaling of skill in the competency-based class. It is designed for positioning competency, technical competency, managerial competency and for up level to interior part. For our employee to evaluate competency is to pass to the upper level and training course for IDP program; Individual Development Program, to align with competency and training, and training and career alignment to human resource develop system in PWA.

Facilitator

- Thank you for sharing. We are also very similar in Manila Water. You also measure and track the competency of each personnel. It's similar. We also have the management competencies and the functional and technical competency which is role-base, and it's also linked to the succession plan. It is really embedded into the structure of your organization, and you improve the talent (accordingly).

Mr. Pornsak Samornkraisorakit (MWA, Thailand)

- I am not a human resource (staff), but I am an engineer, M-Water operator. M-Water is a project, project of trainings in Human Resources Department, and I focus on the field of technical operator. I can attend JICA (training) for individual waterworks training center in

MWA long time ago, collaborating with JICA. Currently, we are trainers. My friend of PWA, which is another water company of Thailand, joined MOU together to support VN companies.

- We did technical cooperation: operation, about how we find algae in raw water, how we find out the TOC, total organic carbon in the raw water, how you operate rapid sand filter, how you control the coordination system, how you control chemical feeder, how you control raw water pumping and distribution pumping…these details. It is some of our training in this year. Last year we had MOU for PWA. Employees from MWA joined training with me. The training was around one month. In the classroom one week, and three weeks for workout with our operators, working together to operate. Real operation through on-the-job training. I am head of all trainers on operation.

Facilitator

- Thank you. I can sense that the training handled by the Waterworks Training Center is very deep(ly) technical. You mentioned learning about total organic carbon, sand filter, correct(?) on real operations for your workers. I guess that a follow-through question is the MOU that you have for joint training. How does this collaboration continue? Is there a specific time frame? Who finances that MOU, so that you can ensure the collaboration?

Mr. Nithit Thongsa-ard (PWA, Thailand) & Mr. Pornsak Samornkraisorakit (MWA, Thailand)

- Our MOU is about operation training only.

Facilitator

- (Making sure) Operation training only…

Mr. Pornsak Samornkraisorakit (MWA, Thailand)

- Universities in Thailand like Chulalongkorn University for a class training.

Facilitator

- (Making sure) There's no building or structure?

Mr. Nithit Thongsa-ard (PWA, Thailand)

- Yes (that probably means "No, there aren't any"). It's specific academy in MWA with production. We have a small scale in PWA. MWA has a large production, transfer knowledge from MWA.

Mr. Pornsak Samornkraisorakit (MWA, Thailand)

- It's telling about skills from VN. Learning by oneself is important. Learning by oneself is the top priority. The operator is watching water/effluent water; it's a while, but the problem is about the license, technical license. It means; algae die there, the "life fog" (does it mean floating matter, or suspended matter?) is not heavy weight sediment, and "life fog" is caught in the filter, and it is problem in the filter. (By) Walking in the filter area, I learned what happened by myself. The head loss in the filter is usually short time. We check the sand filter to the laboratory for finding (of) what happened.
- If we use a microscope, (we find) AWA, a specific species of algae. We then knew learning by oneself is important.

Facilitator

- I guess having employees who have a lot of initiative to learn by themselves, right? Building that culture and behavior is also critical.

Mr. Nithit Thongsa-ard (PWA, Thailand)

- I think in the future I want to improve my employee from best practice and other country, other universities outside my country. I think (hope) my employee to upscale and in management

perspective, technical perspective, sharing with other countries (like) Tokyo, Japan and MWA's best technical practice.

Facilitator
- International exposure, and is this via collaboration or is it financed by PWA?

Mr. Nithit Thongsa-ard (PWA, Thailand)
- I think in some East Asia country the same problem. I think it is the same problem for raw water, algae, salinity, total organic carbon… It is same, but we are learning together. We challenge how we find out or figure out this book. I think knowledge-based society is important for sustainability. Sharing knowledge, collaborate, synergize with other countries, sharing knowledge of other private sectors.

Facilitator
- Thank you. Maybe we should save each other. Very (much) concluded. Are all of you private corporations or government corporations? Sorry, sir, are all of you from VN private corporation or government corporation?

Mr. Nguyen Van Thien (BIWASE, Vietnam)
- About 90% of VN water companies are private, but about 70% is still under government control of over 50% (stock share of national government of different level), and the rest is about 30%, (in which) the government owe (share of) less than 50%.

Mr. Edgar H. Donoso (MCWD, Philippines)
- In other words, the entity itself is considered a private entity but there's a stake coming from the government about 30% to 50%. Is my understanding correct?

Mr. Nguyen Van Thien (BIWASE, Vietnam)
- It means that the government can have about 70% of the joint stocks and the other 30% will be owned by the companies or others.

Mr. Edgar H. Donoso (MCWD, Philippines)
- Thank you.

Facilitator
- For any follow-ups, you can ask later. Just a quick wrap up. Three points I guess from our discussion; one is that I feel that everybody has really (been) benefited from these international collaborations. You've mentioned JICA and ADB as spearheading not just the technical assistance, but knowledge sharing as well, and the results are apparent with reduction of NRW you and other benefits to our organization.
- The second point is there is also collaboration between each other within our country water districts and interagency learning from each other: peer learning. That has also contributed to knowledge sharing, and the third, I guess it was emphasized that individual trainings should also be considered this upskilling of individuals and learning by oneself is also necessary, need to be built in your workers so that you could progress.
- I hope I did not miss anything. OK, congratulations!

(End of session)

11-5-8 Session 3 Group B

Record of Group Discussion	
Session	Session 3 (Day4)
Program	Group Discussion

Group No.	GroupB Day4
Recorded by	Ms. Emily Wathen
Theme of group discussion	Collaboration and Co-Creation
Facilitator Sub Facilitator Accelerator	Mr. Ade Syaiful Rachman (PU, Indonesia) Mr. Keisuke Sonoda (Saitama City Bureau of Waterworks, Japan) Mr. Siphanh Inmouangxay (NPNL, Laos) *Changed to Mr. Khamphouvong Sikholom (DWS, Laos)

Mr. Ade Syaiful Rachman (PU, Indonesia)

- Good morning, I will be your facilitator. Mr. Sonoda will be your Sub Facilitator.

Mr. Keisuke Sonoda (Saitama City Bureau of Waterworks, Japan)

- I worked with the Laos water supply center as chief advisor for water supply development projects from 2018 to 2021, so I am happy to support the group discussion today.

Mr. Ade Syaiful Rachman (PU, Indonesia)

- To realize sustainable water supply capacity and SDGs goals, effective multisector cooperation and cocreation is required, not just between utilities alone. I would like to invite the NPNL to talk about Lao Waterworks Association (LWWA) and tell us about their future activities and any extra information

[Accelerator]

Mr. Khamphouvong Sikholom (DWS, Laos)

- I would like to discuss supply and hear about water supply state enterprises in Cambodia and Indonesia. Because my country's water supply state enterprise had high water loss and physical loss last year, we implemented many measures, but the capacity has stayed the same. I would like to ask for any information from Cambodia and Indonesia during the discussion.

[Discussion]

Mr. PHILAVONG Ladda (NPLP, Laos)

- Vientiane Capital Water Supply State Enterprise is the biggest water supply state enterprise in Laos, our population is 7 million, but they supply around 1 million, so compared to us they are a larger utility. We have the data for non-revenue water in other suppliers, ours is the highest in the country at around 29%, which is high compared to neighboring countries and regions. I believe Cambodia is around 8-10% and Indonesia is also just 2-3% right? We are trying to reduce the percentage, but we are having problems. We would like to learn from our brothers in Cambodia and Indonesia on how to reduce this to single digits, even maybe down to 3-5%. For our production, we need to pay more for chemicals, and the return is small. For my state enterprise, water leakage is also high at 27%, so we have JICA experts from Saitama and Kawasaki helping us make long term reduction plans. In my city, aging pipes are an issue. Sometimes we search for the leakage, and it comes from commercial areas. Luckily Luang Prabang Province has JICA support to replace around 40km of pipe. We hope to monitor and check the data after this to see if there is reduction in leakage and how much per second. But provincial suppliers to not have the chance to do this or receive grant aid, they also do not how to fight this issue. We hope we can learn from you.

Facilitator

- NPNL and LWWA have given their presentation on the establishment and feature development of LWWA. Could you tell us more about the process, including research and case studies, and planning of the service too?

Mr. Khamphouvong Sikholom (DWS, Laos)

- We have 27-29% non-revenue water per year including all of the water utilities in Laos. The smaller utilities have lower loss, but the large ones have a high percentage. Based on the

information we receive from them, there are three types of loss, water leakage in the pipeline network due to the infrastructure which was established in 1925/75. We are constructing the pipes and developing infrastructure. We don't know exactly how much leakage there is. Commercial loss suffers from meter aging, and we do not have the money to change our meters. We also have high scale loss under operator control. We must fight to reduce water loss. We don't have the budget to do this, therefore we try to request loans and grant aid from other countries that can help us.

Mr. PHILAVONG Ladda (NPLP, Laos)

- The problem we are facing now is high water loss. In Luang Prabang Province we set up a team to check for leakage each day and check the water meters. We tried to use our own people to do this to save costs and repair reported leakage as soon as we can. We also tried to make zones to clarify where to check. We only have one team, with lots of work to do. We have made 5 zones, but based on the size of the area, we will need to make more zones than this, and this is just the start. We are aware of the difference between billing and water service in certain areas, so we try to make zones and have the meters there, and check at night.

Facilitator

- In Laos is there a special board for training, research, or studies, especially for non-revenue water or efficiency?

Mr. PHILAVONG Ladda (NPLP, Laos)

- Not yet, we have a 2021 study as part of NPNL but not widespread.

Facilitator

- Does Cambodia collaborate with universities for research and studies?

H. E. Long Naro (PPWSA, Cambodia)

- Yes, we have external human resource training on executive management where we send people to outside countries, like France, or Japan. We are working with the institute of development in Cambodia, we send our operation team to understand about pipes, leaks, and leak modelling. We also have a module in collaboration with the international water association since last year, we can receive the documentation we need from them, to train our team on technical documents. So, we have outside collaboration with our national institute and the international water association. For internal training, we have a "trainer" who was trained by JICA experts, to train our team on water production, distribution, management, analysis, and operation. Our trainer can train our team from within the utility.
- We also send our trainers to provincial water supply utilities based on specific requirements for specific types of training, including cooperation and management, operation, and financial and asset management. We send our team to evaluate and train them towards self-operation. We have our own training classroom and materials. We are discussing with the ministry establishing a national training center or one at the water utilities, we hope to construct this in 2024 or 2025. As I said, we have our own team become trainers.

Mr. PHILAVONG Ladda (NPLP, Laos)

- Do outside water suppliers come to your trainings?

H. E. Long Naro (PPWSA, Cambodia)

- Yes, this year we received East Timor for a week, and they visited each department to understand the management. We will receive 30 executive engineers from France, they have the executive management on water supply and receive top management from several countries and train them for around two years. They will come to Cambodia for a study of executive management on water supply. This will be next month. This is how we do outside training; we usually accept at least one country a year, usually from Africa.

Facilitator
- How about training and research in Indonesia?

Mr. Dwike Riantara (PERUMDA Tirta Mayang Kota Jambi, Indonesia)
- I have experience facilitating water operator partnerships in southeast Asia. I previously worked for the Water Supply Association, the biggest water association in southeast Asia, with more than 400 utility members, which were not only operators, but relevant private sector entities. During this time, I facilitated over 60 water operator partnerships nationally and regionally, including between Malaysia, Philippines, Indonesia, Vietnam, and East Timor. Water operator partnerships enable peer to peer collaboration, as an experienced well performing utility can share their skills, experiences and knowledge in non-revenue water reduction, efficient energy use, customer service improvements etc., with interested utilities. Indonesia established its national WOPS (Water Operator Partnerships) in 2011, and has conducted 100s of trainings, including on the job trainings and study visits between utilities. Indonesia also established the Center of Excellence, which was originally supported by JICA but unfortunately this stopped in around 2017 so there is an absence of continuity there. Indonesia and PERPAMSI hopes to continue this platform to support water utility improvement.
- This could be a best practice for all of us, and I would like to suggest Laos, Indonesia and Cambodia can establish a partnership platform between us.
- I would like to move onto discussing collaboration and co creation. Laos established a new water supply association as we heard. You also came to Jakarta for the meeting SEAWUN (Southeast Asian water Utility Network) in June. The first president of SEAWUN, established 2001, was Indonesian and the chairman of PERPAMSI, but SEAWUN has not been active since around 2010. Membership is made of water supply associations and utilities. It is under the ASEAN umbrella, although I do not know if they are affiliated. SEAWUN was based in Vietnam for a while but had been inactive since 2010. Through the Jakarta meeting, we would like to reactivate this platform. Laos, Indonesia, and Cambodia could be part of this utility platform. Cambodia also has an association, correct?

H. E. Sreng Sokvung (MISTI, Cambodia)
- The Cambodia water supply association. It has maybe 300 members, including utilities and others.

Mr. Dwike Riantara (PERUMDA Tirta Mayang Kota Jambi, Indonesia)
- At this forum, we could invite representatives from water associations in each ASEAN country. I'm not sure Cambodia has a representative at this forum, so I will try to address this and ask that we can invite representatives in future. I think this could be a strong and influential partnership to share more about the development of water supply in southeast Asian countries. Water operator partnerships could help us share expertise and ideas, to achieve the SDGs.

Facilitator
- Thank you, SEAWUN could represent international collaboration and cooperation on water. I would like to invite Mr. Arief Nasrudin to tell us about how you decrease non-revenue water in Indonesia, and also about the training system.

Mr. Arief Nasrudin (PERUMDA PAM JAYA, Indonesia)
- I would first like to declare that Laos has better non-revenue water percentages than Jakarta. We recorded 46.6%, so frankly I don't have success stories on how to reduce NRW, and we need resolve this. Some preliminary studies were conducted by some companies using their water supply experts and universities. The universities also have a water supply major; and we invite them to analyze and review the NRW processes in Jakarta.

- Secondly, in Jakarta, PAM JAYA is over 100 years old. We visited Kubota yesterday. We also applied Kubota's pipes in Jakarta. Kubota said that their lifetime guarantee is 100 years, but I think they will need to be replaced. Of course, there are other issues such as water being stolen, but at the end of the day this is due to infrastructure, and we need to replace the pipes in the next six years. With nearly 50% loss, of course we do not have back up raw water. We supply 65% of 14 million people. We need to construct more pipes to serve every house in Jakarta, and secure more raw water supply, and this basically needs funding. Laos and Cambodia have succeeded in reducing non-revenue water. For the next forum I would like to have more success stories in detail with detailed staging. Like yesterday's explanations from Manila and Dhaka explanations, we need detailed explanations with an overview and description of the action plan. PAM JAYA has just taken over from the private sector, so our experience is premature.

Facilitator
- Is there any information about collaboration from Cambodia or Laos?

Mr. Dwike Riantara (PERUMDA Tirta Mayang Kota Jambi, Indonesia)
- I would like to propose JICA support this collaboration/ co creation.

Sub Facilitator
- I worked with the Lao waterworks association to help them establish it, it is supported by JICA and the Japan Waterworks Association (JWWA), based on JWWA components. JWWA supported Laos on how to establish the association. JWWA has a long history and a lot of content, so they needed to decide the priorities by discussing between Saitama, JICA, Laos and JWWA. Laos just started this association so they need time to improve but can learn from other waterworks associations in Japan and other countries.

Mr. Dwike Riantara (PERUMDA Tirta Mayang Kota Jambi, Indonesia)
- The issue is who will finance the activities. For example, Osaka city waterworks might be able to spend money in a partnership, but my utility does not have the budget for study visits, non-revenue water commitments ecological network analysis and establishment etc. This should be funded by a development agency like JICA. Indonesia receives funding from JICA, UN habitat, and others, but regarding finance for partnerships, we understand that JICA has a partnership program, and we already proposed to JICA establishing a partnership between Jambi and Osaka waterworks bureau, so please support this.

Mr. Arief Nasrudin (PERUMDA PAM JAYA, Indonesia)
- As we are newly self-operated, to reach the SDGs goal by 2030, we just signed a private sector linked bundling project. The bundling operator is us, and they are just bridging and financing. This bundling project is for remaximising our brownfields and existing water plants, it is operated by them as the investor, and we pay for the water from them. We only do this for plants equal to half of our capacity, to pay back 25 years in advance. By October 2022, this will provide us with 1.6 billion USD to install and construct 7000km more pipes in Jakarta. If you have brownfield water plants, and maybe if JICA wants to be involved in bundling projects in Jakarta. I think this is one suggestion to get the financing. I also suggested to JICA maybe if PAM JAYA achieved a saving in non-revenue water or reached a certain percentage, then maybe we can talk about further funding.

Facilitator
- Maybe you could inform us about regional water supply in Jakarta, and government involvement in your experience with PPP funding in Jakarta?

Mr. Arief Nasrudin (PERUMDA PAM JAYA, Indonesia)

- This is not only involving the private sector and us, as a state-owned utility, it also involves the central government. They have built a 3000lps plant to supply Jakarta. By having government funding too, we are trying to catch up and accommodate water demand through new pipes. We are using private sector investment, but all of the pipes will be owned by PAM JAYA afterwards. There are three participants in this kind of bundling, the central government who protect the supplier through regulations, PAM JAYA which also is owned by the provincial government, and then the private sector. Also, if JICA wanted to be involved then this would also be given priority.

Facilitator
- Thank you. It is time to wrap up our discussion.
- We agree that partnerships are important to fix water problems, integrating government and non-government decision makers, through negotiation involving stakeholders from nonprofits and the private sector while also including the general public. There are requirements for collaboration and cooperation. Collaboration must be sponsored by the government and participating stakeholders, and the public must be involved. This must be addressed for sustainable water management. These are difficult problems, but efforts to ensure cooperation can lead to success.

Sub Facilitator
- Thank you. Regarding suggestion for an international platform, this is a good suggestion, and an important conclusion of this group session, which can strengthen our countries and further inform the platform.

11-5-9 Session 3 Group C

Record of Group Discussion	
Session	Session 3 (Day4)
Program	Group Discussion
Group No.	GroupC Day4
Recorded by	Ms. Etsuko Mitani
Theme of group discussion	Collaboration and Co-Creation
Facilitator Sub Facilitator Accelerator	Mr. Tiresh Prasad Khatri (Ministry of Water Supply, Nepal) Dr. Yasuko Kamegai (CTI Engineering international Co., Ltd., Japan) Dr. Wasantha Kumari Illangasinghe (NWSDB, Sri Lanka)

[Accelerator]
Dr. Wasantha Kumari Illangasinghe (NWSDB, Sri Lanka)
- Collaboration among the same organizations' departments, other interested partners in the sector, and the industries supporting our activities, both domestic and international
- For capacity development, share experiences among organizations.
- R&D is very important.
- Improve our production and processes.
- For new technology, we need to learn from others.
- New invention is needed to move forward.
- All these things will help enhance the efficiency and productivity of the organizations.
- New financing methods, grants, loans, and public-private partnership (PPP).
  Development.

[Discussion]
Mr. Waruna Samaradiwakara (MWSEID, Sri Lanka)

- Technical assistance. In Sri Lanka, several local governments have their water supply schemes, but they are less technically capable than national water suppliers with engineers and experts who have high degrees. Those experts generally provide technical assistance to the local governments. That's our system.
- We have a joint research and demonstration center, conducting many research programs. They are mainly working on groundwater depletion and the quality of the groundwater. These are very important.
- We have a national water resource institution. They are also working on the groundwater. They are the ones who monitor and give experts knowledge. They hold a licensing system. If someone wants to start a company for a commercial well, the company has to get a license from them.

Mr. Zeeshan Bilal (WASA-L, Pakistan)
- We lacked collaboration in the last ten years, but a network was created. Since we started to connect among the utilities of the organization, we have learned a lot from each other.
- WASA-F has already been doing a surface water treatment plant. WASA-L is seeking surface water treatment and has been learning about operation and maintenance from them.
- Similarly, WASA-F is doing PPP. We're also learning from them on that.
- Training comes from the international level. We've been learning from other organizations, including JICA, and sharing knowledge and experiences.
- Each country may have a waterworks association, and we should collaborate and create a South Asian water utility network.

Dr. Usman Latif (WASA-F, Pakistan)
- We should involve universities in research projects. By doing this, university teachers also get some financial benefits. They will provide us with sustainable development that can be the country's backbone and play an essential role in the nation's progress and utilities. Yesterday, we visited Yokokawa. They are progressing daily by conducting research work, which is a crucial thing and what we are lagging.
- We belong to the same region and face similar challenges. By promoting collaboration with universities, we can establish a small lab in our organization and place the right person for the right job. I observed civil engineers taking care of mechanical equipment. That bothers the performance of the utilities as well. We should always keep utility progress in mind.
- We should learn from similar utilities like DWASA, which has significantly progressed in the last few years. We can cooperate and learn many things. By doing this, we can enhance our performance greatly.

Mr. Gyanendra Bahadur Karki (KUKL, Nepal)
- Regarding collaboration & co-creation, there is a partnership between DWASA and KUKL and another partnership between KUKL and a water company. We are getting various knowledge and training programs from JICA.

Engr. A. K. M Fazlullah (CWASA, Bangladesh)
- In 15 years after taking up the assignment, our water supply service has reached 92%.
- Should cooperate and share experience to improve water situations in Bangladesh.
- People are facing severe water crises in every country. We should discuss what help we can extend to those areas.

Engr. Taqsem A Khan (DWASA, Bangladesh)
- Nothing can be done by a single person. Nobody should be alone. We need to collaborate and unite.
- When DWASA started a water program in 2009, it was a dysfunctional utility. It could not deliver water to many people, 12-13 million people and the government thought that radical changes were needed. Among the many works, one of the best things was support from others

and collaboration with others, technical, managerial, and financial support to deliver water to millions of people.

- Bankability. We need money. Money always comes with conditions. Money can only be given once banks know they will get it back. That's why collaboration and cooperation are needed. One type of collaboration and cooperation is that you collaborate to make yourself self-sustainable so that you can attract investment.
- Development banks need to come. With the investment by development banks, we can make changes, and we did it and have many development bank partners like ADB and WB.
- The 2nd type of collaboration is with other utilities. We have a collaboration with a Netherlands organization. They have two public utilities. They made a contract with us, WOP, Water Operator Partnership program. We don't need consultants but need partners. We also have a program with Tokyo Waterworks.
- So, there are two types of collaboration: networking and partnership.
- We have wonderful collaborations online with the waterworks in Tokyo, Korea, Taiwan, Thailand, and a Vietnam university.
- The collaboration greatly supports day-to-day work and young engineers' mental growth.
- Most development partners and banks, including JICA, give money for particular projects. The money includes everything, but a project should be given project money and extra money should be given to make them bankable and sustainable.

Sub Facilitator

- That's why JICA is implementing technical assistance.

Dr. Wasantha Kumari Illangasinghe (NWSDB, Sri Lanka)

- You mention that it is your catalyst money. Development partners can give catalyst money for cooperation.

Sub Facilitator

- A partnership can be internally in the country.

Engr. Taqsem A Khan (DWASA, Bangladesh)

- The government should do it. We have a DWASA network and are supporting each other.

Sub Facilitator

- How about smaller utilities?

Engr. Taqsem A Khan (DWASA, Bangladesh)

- They are under the department of public engineers in the same ministry. It is an organization looking after rural areas. They have their collaboration.
- The World Bank made programs with DWASA to develop all the city utilities.

Sub Facilitator

- Is it an established system?

Engr. Taqsem A Khan (DWASA, Bangladesh)

- It WAS an established system, but it stopped. Now, DWASA has its program. The ministry overviews, not intervenes.

Mr. Waruna Samaradiwakara (MWSEID Development, Sri Lanka)

- The constitution of Sri Lanka may hinder collaboration among agencies. The subject of water supply belongs to provincial governments. So, they have their policies and regulations. If the central government goes to intervene or give them some help, the provincial government can reject or refuse their intervention. Sometimes, it may happen. If we have water policies, exchanging our views and expertise in collaboration may be easy.

- We had a serious case: someone started a water supply project in one province. Our selected water source was in another province. Once we started part of the project, farmers refused to get the water to the tank.

Engr. Taqsem A Khan (DWASA, Bangladesh)
- That kind of case happens everywhere. We also had a case and found a solution.

Sub Facilitator
- Such experience and knowledge can be shared between you two.

Engr. Taqsem A Khan (DWASA, Bangladesh)
- That's collaboration.

Sub Facilitator
- Now, Nepal and Sri Lanka will make an MOU to start a program in partnership. It must be self-sustaining.

Engr. Taqsem A Khan (DWASA, Bangladesh)
- We call money to start "Catalyst support".
- No JICA, no ADB, and then no collaboration.

Sub Facilitator
- Without concerning development partners, please make a system on your side.

Engr. Taqsem A Khan (DWASA, Bangladesh)
- Yes, we already have. We have a MOU for three years and will continue.

Sub Facilitator
- We need to make a summary in 10 min.

Engr. Taqsem A Khan (DWASA, Bangladesh)
- JICA and all the development partners should support as a catalyst to enhance collaboration and cooperation in these countries.

Sub Facilitator
- Later, you need to create an action plan. You are the leaders of your authorities. Based on today's discussion, how will you share your knowledge about better water service in your country with your colleagues?

Mr. Zeeshan Bilal (WASA-L, Pakistan)
- We have an internal water network, a very active water operators' network. It's self-sustaining. Sometimes we do it online. Before this, we were kind of disconnected. We realize that this has a lot of potential. There is no shortcut to experience in the world. We can share experiences to help water operators.
- We also have Budapest Waterworks, Hungary, and other waterworks.

Dr. Usman Latif (WASA-F, Pakistan)
- I learned a lot from you.
- I am surprised that everyone is talking about money and bankability, but no one considers little things like how we can improve our system, if what we have is working efficiently, we should introduce a design system because these things are required in our utilities.
- Technology transfer is another thing. By sharing, you can improve a system. Even if you don't need loans or money, you still need technology, because Japanese cars are very famous in the world. Still Japanese are using Porsche, BMW, and other cars maybe because due to quality

and exposure to it. So, this one is leading in one way that technology transfer is leading one sector. We can contribute and cooperate, joining hand to move forward to make a progress. I learned a lot from you.

- I am surprised that everyone is talking about money and bankability, but no one considers little things like how we can improve our system; if what we have is working efficiently, we should introduce a design system because these things are required in our utilities.
- Technology transfer is another thing. By sharing, you can improve a system. Even if you don't need loans or money, you still need technology because Japanese cars are famous worldwide. Still, the Japanese are using Porsche, BMW, and other cars, maybe because of quality and exposure to it. So, this one is leading in one way: technology transfer is leading one sector. We can contribute and cooperate, joining hands to move forward to make progress.

Dr. Wasantha Kumari Illangasinghe (NWSDB, Sri Lanka)

- This session showed us many good examples of collaboration.
- We are facing a severe drought in Sri Lanka. Engr. Taqsem A Khan (DWASA, Bangladesh) explained the water resource policy. That's a kind of collaboration between people sharing the same water source.
- I listened to the presentation that Yokohama Waterworks created a fully-owned subsidiary company. Our agency is also aiming to have a wholly state-owned subsidiary company.
- I also saw a Philippines example where a government organization became a private company, and we could learn how it is.
- We learned a lot about water operator partnerships and want to get advice from Mr. Zeeshan Bilal (WASA-L, Pakistan).

Mr. Gyanendra Bahadur Karki (KUKL, Nepal)

- As for water partnerships, we are doing online discussions and still waiting to visit.
- Another thing is assessing asset management. We are also doing it online. Due to Covid-19, there were no meetings so many times.

Sub Facilitator

- Everyone talked about the importance of partnership and collaboration. We need to consider many kinds of partners in other ministries, both inside and outside the country and among utilities. I also think about collaboration with users. We sometimes need to get consent to raise the tariff.
- This session was very catalytic. I hope you continue your relationship and the water operator's partnership.

Facilitator

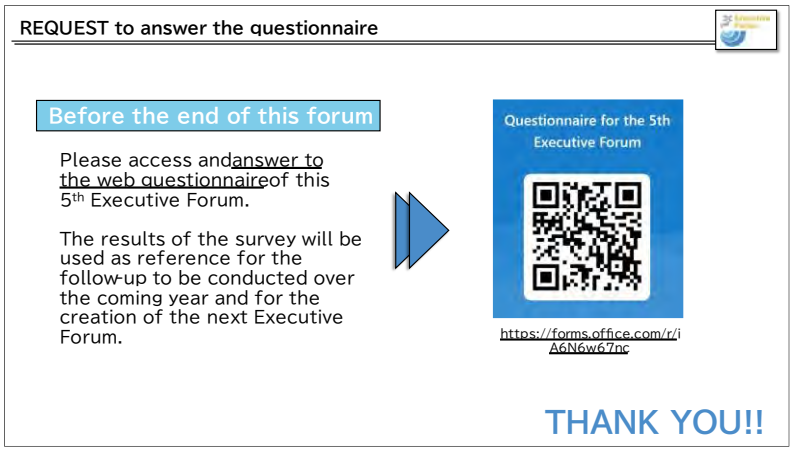
- Based on the last 2-day discussion, our basic problems are almost identical. Our challenges require a holistic approach, not a project approach. The holistic approach also involves collaboration. Utility should take action with a specific context.

EOT

11-6 Results of Questionnaire

11-6-1 Questionnaire Overview

The questionnaire was distributed and collected on Day 4 of the 5th Executive Forum. The questionnaire consisted of 28 questions, and respondents were asked to complete it over the website with Microsoft Forms. The survey collection rate was 100%.



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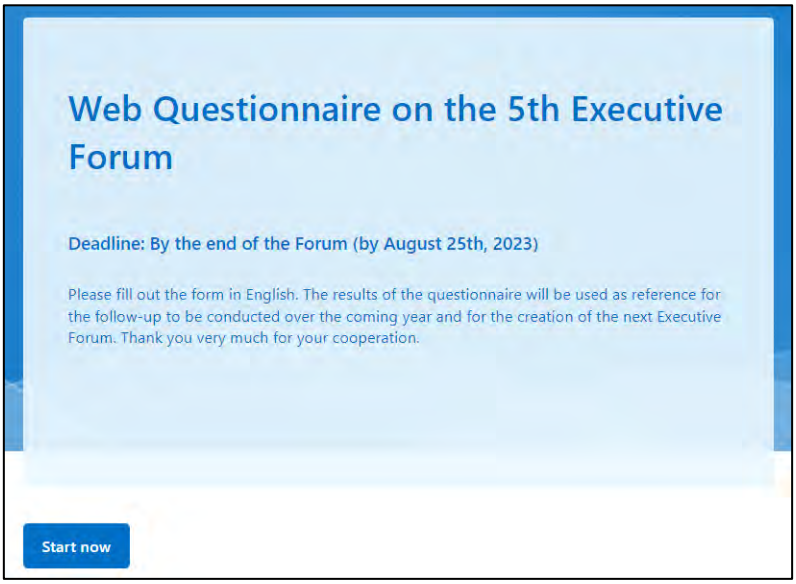

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11-6-2 Results

Note: As a rule, free-text descriptions are described in their original form (only clear spelling errors are corrected).

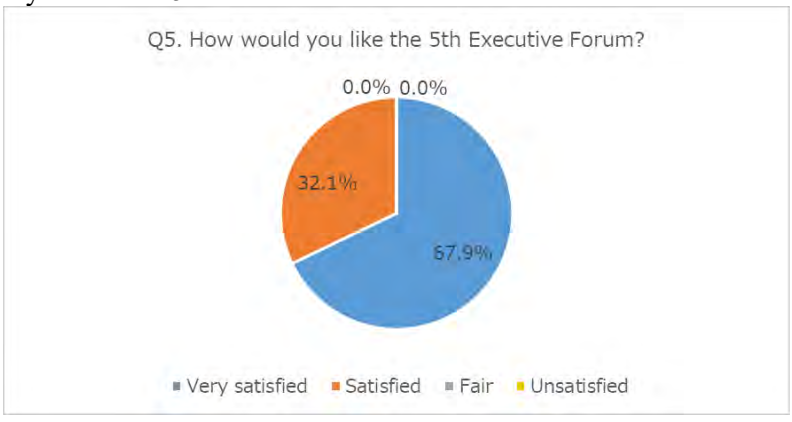
Q1. Name、Q2. Organization
Omitted

Q3. Where do you expect the next Executive Forum to be held?

Q4. (If you selected 2, 3 on Q3) Additional comments on Q3. (E.g. provide the name of the country you recommend.)

- Philippines: Four votes
- Bangladesh: Two votes
- Cambodia: Two votes
- Nepal
- Pakistan
- Sri Lanka
- Vietnam
- Any country of the 10 participating countries: Three votes

Q5. How would you like the 5th Executive Forum?



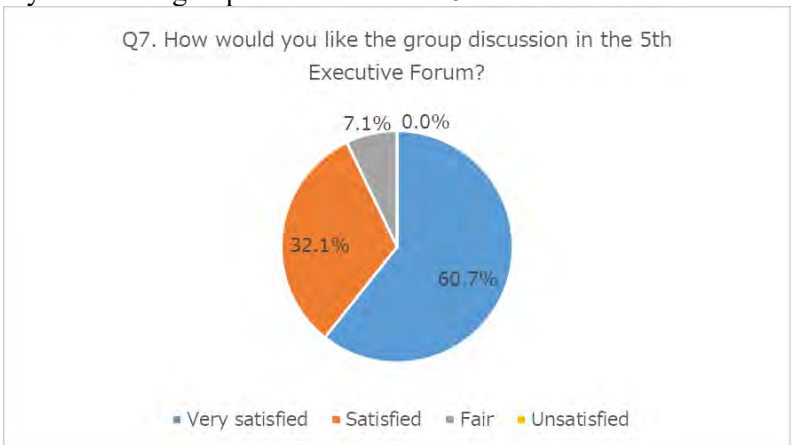
Q6. Additional comments on Q5.

- It was quite hectic but very much informative. Had a chance to have good networking with other country representatives
- I have got many opportunities to participate many training program previously but this program is very much knowledgeable for me by meeting and getting knowledge from seniors

from different water utilities of many countries.

- Congratulations on the well-organized event. It fostered meaningful exchange between water utilities
- Greatly opportunity to exchange lesson learns of really practices from other participants, and good chances understand how to solve problems that relate to our currently issues, having good time cooperation with water supply utilities and can support each other in long term...
- Leaders countries of Asian region were participated the 5th Executive Forum, shared more experiences on water and sanitation.
- Able to communicate Asian region
- It was great to have an opportunity to meet colleagues from other countries and learn from their best practices and experience. The forum was very inspiring.
- We had the opportunity to network and learn many things from similar water authorities
- It was very well organized. Participants were knowledgeable
- JICA experts, staffs were good designing, operating, facilitating all participants and take care.
- JICA has arrange a really helpful forum for all countries may share our experience, knowledge, skill from each other
- Good organization
- Very organized, engaging and informative.
- With well prepare by organizers
- It was well managed.
- It was well prepared and professionally organized, no further.
- Very hospitality and very nice place
- I'm really satisfied since this is my first visit to Japan.
- Consider the method of presentation, most of participants are coming is to have a lesson learnt, from the FGD part, we only share our weaknesses without conclusion obviously, in the big forum the presenter who succeeded in the program must share also the path to reach the goals, what are the steps toward the Goal. Anyway, whatever things that has been shared yesterday in the forum have enrich our knowledge do so. though that I still curious the way they reach the goal, such as; Reduction of NRW. It is become so important for some countries that still having a big percentage of NRW.
- The session is so tight.
- This forum is really useful and beyond my expectations, as we shared experiences from several countries. We got a lot of updated information. In my view the schedule is too tight hopefully for the next event, can be arranged such away, that we have a little bit free time, at least half day or one full day, to see the real culture/ real life of the Japanese people.

Q7. How would you like the group discussion in the 5th Executive Forum?



Q8. Additional comments on Q7. *Classified and described according to the results of Q7 responses

(Very satisfied)

- It's so interactive
- The success of group discussion depends a lot on facilitator
- All discussions were very lively and interactive.
- We can focus on specific problems and brain storming in group discussion look for possible best way to get answers from each.
- Discussions were very fruitful.
- Because the same country is gathering together in same room and sharing an experience of waterworks to another country
- Engaging and all of the delegates participated in the discussion
- Group discussions were a very good opportunity to share experience
- None, the it was well guided, the instructions were clear and the output expectation was well defined.
- It facilitates us to share the experiences among neighboring countries.
- Each group discussion should be making more problem and share more experiences to resolve, improve and lesson learn more from each group…

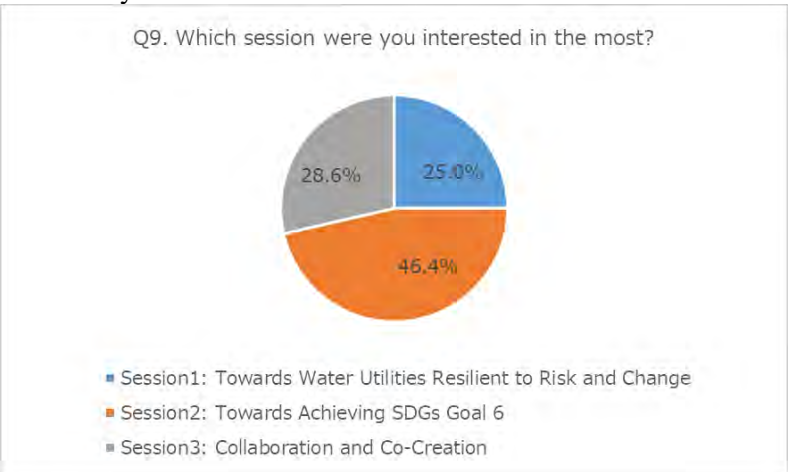
(Satisfied)

- We have discussed about regional partnership to share experience which is very necessary for this time.
- Exchange problem
- Should have been more specific
- Lacked time to learn from each other
- Please provide a whiteboard and sticky papers to collect participants' ideas during discussion. It can help to structure the flow of discussion.

(Fair)

- The same concerns mention above. (Consider the method of presentation, most of participants are coming is to have a lesson learnt, from the FGD part, we only share our weaknesses without conclusion obviously, in the big forum the presenter who succeeded in the program must share also the path to reach the goals, what are the steps toward the Goal. Anyway, whatever things that has been shared yesterday in the forum have enrich our knowledge do so. though that I still curious the way they reach the goal, such as; Reduction of NRW. It is become so important for some countries that still having a big percentage of NRW.)

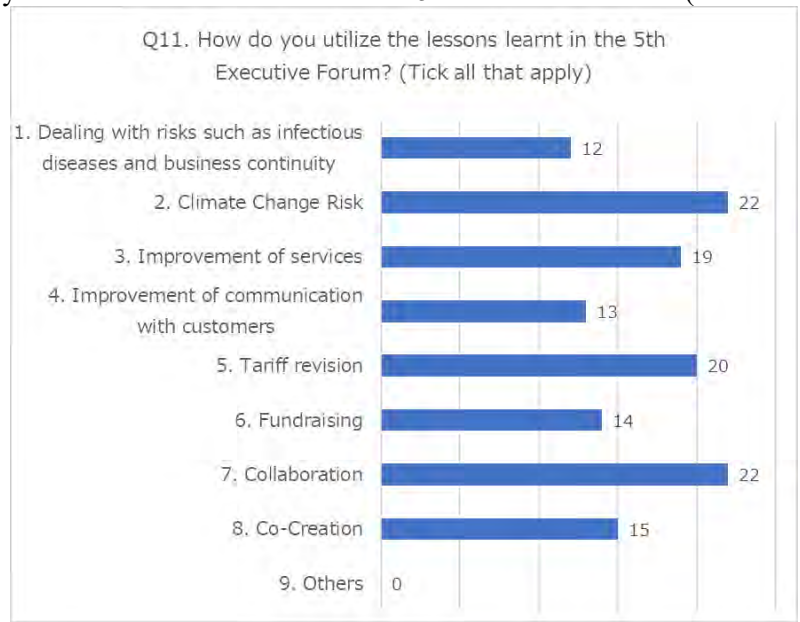
Q9. Which session were you interested in the most?



Q10. Which presentations impressed you? (Tick up to three presentations)

- Reform towards a Bankable Water Utility: “Dhaka WASA Turnaround Program” (Dhaka Water Supply and Sewerage Authority (DWASA), Bangladesh): Eleven votes
- Framing the Sustainability Agenda: Delivering on the SDGs (Manila Water Company, Inc., Philippines): Nine votes
- Toward the Realization of Reliable Waterworks in Connection with Customers (Bureau of Waterworks, Tokyo Metropolitan Government, Japan): Nine votes
- Responses to the COVID-19 Pandemic by Nagoya City Waterworks & Sewerage Bureau (Nagoya City Waterworks & Sewerage Bureau, Japan): Five votes
- Waterworks technologies and knowhow; transferred from Yokohama to the world ~Yokohama Water Company walks with water utilities domestic and overseas (Yokohama Water Co., Ltd., Japan): Five votes
- Securing business continuity even in the event such as infectious disease outbreak or saltwater intrusion (Chattogram Water Supply and Sewerage Authority (CWASA), Bangladesh): Four votes
- Efforts to make F-WASA Self sustainable by improving services and taking concrete steps (Water and Sanitation Agency, Faisalabad (WASA-F), Pakistan): Three votes
- SUSTAINABLE DEVELOPMENT GOALS – SDGS (Binh Duong Water-Environment Corporation-JSC. (BIWASE), Vietnam): Three votes
- Human Resource Development Initiatives (Provincial Waterworks Authority (PWA), Thailand): Three votes
- Response to infectious diseases in water supply (Osaka Municipal Waterworks Bureau, Japan): Two votes
- Creating Corporate Plan and Revising Water Rate 2020-2025 (Luang Prabang Water Supply State-owned Enterprise (NPLP), Laos): Two votes
- PPWSA: Sustainable Water Service in Phnom Penh (Phnom Penh Water Supply Authority (PPWSA), Cambodia): Two votes
- Case Study: Philippine Water Revolving Fund (PWRF) (Development Bank of the Philippines, Philippines): Two votes
- “Center of Excellence for Water” Initiative (National Water Supply and Drainage Board (NWSDB), Sri Lanka): Two votes
- Efforts to secure and adjust water resources (Metropolitan Waterworks Authority (MWA), Thailand)
- ENSURING SAFE WATER SUPPLY DURING NATURAL DISASTER AND INFECTIOUS DISEASES (Thua Thien Hue Water Supply Joint Stock Company (HueWACO), Vietnam)
- Unification of water tariff in the water business integration (Iwate Chubu Water Supply, Japan)
- Lao Water Works Association (LWWA) (Vientiane Capital Water Supply State Enterprise (NPNL), Laos)
- MANAGE WATER & SANITATION AND BOOST COOPERATION IN NORTH SUMATERA PROVINCE - INDONESIA (PERUMDA Tirtanadi, Indonesia)

Q11. How do you utilize the lessons learnt in the 5th Executive Forum? (Tick all that apply)



Q12. Additional comments on Q11.

- I would like to apply knowledge from presentation to improve my current in charge and will persuade my staff do it too
- We need technical support as skilled training, ESMS management system set up
- Every lesson is interesting and good for studying
- For LWWA
- Very important letion
- Leadership, good political will, and good water governance should be the sub themes and deeply discussed.
- Maximum use of networking by sharing important information between organizations
- Drill more to reduce NRW

Q13. What actions would you take to activate the network between participated utilities and agencies? (Tick all that apply)

Q14. Additional comments on Q13.

- More emphasis has to be given for WOP and networking with different utilities.
- I agree with idea of people from Indonesia on make cooperation between among of us through water association by support from JICA
- We would like to improve our water work
- Contact and share information
- Mobile phone
- Create a media social platform for intense communication such as WhatsApp group or Facebook Workplace.
- Need to have some facts finding to get lesson learnt

Q15. Based on the knowledge learnt in the forum, what do you analyze your major challenges/goals in the next three years are? (Tick all that apply)

Q16. Additional comments on Q15.

- Opportunity to connect with other utilities for mutual learning
- LWWA management
- NRW
- Government's priority
- Policy, laws, rules and regulations
- Institutional arrangement
- Political risk and social acceptance
- These are best knowledges for studying and learning next future

Q17. In which category can your organization and Japan be collaborated? (Tick all that apply)

Q18. Additional comments on Q17.

- I want to collaborate on practices and technology on climate change, and possible reducing NRW further esp. for our concessions in the provincial areas. Also for funding for Renewable energy transition
- Because of Japan is successful in water supply with teacher for us
- All categories are important for waterworks in Lao PDR
- Contact and share information concern for enhancing sustainability of the urban water service in Asian region…
- Human capacity building
- Sharing of Maynilads Water Academy curriculum
- Work culture and ethics.
- Research and development collaborations, Water Operator Partnerships
- Japan will influence the transformation of the policy and legal framework as the backbone for the realization of sustainable water services
- Need in soon

Q19. What benefits do you anticipate from participating in the Executive Forum?

- Sharing of experiences and knowledge
- Understand all issues in all utilities and can compare to our own utility. Getting more new ideas from other country.
- All sessions let me to know more about water supply system from participants utilities for the improvement of the area which are not yet implemented by our utility.
- Increased awareness of each other performance and practices and network.
- Learn experiences from other countries
- Knowledge enhancement, Networking and Knowledge sharing.
- During forum, I obtain and exchange knowledge and knowhow in water supply management.
- Sharing experiences, knowledge, networking development
- Learn and know from difference oversea company and institution
- Improve waterwork in our utility
- Experience
- Knowledge sharing
- Boosting up the networking with other organizations and utilities
- Strengthening partnership with Japanese counterparts and maintain my water professional networking.
- Networking
- New knowledge
- Experience
- Capacity building, enhancement leadership and learning best practices from others countries specially Japan.
- Getting knowledge and experiences from the countries who are successful in water supply business.

- Get more knowledges on how every each countries doing and put some strategies to maximizing water supply through Household
- The forum provided the opportunity to connect with other regional utilities and learn from their experience and knowledge.
- Getting new knowledge and new experiences from several countries, including the water management in Tokyo and Yokohama.

Q20. If you have any ideas for future possibilities for the Executive Forum to collaborate with other development partners and relevant agencies for scaling up its impact, please describe them.

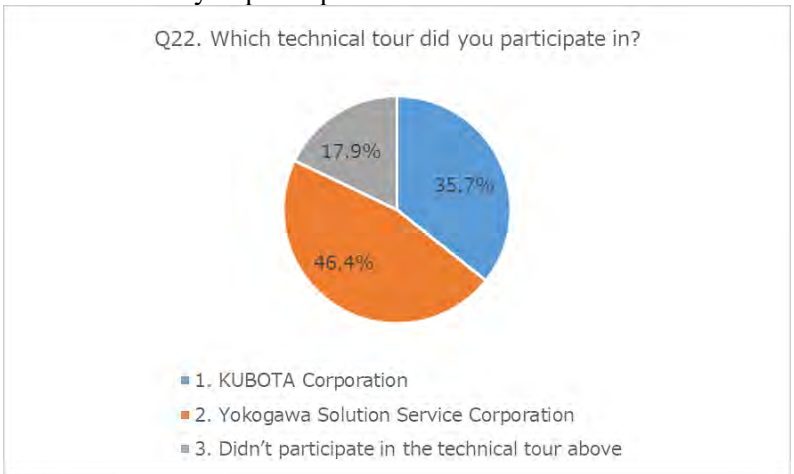
- For future executive forum we may propose other developing partners which is involving in the utility to participate to the forum.
- May be collaboration with ADB
- It's good to allocate a day for discussions with other donor agencies (like WB, ADB ...) to get a clear idea about their new guidelines, criteria etc.
- There is huge infrastructural development and human resource development requirements in most of the water utilities in Pakistan and region in order to meet SDG 6 goals and in order to achieve the aim of provision of improved service delivery. Therefore, the enormity of the challenge requires to collaborate with other development partners in future executive forum.
- Future forum, if there are water supply association attend forum will more useful
- JICA should invite the representatives of water association from each participating country.
- Identify especial collaboration or sharing needs identified some of the partners and facilitate it
- Establishing MCWD's National Training University for the local water district.
- Cheap and durability technology to enhance the WTP
- Exploring water reuse, RE transition
- As one of the most problem in water management in the developing countries is NRW, therefore in the next forum, it is quite possible the sharing session for reducing of NRW can be shared from several countries that already succeed in reducing their NRW.
- NRW
- Follow up
- JICA play a very good role.
- That's good

Q21. The follow-up is scheduled to be conducted by JICA survey team for one year after this forum's completion. What are your expectations for the follow-up?

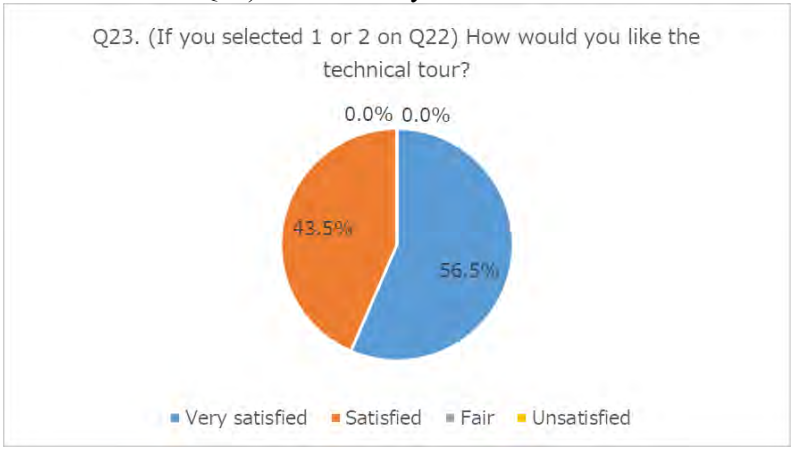
- I hope we have realized the country target
- Hope the fruitful of this action will be useful.
- As per our proposed action plan, we will commit to implement and manage as per our action plan.
- Discuss progress and barriers to action plan implementation
- The action could be done as planned.
- I will try my best to do as our action plan
- Continuing consultancy and feedback for our action plan
- Actions plans are running smooth and yearly targets will be met
- Any requirements for the implementation of action plan can be supported.
- Assessment/Review of progress on the action plans committed by the participants.
- To make sure that whether we are able to achieve pre-determined targets (or at least make improvements in our water supply services)
- Follow up may examine the action plans and time lines proposed against the progress achieved
- Through survey like this, hopefully we can apply the action plan that already decided

- It's a good step to achieve desired results
- The follow up is very much necessary.
- Action plan
- Water supply service and tariff revision
- Facilitate continuation of partners activities
- Need JICA to come over to Jakarta to see some opportunities with Pamjaya to solves some matters
- To be continue ...

Q22. Which technical tour did you participate in?



Q23. (If you selected 1 or 2 on Q22) How would you like the technical tour?



Q24. (If you selected 1 or 2 on Q22) Additional comments on Q23. *Classified and described according to the results of Q22 responses

(KUBOTA)

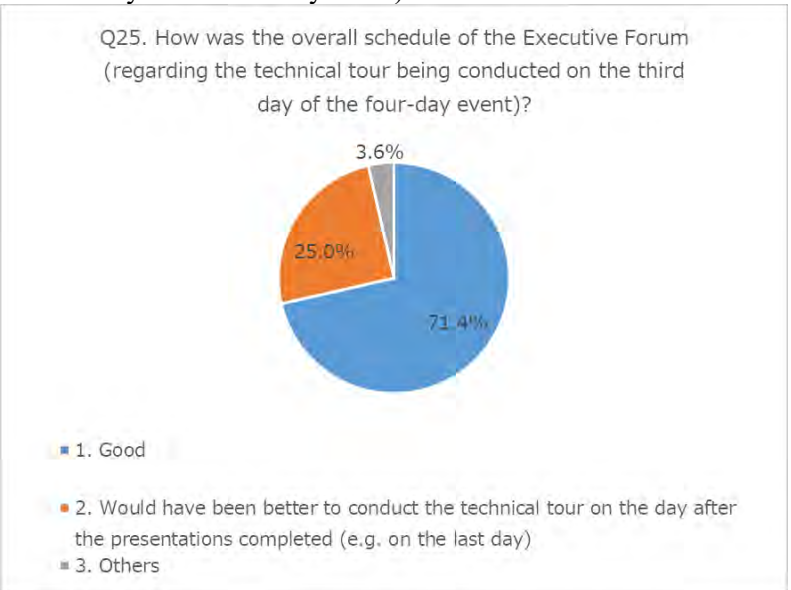
- That's good company (pipelines products…)
- Interesting product
- The technology used for pipe laying and the DI pipes with 100 years lifespan impressed me. Then, I am initiating discussion with some people from Yokohama Water to support MCWD in its Asset improvement - Transmission Lines (approx. 20 kilometers x 1000mm to 1500mm) through JICA's International Cooperation.

(Yokogawa)

- Very interesting technology. Just not sure how it will be applied in organization
- Developed robot for water supply is grealy for me
- Specially for the demo robotic

- Robot
- I wish I could bring my engineers to learn more about Yokogawa innovations.
- It facilitates us to get an idea about the available advanced digital solutions for our business.

Q25. How was the overall schedule of the Executive Forum (regarding the technical tour being conducted on the third day of the four-day event)?



Q26. Additional comments on Q25.

- That's good time
- Inserting tech tour in between sessions is fine to have a short pause on 2-day whole day sessions
- The schedule worked well. I don't think the technical tour should be done on the last day of the forum.
- 1 day
- Last day
- Over tight schedule, until we don't have a chance to see the museum of water supply in Japan

Q27. What technologies, services, or other matters would you like to see on the technical tour in the next Executive Forum?

- All the management for about this forum is better, would be better if in next technical tour for modern water and waste water technology.
- Advanced technology
- High technology equipment
- Pumping (Kubota brand)
- Pipe construction
- Newly technology of piping and water plant
- Advanced technologies in water purification.
- Regarding water quality
- Water supply system run by private water supply and less learnt from them
- Monitoring center of the water supply management
- Water meter calibration labs and water supply design software
- Smart water meter, leak detection equipment, implementation of standards in manufacturing water supply products (pipe, water meter, etc.).
- More detail on stimulation, SCADA system
- SCADA system. Leakage Detection

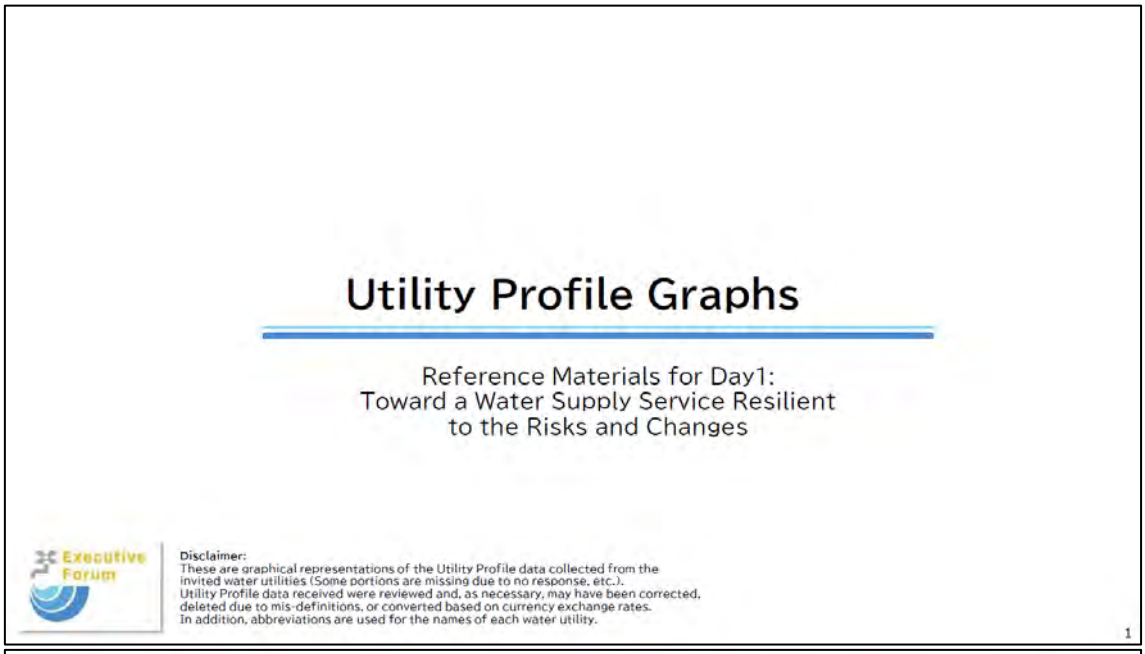
- Improved SCADA system and NRW Reduction Program
- The technology to reduce the NRW

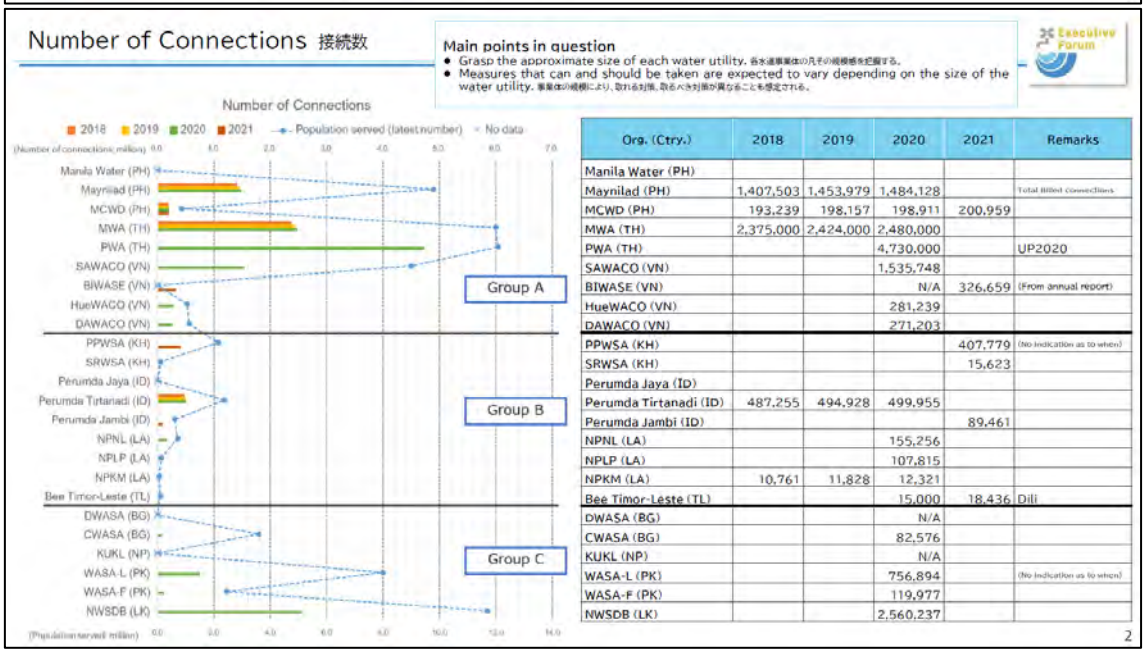
Q28. Please give us any comments.

- Thank you to the organizers and we found that the forum is very profitable to us by getting more experience from the utilities.
- I am honored to have participated this international forum upon the invitation of JICA. Japan's support and commitment to the realization of SDG 6 made this forum possible. Thank you so much officials of the Yokohama City and Yokohama Water Company for this wonderful and enriching accommodations. To the forum staffs and facilitators, I bow my head to your kind and patience facilitations from arrival to our way home.
- I hope the executive forum will bring Indonesian water supply to the bright future
- Overall, I would like to Thank to JICA for all the forum arrangement in whatever advantages brought in.
- Thanks for giving us a very good opportunity to improve our knowledge in how to do water supply services as a business.
- Thank you JICA
- Arigatoo for all support from the best organizer of the forum
- All Japanese are very kind and very good working. Thank you very much.
- Very good
- Very Good forum
- The forum should produce a number of recommendations to the government of each participating countries. JICA has been our powerful and influential development partner. This way, the forum will bring a strong impact to the improvement of water services in the respective countries.
- Time schedule is very tight.
- Language might be limited the successful of the forum
- Please do manage some spare time especially after arrival via a long flight you need some time to take rest and settle down according to time zone and to deal with jet lag issues
- And if possible, please arrange food/lunch box from some Indian or Arabic restaurants because that is acceptable for all the participants including Muslim candidates
- Overall forum was organized in well-coordinated manner and was focused on the main aim. The forum provided opportunity to "Water Family" to discuss the challenges, learn from each other experience and collaborate to meet challenges. However, there is suggestion that in future that dietary requirements based on beliefs may kindly be considered in the matter of food please.

11-7 Results of Utility Profile Data Analysis

The Utility Profile materials (graphs) printed and distributed at the 5th Executive Forum are shown below.

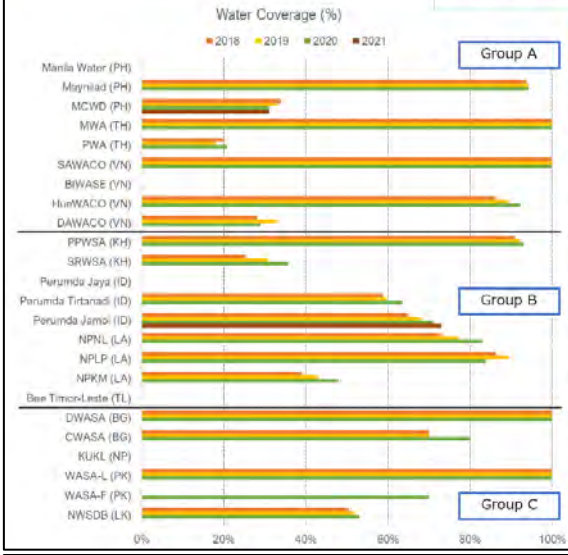




Org. (Ctry.)	2018	2019	2020	2021	Remarks
Manila Water (PH)					
Maynilad (PH)	1,407,503	1,453,979	1,484,128		Total Billed Connections
MCWD (PH)	193,239	198,157	198,911	200,959	
MWA (TH)	2,375,000	2,424,000	2,480,000		
PWA (TH)			4,730,000		UP2020
SAWACO (VN)			1,535,748		
BIWASE (VN)			N/A	326,659	(From annual report)
HueWACO (VN)			281,239		
DAWACO (VN)			271,203		
PPWSA (KH)				407,779	(No indication as to when)
SRWSA (KH)				15,623	
Perumda Jaya (ID)					
Perumda Tirtanadi (ID)	487,255	494,928	499,955		
Perumda Jambi (ID)				89,461	
NPNL (LA)			155,256		
NPLP (LA)			107,815		
NPKM (LA)	10,761	11,828	12,321		
Bee Timor-Leste (TL)			15,000	18,436	Dili
DWASA (BG)			N/A		
CWASA (BG)			82,576		
KUKL (NP)			N/A		
WASA-L (PK)			756,894		(No indication as to when)
WASA-F (PK)			119,977		
NWSDB (LK)			2,560,237		

Water Coverage (%) 給水率

Main points in question
- Grasp the approximate growth phase of each water utility. 各水道事業体の凡その成長段階を把握する。
- What is needed to promote business expansion while also ensuring business continuity? 事業継続性も担保しつつ、事業拡張を進めるために必要なことは何か。

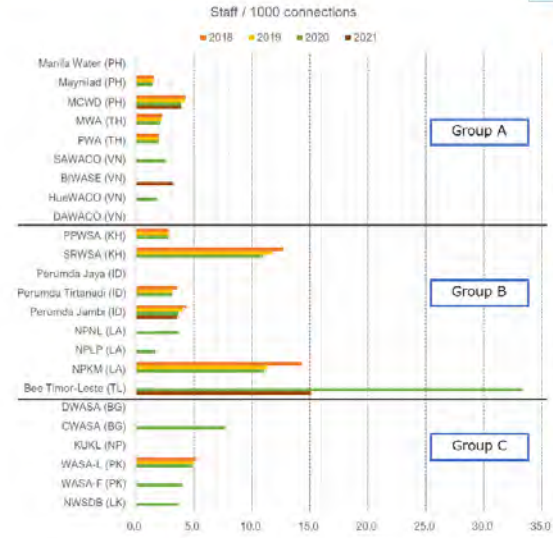


Org. (Ctry.)	2018	2019	2020	2021	Remarks
Manila Water (PH)					
Maynilad (PH)	93.86%	94.24%	94.33%		
MCWD (PH)	34%	33%	31%	31%	
MWA (TH)	100%	100%	100%		
PWA (TH)	20%	18.12%	20.84%		
SAWACO (VN)	100%	100%	100%		
BIWASE (VN)	N/A	N/A	N/A		
HueWACO (VN)	86.37%	89.25%	92.31%		
DAWACO (VN)	28%	33%	29%		
PPWSA (KH)	91%	92%	93%		Population coverage
SRWSA (KH)	25.31%	30.79%	35.69%		Water service coverage
Perumda Jaya (ID)					
Perumda Tirtanadi (ID)	58.8%	59.6%	63.6%		
Perumda Jambi (ID)	65%	68%	71%	73%	
NPNL (LA)	73%	77%	83%		
NPLP (LA)	86.4%	89.5%	83.9%		
NPKM (LA)	39%	43%	48%		
Bee Timor-Leste (TL)	N/A	N/A	N/A	N/A	
DWASA (BG)	100%	100%	100%		
CWASA (BG)	70%	70%	80%		
KUKL (NP)	N/A	N/A	N/A		
WASA-L (PK)	100%	100%	100%		
WASA-F (PK)	N/A	N/A	70%		
NWSDB (LK)	50.5%	51.8%	53.1%		

3

Staff / 1,000 connections 1,000接続あたり職員数

Main points in question
- What is the optimal human resource structure to balance service quality and efficiency while also ensuring business continuity? サービスの質と効率性のバランスを取りつつ、事業継続性も担保できるために最適な人員体制はどのようなものか。



Org. (Ctry.)	2018	2019	2020	2021	Remarks
Manila Water (PH)					
Maynilad (PH)	1.57	1.53	1.46		
MCWD (PH)	4.32	4.25	3.94	3.93	Staff over total SC
MWA (TH)	2.26	2.23	2.1		
PWA (TH)	2	2	2		UP2020
SAWACO (VN)			2.6		
BIWASE (VN)				3.2	
HueWACO (VN)			1.8		(Reference value)
DAWACO (VN)					
PPWSA (KH)	2.85	2.80	2.82		
SRWSA (KH)	12.73	11.78	10.93		
Perumda Jaya (ID)					
Perumda Tirtanadi (ID)	3.59	3.16	3.11		
Perumda Jambi (ID)	4.40	4.01	3.68	3.59	
NPNL (LA)			3.7		
NPLP (LA)			1.7		
NPKM (LA)	14.3	11.3	11.0		
Bee Timor-Leste (TL)			33.3	15.1	
DWASA (BG)					
CWASA (BG)			7.7		
KUKL (NP)					
WASA-L (PK)	5.26	5.01	4.86		
WASA-F (PK)	N/A	N/A	4		
NWSDB (LK)			3.7		

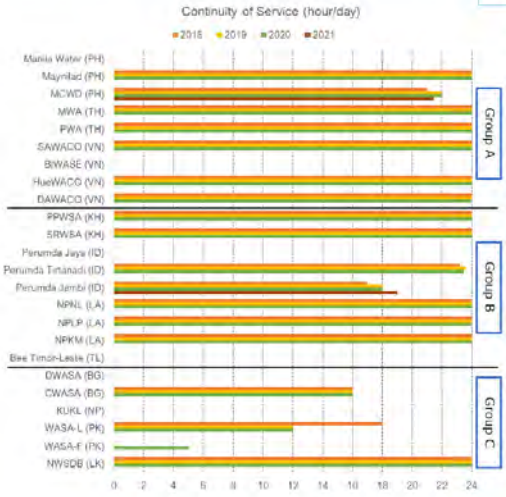
Note: For the six countries of Vietnam, LaoPDR, Timor-Leste, Bangladesh, Nepal, and Sri Lanka, the figures are calculated based on the data of the number of connections and the number of staff.

4

Continuity of Service (hour/day) 給水継続時間

Main points in question

- Ideally, water supply should be continued as possible even in emergency or disaster situations. What are the key initiatives that you are focusing on to achieve this? And if it is difficult to continue water supply, what can be done to promptly recover the water supply? 緊急時、災害時でも可能な限り給水を継続するのが理想だが、そのために重要視している取組みは何か。また、給水継続が難しい場合に、早期に復旧できるためにできることは何か。



Org. (Ctry.)	2018	2019	2020	2021	Remarks
Manila Water (PH)					
Maynilad (PH)	24	24	24		*1
MCWD (PH)	21.00	21.97	21.97	21.45	hours/day
MWA (TH)	24	24	24		
PWA (TH)	24	24	24		UP2020
SAWACO (VN)	24	24	24		
BIWASE (VN)	N/A	N/A	N/A		
HueWACO (VN)	24	24	24		
DAWACO (VN)	23.95	23.98	23.94		
PPWSA (KH)	24	24	24		
SRWSA (KH)	24	24	24		
Perumda Jaya (ID)					
Perumda Tirtanadi (ID)	23.20	23.59	23.48		
Perumda Jambi (ID)	17	18	18	19	
NPNL (LA)	24	24	24		
NPLP (LA)	24	24	24		
NPKM (LA)	24	24	24		
Bee Timor-Leste (TL)	N/A	N/A	N/A	N/A	
DWASA (BG)	N/A	N/A	N/A		
CWASA (BG)	16	16	16		
KUKL (NP)	N/A	N/A	N/A		
WASA-L (PK)	18	12	12		*2
WASA-F (PK)	N/A	N/A	5		
NWSDB (LK)	24	24	24		*3

*1:The original responses stated the percentage of customers with 24hrs water supply. Corrected to "24" since the principle is 24-hour water supply.
*2:The original responses were 16-18(2018), 10-12(2019),10-12(2020).
*3:The original responses were "Varies from 8 to 24hrs". Corrected to "24" since the principle is 24-hour water supply.

5

Utility Profile Graphs

Reference Materials for Day2:
Toward the Achievement of SDG Goal 6

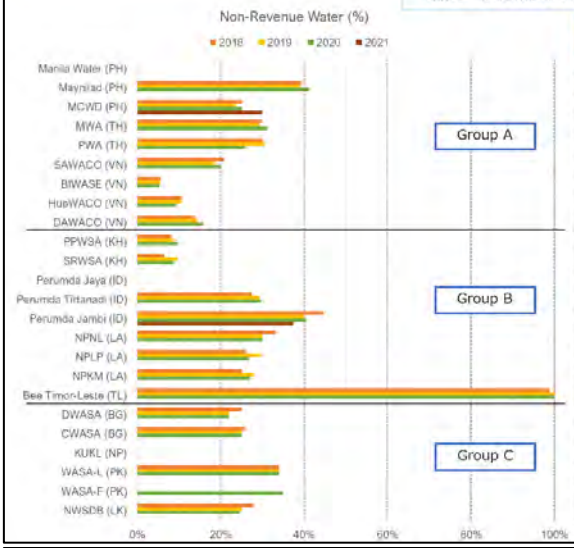
Disclaimer:
These are graphical representations of the Utility Profile data collected from the invited water utilities (Some portions are missing due to no response, etc.).
Utility Profile data received were reviewed and, as necessary, may have been corrected, deleted due to mis-definitions, or converted based on currency exchange rates.
In addition, abbreviations are used for the names of each water utility.

6

Non-Revenue Water (%) 無収水率

Main points in question

- What initiatives are being taken by utilities that are steadily reducing their NRW rates? 着実にNRW率を低減している事業体はどのような取組みを行っているか。
- On the other hand, some entities appear to be experiencing flat or increasing changes over time. What are the reasons for this, what measures are being taken, and what are the prospects for the future? 一方で、前年変化が横ばい、増加している事業体も見られる。その原因や、取っている対策、今後の見込みはどうか。



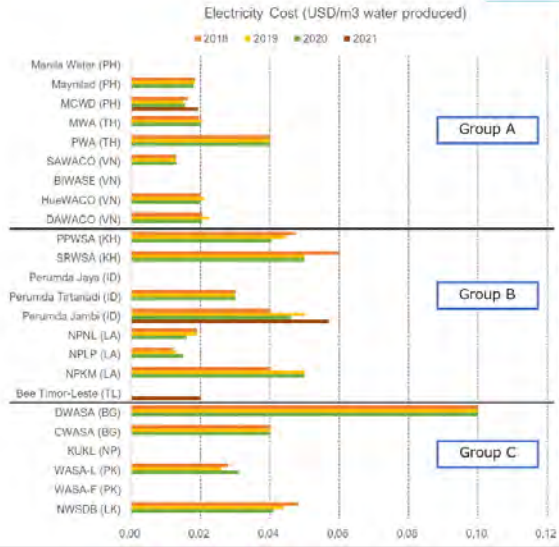
Org. (Ctry.)	2018	2019	2020	2021	Remarks
Manila Water (PH)					
Maynilad (PH)	39.53%	38.97%	41.35%		Ave. Total (%)
MCWD (PH)	25.23%	23.66%	25.18%	30.05%	
MWA (TH)	29.8%	29.3%	31.2%		
PWA (TH)	30.06%	30.50%	26.03%		
SAWACO (VN)	20.85%	18.59%	19.96%		
BIWASE (VN)	5.75%	5.54%	5.33%		
HueWACO (VN)	10.75%	10.63%	9.35%		
DAWACO (VN)	13.82%	14.49%	15.90%		
PPWSA (KH)	8.18%	8.90%	9.74%		
SRWSA (KH)	6.49%	9.71%	8.88%		
Perumda Jaya (ID)					
Perumda Tirtanadi (ID)	27.4%	29.3%	29.7%		
Perumda Jambi (ID)	44.67%	39.98%	40.54%	37.4%	
NPNL (LA)	33.24%	30%	30%		
NPLP (LA)	26%	29.7%	26.8%		
NPKM (LA)	25%	28%	27%		
Bee Timor-Leste (TL)	98.8%	100%	100%		
DWASA (BG)	25%	22%	22%		
CWASA (BG)	26%	25%	25%		
KUKL (NP)	N/A	N/A	N/A		
WASA-L (PK)	34%	34%	34%		
WASA-F (PK)	N/A	N/A	35%		
NWSDB (LK)	27.83%	25.06%	24.63%		

7

Electricity Cost (USD/m³ water produced) 動力費

Main points in question

- What initiatives have been implemented by utilities that have continually reduced electricity cost? 動力費を継続的に削減できている事業体は、どのような取組みを実施したのか。



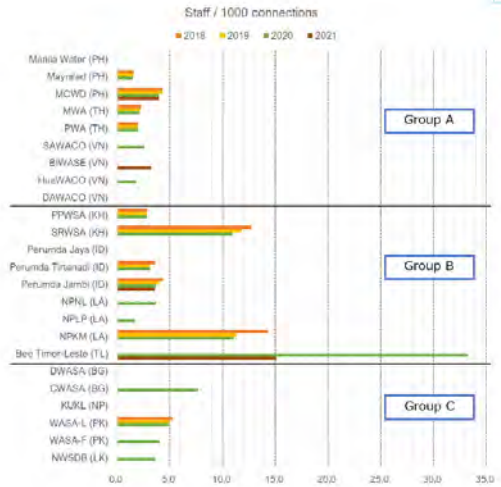
Org. (Ctry.)	2018	2019	2020	2021	Remarks
Manila Water (PH)					
Maynilad (PH)	0.0183	0.0184	0.0180		Total Power Cost
MCWD (PH)	0.016	0.015	0.016	0.019	
MWA (TH)	0.0195	0.0204	0.0201		
PWA (TH)	0.04	0.04	0.04		UP2020
SAWACO (VN)	0.013	0.013	0.013		
BIWASE (VN)					
HueWACO (VN)	0.020	0.021	0.020		
DAWACO (VN)	0.021	0.022	0.020		
PPWSA (KH)	0.047	0.045	0.040		Total electricity expenses / Total water production
SRWSA (KH)	0.06	0.05	0.05		
Perumda Jaya (ID)					
Perumda Tirtanadi (ID)	0.03	0.03	0.03		
Perumda Jambi (ID)	0.04	0.05	0.046	0.057	
NPNL (LA)	0.019	0.019	0.016		
NPLP (LA)	0.012	0.013	0.015		Exchange rate Date 17-02-2021 USD=9,347
NPKM (LA)	0.04	0.05	0.05		
Bee Timor-Leste (TL)	N/A	N/A	N/A	0.02	
DWASA (BG)	0.1	0.1	0.1		
CWASA (BG)	0.04	0.04	0.04		
KUKL (NP)	N/A	N/A	N/A		
WASA-L (PK)	0.028	0.026	0.031		
WASA-F (PK)	N/A	N/A			
NWSDB (LK)	0.048	0.044	0.041		

8

Staff / 1,000 connections 1,000接続あたり職員数

Main points in question

- 5.0persons/1,000connections could be considered as one benchmark, and what are the conditions of the utilities that exceed this threshold, and is there likely to be room for increased efficiency? 1,000接続あたり5人が1つの目安と考えられるが、それを超えている事業体にはどのような事情があるか、効率化の余地はありそうか。
- In utilities with low values, is there an appropriate balance between productivity and each employee's workload? Are there target figures and what are the reasons for these figures? 数値が低い事業体においては、生産性と各従業員の負荷は適切なバランスにあるか、目標としている数値はあるか、またその理由は。

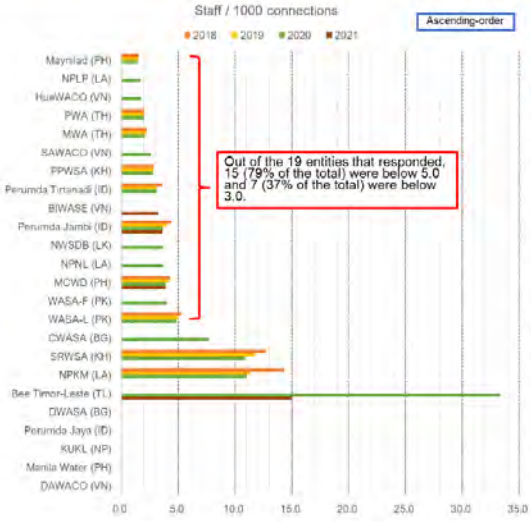


Org. (Ctry.)	2018	2019	2020	2021	Remarks
Manila Water (PH)					
Maynilad (PH)	1.57	1.53	1.46		
MCWD (PH)	4.32	4.25	3.94	3.93	Staff over total SC
MWA (TH)	2.26	2.23	2.1		
PWA (TH)	2	2	2		UP2020
SAWACO (VN)			2.6		
BIWASE (VN)				3.2	
HueWACO (VN)			1.8		(Reference value)
DAWACO (VN)					
PPWSA (KH)	2.85	2.80	2.82		
SRWSA (KH)	12.73	11.78	10.93		
Perumda Jaya (ID)					
Perumda Tirtanadi (ID)	3.59	3.16	3.11		
Perumda Jambi (ID)	4.40	4.01	3.68	3.59	
NPNL (LA)			3.7		
NPLP (LA)			1.7		
NPKM (LA)	14.3	11.3	11.0		
Bee Timor-Leste (TL)			33.3	15.1	
DWASA (BG)					
CWASA (BG)			7.7		
KUKL (NP)					
WASA-L (PK)	5.26	5.01	4.86		
WASA-F (PK)	N/A	N/A	4		
NWSDB (LK)			3.7		

Note: For the six countries of Vietnam, LaoPDR, Timor-Leste, Bangladesh, Nepal, and Sri Lanka, the figures are calculated based on the data of the number of connections and the number of staff.

9

Staff / 1,000 connections 1,000接続あたり職員数 *Ascending-order



Org. (Ctry.)	2018	2019	2020	2021	Remarks
Maynilad (PH)	1.57	1.53	1.46		
NPLP (LA)			1.7		
HueWACO (VN)			1.8		(Reference value)
PWA (TH)	2	2	2		UP2020
MWA (TH)	2.26	2.23	2.1		
SAWACO (VN)			2.6		
PPWSA (KH)	2.85	2.80	2.82		
Perumda Tirtanadi (ID)	3.59	3.16	3.11		
BIWASE (VN)				3.2	
Perumda Jambi (ID)	4.40	4.01	3.68	3.59	
NWSDB (LK)			3.7		
NPNL (LA)			3.7		
MCWD (PH)	4.32	4.25	3.94	3.93	Staff over total SC
WASA-F (PK)	N/A	N/A	4		
WASA-L (PK)	5.26	5.01	4.86		
CWASA (BG)			7.7		
SRWSA (KH)	12.73	11.78	10.93		
NPKM (LA)	14.3	11.3	11.0		
Bee Timor-Leste (TL)			33.3	15.1	
DWASA (BG)					
Perumda Jaya (ID)					
KUKL (NP)					
Manila Water (PH)					
DAWACO (VN)					

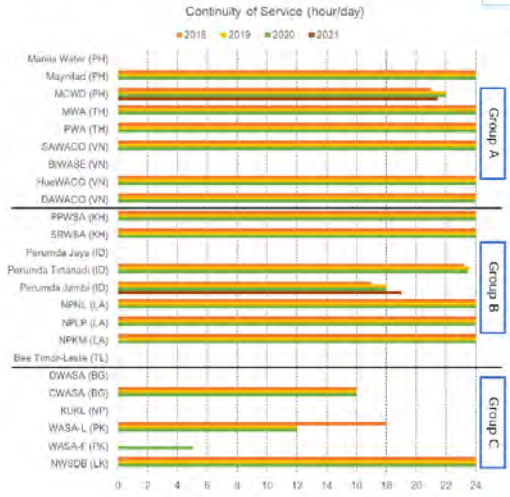
Note: For the six countries of Vietnam, LaoPDR, Timor-Leste, Bangladesh, Nepal, and Sri Lanka, the figures are calculated based on the data of the number of connections and the number of staff.

10

Continuity of Service (hour/day) 給水継続時間

Main points in question

- To ensure the safety and service level of water supply, we should aim for a 24-hour water supply. What measures could be taken to achieve this? 水道事業の安全性やサービス水準を担保するためには、24時間給水を目指すべきではないか。24時間給水にするためには、どのような方策が考えられるか。
- What are the reasons and causes of not being 24hrs/day? Are there any measures taken? 24時間給水でない理由・原因は何か？何か対策が取られているか。



Org. (Ctry.)	2018	2019	2020	2021	Remarks
Manila Water (PH)					
Maynilad (PH)	24	24	24		*1
MCWD (PH)	21.00	21.97	21.97	21.45	hours/day
MWA (TH)	24	24	24		
PWA (TH)	24	24	24		UP2020
SAWACO (VN)	24	24	24		
BIWASE (VN)	N/A	N/A	N/A		
HueWACO (VN)	24	24	24		
DAWACO (VN)	23.95	23.98	23.94		
PPWSA (KH)	24	24	24		
SRWSA (KH)	24	24	24		
Perumda Jaya (ID)					
Perumda Tirtanadi (ID)	23.20	23.59	23.48		
Perumda Jambi (ID)	17	18	18	19	
NPNL (LA)	24	24	24		
NPLP (LA)	24	24	24		
NPKM (LA)	24	24	24		
Bee Timor-Leste (TL)	N/A	N/A	N/A	N/A	
DWASA (BG)	N/A	N/A	N/A		
CWASA (BG)	16	16	16		
KUKL (NP)	N/A	N/A	N/A		
WASA-L (PK)	18	12	12		*2
WASA-F (PK)	N/A	N/A	5		
NWSDB (LK)	24	24	24		*3

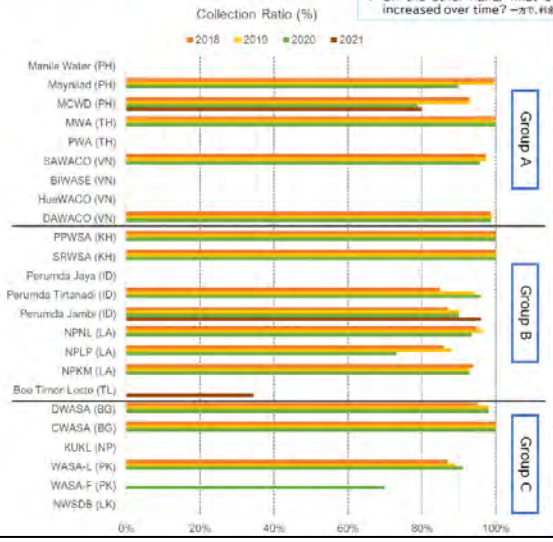
*1:The original responses stated the percentage of customers with 24hrs water supply. Corrected to "24" since the principle is 24-hour water supply.
*2:The original responses were 16-18(2018), 10-12(2019),10-12(2020).
*3:The original responses were "Varies from 8 to 24hrs". Corrected to "24" since the principle is 24-hour water supply.

11

Collection Ratio (%) 料金徴収率

Main points in question

- What are the hurdles for collecting water rates at utilities with low collection ratio? How can they be improved? 料金徴収率が低い事業体では、何が料金徴収のハードルとなっているか。どう改善すればいいか。
- What occurred to utilities whose collection ratio has declined over time? What are the prospects for the future and what measures are being considered for this? 料金徴収率が経年で低下している事業体では、何があったのか。今後の見込みや対策などは考えられているか。
- On the other hand, what efforts have been successful in utilities where the collection ratio has increased over time? 一方で、料金徴収率が経年で増加している事業体では、どのような取組みが功を奏したか。



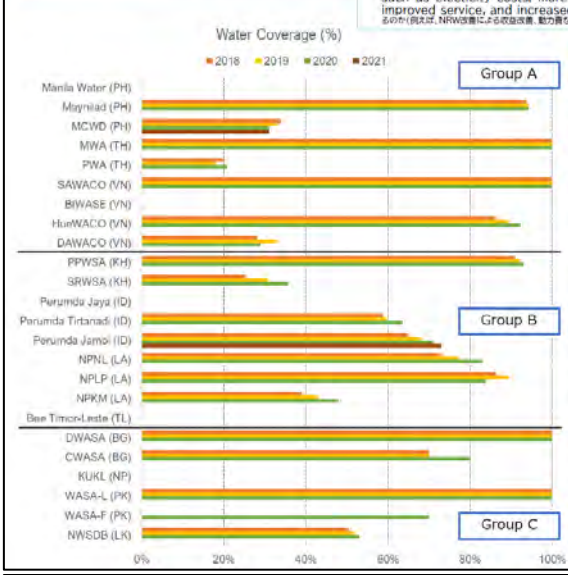
Org. (Ctry.)	2018	2019	2020	2021	Remarks
Manila Water (PH)					
Maynilad (PH)	99.67%	99.40%	89.79%		
MCWD (PH)	93%	93%	79%	80%	
MWA (TH)	99.9%	99.9%	99.9%		
PWA (TH)					
SAWACO (VN)	97.30%	97.53%	95.76%		
BIWASE (VN)	N/A	N/A	N/A		
HueWACO (VN)					
DAWACO (VN)	98.58%	99.04%	98.79%		
PPWSA (KH)	99.90%	99.90%	99.90%		
SRWSA (KH)	99.99%	99.99%	99.99%		
Perumda Jaya (ID)					
Perumda Tirtanadi (ID)	85.0%	94.3%	96.1%		
Perumda Jambi (ID)	87%	90%	90%	96%	
NPNL (LA)	94.87%	96.48%	93.55%		
NPLP (LA)	86%	88%	73.2%		
NPKM (LA)	94%	93%	93%		
Bee Timor-Leste (TL)	N/A	0%	0%	34.5%	
DWASA (BG)	95%	98%	98%		
CWASA (BG)	100%	100%	100%		
KUKL (NP)	N/A	N/A	N/A		
WASA-L (PK)	87%	89%	91%		
WASA-F (PK)	N/A	N/A	70%		Financial
NWSDB (LK)					

12

Water Coverage (%) 給水率

Main points in question

- How have utilities that have increased their water coverage rate over time secured funding, made capital investments, and expanded its services? (e.g. Increased profits through improved NRW, reduced expenses such as electricity costs, more efficient and productive operations, increased customer base through improved service, and increased collection ratio) 給水率が年々増加している事業体は、どのように資金を確保し、設備投資をし、拡張をしているのか（例えば、NRW改善による収益改善、動力費などのコスト低減、効率的・生産性の高い運営、サービスの向上による顧客増加、料金徴収率の増加など）。



Org. (Ctry.)	2018	2019	2020	2021	Remarks
Manila Water (PH)					
Maynilad (PH)	93.86%	94.24%	94.33%		
MCWD (PH)	34%	33%	31%	31%	
MWA (TH)	100%	100%	100%		
PWA (TH)	20%	18.12%	20.84%		
SAWACO (VN)	100%	100%	100%		
BIWASE (VN)	N/A	N/A	N/A		
HueWACO (VN)	86.37%	89.25%	92.31%		
DAWACO (VN)	28%	33%	29%		
PPWSA (KH)	91%	92%	93%		Population coverage
SRWSA (KH)	25.31%	30.79%	35.69%		Water service coverage
Perumda Jaya (ID)					
Perumda Tirtanadi (ID)	58.8%	59.6%	63.6%		
Perumda Jambi (ID)	65%	68%	71%	73%	
NPNL (LA)	73%	77%	83%		
NPLP (LA)	86.4%	89.5%	83.9%		
NPKM (LA)	39%	43%	48%		
Bee Timor-Leste (TL)	N/A	N/A	N/A	N/A	
DWASA (BG)	100%	100%	100%		
CWASA (BG)	70%	70%	80%		
KUKL (NP)	N/A	N/A	N/A		
WASA-L (PK)	100%	100%	100%		
WASA-F (PK)	N/A	N/A	70%		
NWSDB (LK)	50.5%	51.8%	53.1%		

13

Utility Profile Graphs

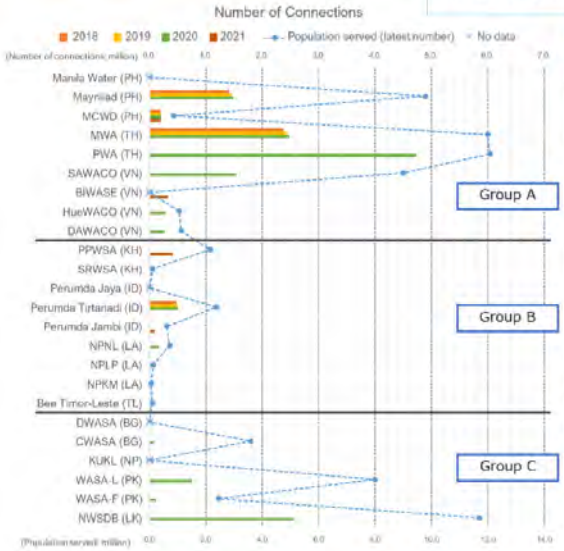
Reference Materials for Day4:
Collaboration and Co-Creation

Disclaimer:
These are graphical representations of the Utility Profile data collected from the invited water utilities (Some portions are missing due to no response, etc.).
Utility Profile data received were reviewed and, as necessary, may have been corrected, deleted due to mis-definitions, or converted based on currency exchange rates.
In addition, abbreviations are used for the names of each water utility.

14

Number of Connections 接続数

Main points in question
- Consider potential partners with whom collaboration and co-creation can be effective (based on the scale of the water utilities) 連携・共創の効果が見込める相手を検討する(規模感をもとに)

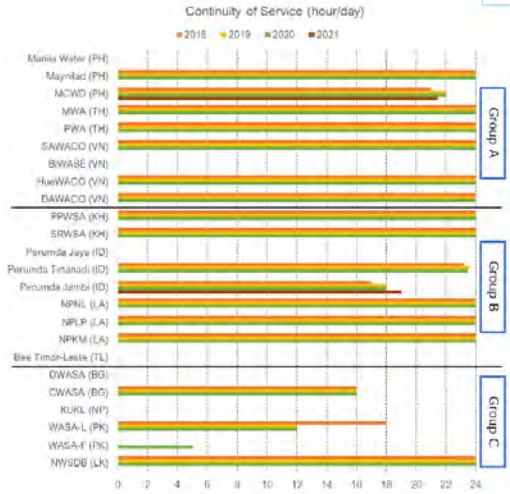


Org. (Ctry.)	2018	2019	2020	2021	Remarks
Manila Water (PH)					
Maynilad (PH)	1,407,503	1,453,979	1,484,128		Total Billed Connections
MCWD (PH)	193,239	198,157	198,911	200,959	
MWA (TH)	2,375,000	2,424,000	2,480,000		
PWA (TH)			4,730,000		UP2020
SAWACO (VN)			1,535,748		
BIWASE (VN)			N/A	326,659	(From annual report)
HueWACO (VN)			281,239		
DAWACO (VN)			271,203		
PPWSA (KH)				407,779	(No indication as to when)
SRWSA (KH)				15,623	
Perumda Jaya (ID)					
Perumda Tirtanadi (ID)	487,255	494,928	499,955		
Perumda Jambi (ID)				89,461	
NPNL (LA)			155,256		
NPLP (LA)			107,815		
NPKM (LA)	10,761	11,828	12,321		
Bee Timor-Leste (TL)			15,000	18,436	Dili
DWASA (BG)			N/A		
CWASA (BG)			82,576		
KUKL (NP)			N/A		
WASA-L (PK)			756,894		(No indication as to when)
WASA-F (PK)			119,977		
NWSDB (LK)			2,560,237		

15

Continuity of Service (hour/day) 給水継続時間

Main points in question
- Consider potential partners with whom collaboration and co-creation can be effective (based on the standard of services provided) 連携・共創の効果が見込める相手を検討する(提供サービスの水準をもとに)



Org. (Ctry.)	2018	2019	2020	2021	Remarks
Manila Water (PH)					
Maynilad (PH)	24	24	24		*1
MCWD (PH)	21.00	21.97	21.97	21.45	hours/day
MWA (TH)	24	24	24		
PWA (TH)	24	24	24		UP2020
SAWACO (VN)	24	24	24		
BIWASE (VN)	N/A	N/A	N/A		
HueWACO (VN)	24	24	24		
DAWACO (VN)	23.95	23.98	23.94		
PPWSA (KH)	24	24	24		
SRWSA (KH)	24	24	24		
Perumda Jaya (ID)					
Perumda Tirtanadi (ID)	23.20	23.59	23.48		
Perumda Jambi (ID)	17	18	18	19	
NPNL (LA)	24	24	24		
NPLP (LA)	24	24	24		
NPKM (LA)	24	24	24		
Bee Timor-Leste (TL)	N/A	N/A	N/A	N/A	
DWASA (BG)	N/A	N/A	N/A		
CWASA (BG)	16	16	16		
KUKL (NP)	N/A	N/A	N/A		
WASA-L (PK)	18	12	12		*2
WASA-F (PK)	N/A	N/A	5		
NWSDB (LK)	24	24	24		*3

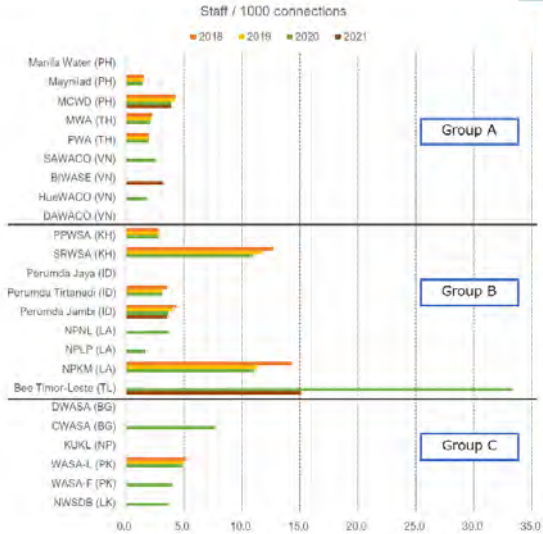
*1:The original responses stated the percentage of customers with 24hrs water supply. Corrected to "24" since the principle is 24-hour water supply.
*2:The original responses were 16-18(2018), 10-12(2019),10-12(2020).
*3:The original responses were "Varies from 8 to 24hrs". Corrected to "24" since the principle is 24-hour water supply.

16

Staff / 1,000 connections 1,000接続あたり職員数

Main points in question

- Consider potential partners with whom collaboration and co-creation can be effective (based on the efficiency of services provided) 連携・共創の効果が見込める相手を検討する(提供サービスの効率性をもとに)



Org. (Ctry.)	2018	2019	2020	2021	Remarks
Manila Water (PH)					
Maynilad (PH)	1.57	1.53	1.46		
MCWD (PH)	4.32	4.25	3.94	3.93	Staff over total SC
MWA (TH)	2.26	2.23	2.1		
PWA (TH)	2	2	2		UP2020
SAWACO (VN)			2.6		
BIWASE (VN)				3.2	
HueWACO (VN)			1.8		(Reference value)
DAWACO (VN)					
PPWSA (KH)	2.85	2.80	2.82		
SRWSA (KH)	12.73	11.78	10.93		
Perumda Jaya (ID)					
Perumda Tirtanadi (ID)	3.59	3.16	3.11		
Perumda Jambi (ID)	4.40	4.01	3.68	3.59	
NPNL (LA)			3.7		
NPLP (LA)			1.7		
NPKM (LA)	14.3	11.3	11.0		
Bee Timor-Leste (TL)			33.3	15.1	
DWASA (BG)					
CWASA (BG)			7.7		
KUKL (NP)					
WASA-L (PK)	5.26	5.01	4.86		
WASA-F (PK)	N/A	N/A	4		
NWSDB (LK)			3.7		

Note: For the six countries of Vietnam, LaoPDR, Timor-Leste, Bangladesh, Nepal, and Sri Lanka, the figures are calculated based on the data of the number of connections and the number of staff.

17