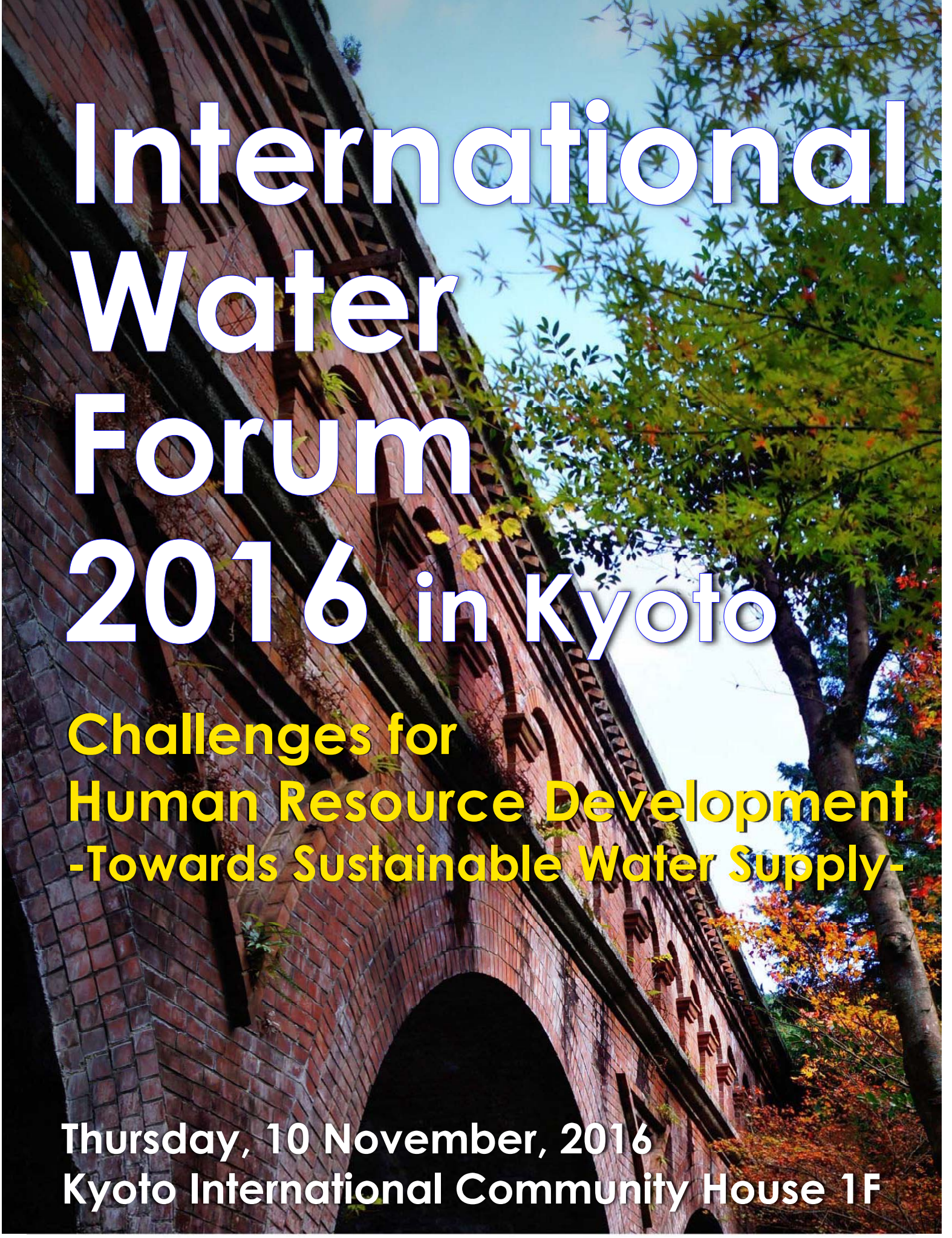


International Water Forum 2016 in Kyoto

Challenges for Human Resource Development
-Towards Sustainable Water Supply-

Thursday, 10 November, 2016
Kyoto International Community House 1F

JAPAN WATER WORKS ASSOCIATION

ひと、くらし、みらいのために 厚生労働省 Ministry of Health Labour and Welfare

IWA International Water Association Japan YWP Japan National Young Water Professionals

Organized by Japan Water Works Association / Ministry of Health, Labour and Welfare / IWA Japan-YWP

Program Overview

Opening Address 14:00-14:15

Ei Yoshida
Executive Director
Japan Water Works Association

Kazuhisa Matsuda
Director, Water Supply Planning and Guidance Office,
Water Supply Division, Ministry of Health, Labour and Welfare

Hiroshi Yamamura
Co-President, IWA Japan-YWP
Associate Professor, Faculty of Science and Engineering, Department of Integrated Science and Technology for Sustainable Society, Chuo University

Keynote Speech 14:15-14:30

Towards sustainable water supply business	**Shozo Kishi** Ministry of Health, Labour and Welfare

Case Study 14:30-16:10

14:30-14:50	Challenges for Human Resource Development : Towards Sustainable Water Supply	**Chayodom Kanchanomai** Thai Waterworks Association (TWA)
14:50-15:10	WOPs in Indonesia	**Dwike Riantara** PERPAMSI (Indonesia Water Supply Association)
15:10-15:30	Challenge for Human Resource Development – Toward Sustainable Water Supply	**Yang-Long Wu** Chinese Taiwan Water Works Association (CTWWA)
15:30-15:50	Human Resource Challenges	**Colin Chung** American Water Works Association (AWWA)
15:50-16:10	YWP and Capacity Development	**Yasuhiro Asada** IWA Japan-YWP

Coffee Break 16:10-16:25

Panel Session 16:25-17:20

16:25-16:35	Introduction	**Masao Shibuya** Japan Water Works Association
16:35-16:45	Human Resource Development by Kyoto City Waterworks Bureau	**Noriko Itagaki** Kyoto City Waterworks Bureau
16:45-17:10	Opinion or Question to the Presentation from the Panelist	
17:10-17:20	Opinion or Question to the Presentation from the Audience	

Wrap-up 17:20-17:30

Takamasa Ichimura, Director of International and Training Department, Japan Water Works Association

Closing

Keynote Speech

Towards sustainable water supply business

Shozo KISHI

Water Supply Division
Department of Environmental Health and Food Safety
Pharmaceutical Safety and Environmental Health Bureau
Ministry of Health, Labour and Welfare

MDGs to SDGs

Millennium Development Goals 2001～2015

8 goals, 21 targets
The goal for developing countries
UN experts led

- Water supply sector has achieved the goal in 2010.
- However the proportion of improved water sources has increased, the coverage of the piped water on premises is not still high.
- Criticism that service level of water quality has not been considered also was a part.

Sustainable Development Goals 2016～2030

17 goals, 169 targets
The goal for all countries
Negotiations at UN all Member States

Sustainable Development Goals （SDGs

Goal 6

Ensure availability and sustainable management of water and sanitation for all

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

6.2 by 2030, achieve access to adequate and equitable sanitation and hygiene for all, and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations

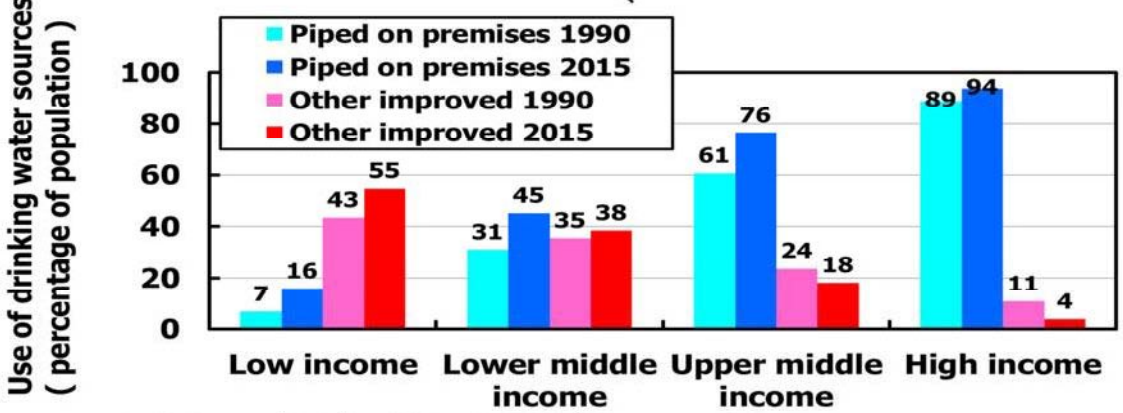
6.3 by 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater, and increasing recycling and safe reuse by x% globally

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

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

6.6 by 2020 protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes

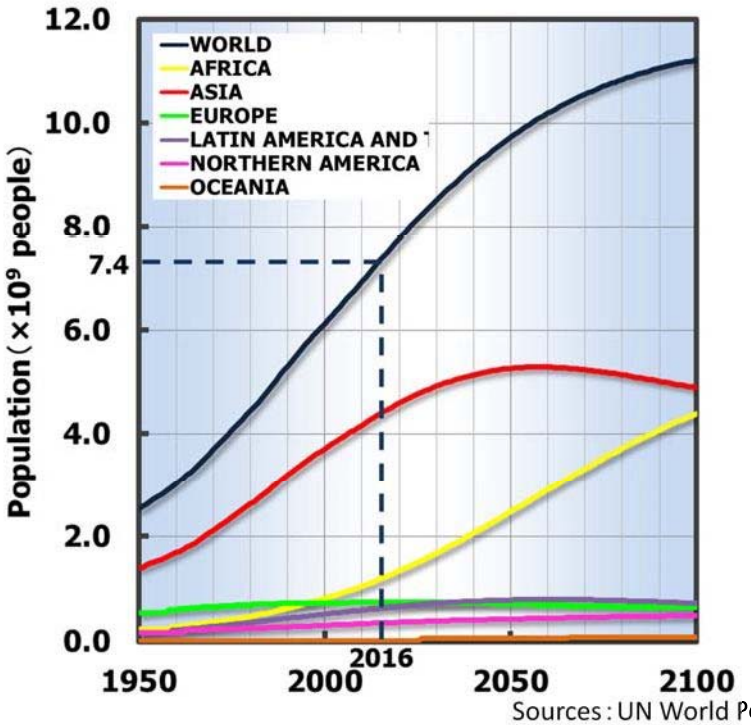
Improved water use of drinking water sources



Source：Progress on Sanitation and Drinking Water 2015 Update

World population prospects

- The world's population is expected to be 11.2 billion people in 2100.
- In Asia, it peaked in the 2050s, then expected to decrease .
- Africa's population continues to increase, In 2100, is expected to reach about 3.6 times the 4.4 billion people of the current population.



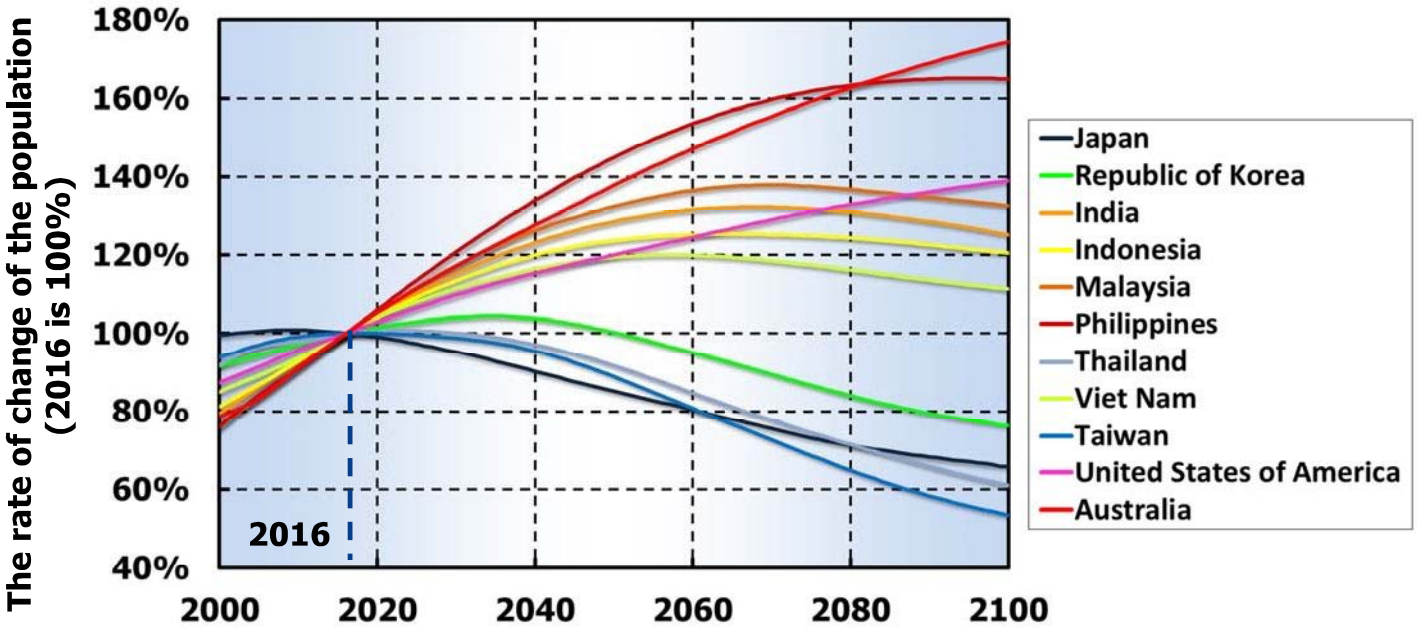
×10⁹ people

Fiscal year	2016	2050	2100
ASIA	4.44	5.27	4.89
	100%	119%	110%
NORTHERN AMERICA	0.36	0.43	0.50
	100%	120%	139%
OCEANIA	0.04	0.06	0.07
	100%	142%	178%
EUROPE	0.74	0.71	0.65
	100%	96%	87%
AFRICA	1.22	2.48	4.39
	100%	204%	361%
LATIN AMERICA AND THE CARIBBEAN	0.64	0.78	0.72
	100%	122%	113%
WORLD	7.43	9.73	11.21
	100%	131%	151%

Sources：UN World Population Prospects: The 2015 Revision; medium variant

Each country's population prospects

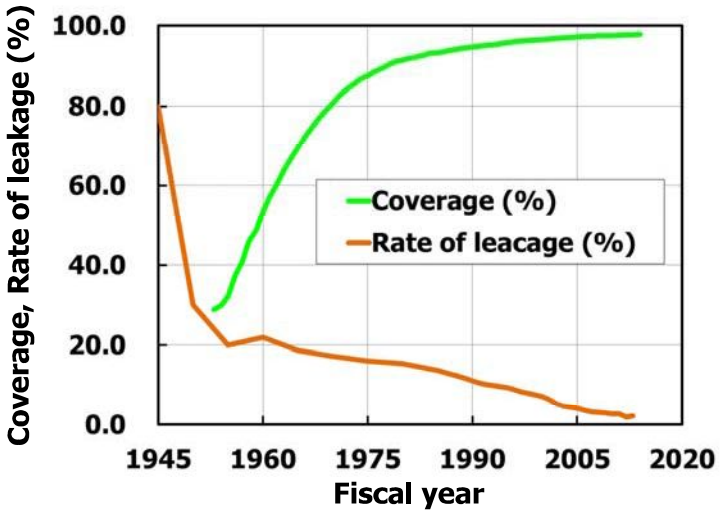
【Large growth】 Australia, Philippines
【Growth 】 U.S.A, India, Indonesia, Malaysia, Viet Nam
【Decline 】 Japan, Republic of Korea, Taiwan, Thailand

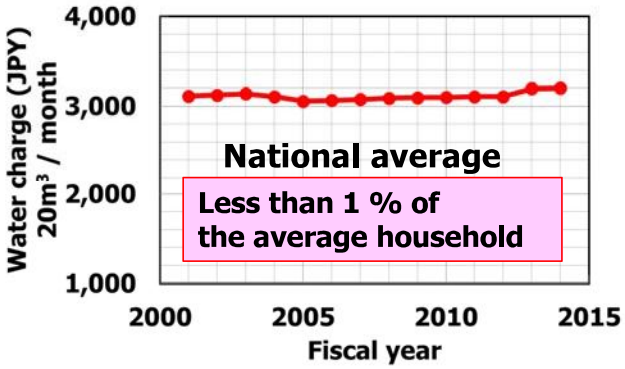


Sources：UN World Population Prospects: The 2015 Revision; medium variant

Current situation of Waterworks in Japan

- Coverage of Water supply 97.8%
- Tap water = drinking water
- Low leakage rate
- Affordable water charge





Price of the 500ml

PET bottle water	:	Tap water
About 100 JPY		About 0.1 JPY

1000 : 1

Source : Water supply statistics
※ Rate of leakage by Tokyo

Action Plan for National Resilience 2016

Notices :

(1) Promotion of the proactive efforts of the private sector
(2) Promotion of community-building of resilience for regional revitalization
(3) Such as Enhancement of the new measures for responses to disasters that occurred in 2015
(4) Deepening and practice of risk communication
(5) **A priority promotion of international contributions** (Excerpt)

Japan that many natural disasters occur, is one of the countries that promoted the innovative initiatives related to National resilience even by international standards, the mutual understanding with other countries in a variety of fields related to National resilience deepen, we should continue to contribute to the international community. (snip)

In cooperation with the Economic Research Institute for ASEAN and East Asia (ERIA), as well as promoting public awareness activities such as symposiums to share the ASEAN countries and knowledge, (snip) National resilience on originated the Japanese efforts, promoting the exchange of opinions about the initiatives of foreign countries, to improve the understanding of the National resilience in the international socialization.

National policy on international contribution

Expansion of policy support tool

Partnership for Quality Infrastructure 2015.05 (excerpt)

- Japan will provide approximately USD 110 billion for "quality infrastructure investment" in Asia over the next five years.
- This initiative will play a catalytic role in further mobilizing global, private sector financial resources and know-how to Asia, a region full of potential, in a way that promotes necessary infrastructure investment, both in terms of quantity and quality.

Expanded Partnership for Quality Infrastructure 2016.05 (excerpt)

- Japan will encourage exports of its high-quality infrastructure and construct win-win relationships that contribute both to domestic economic growth and to economic development of partner countries.
- Japan will aim to provide, among all, financing of approximately 200 billion USD in the next five years to be allocated to infrastructure projects across the world, including those for natural resources, energy, etc.

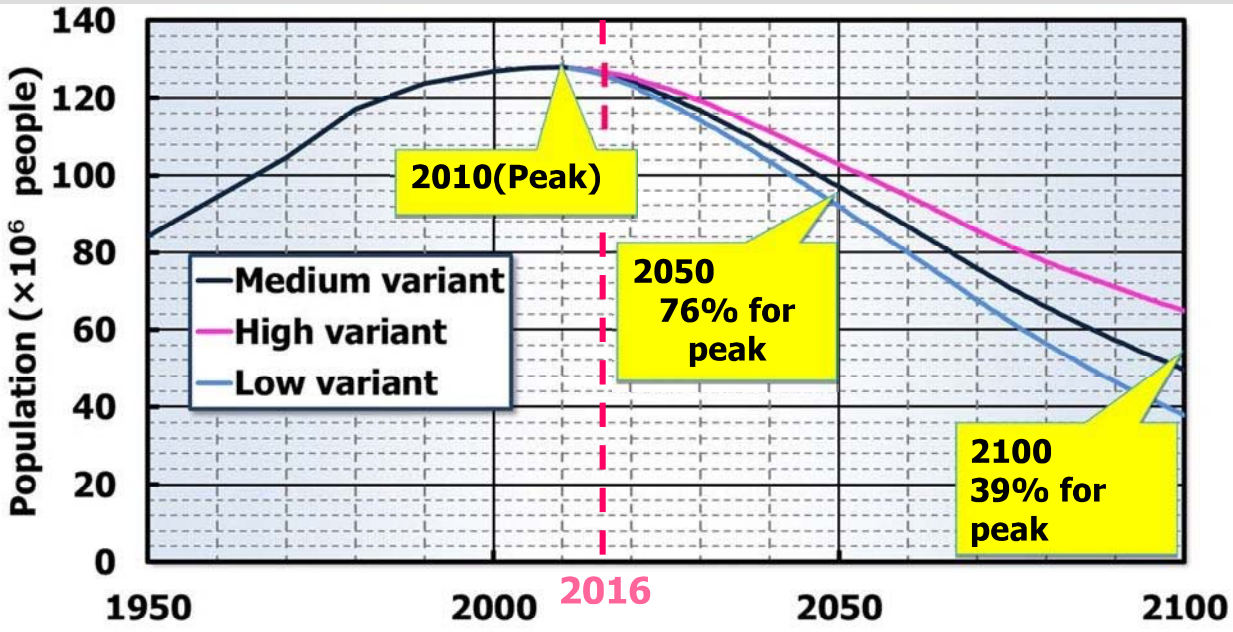
"Quality" **High quality, Good quality**

Advantageous from the point of view of Life Cycle Costs (LCC)
(Long-lasting, low failure rate)

Challenges of Waterworks in Japan

Population decline in Japan

- Japan's population has started to decline after peaking in 2010.
- The population was reduced to three-quarters to the peak in 2050, it is in 2100 expected to decline to about 40%.
- If the population decrease, since the water supply revenue decrease, there is a possibility that the water supply business will not be continued.
- Population decline is not limited to water, it is regarded as a major social problem.



Frequent large-scale earthquake disasters

- Intensity 6 or higher earthquake : since 1995, 50 times occurs (2.4 times / year)
- Long term water outage by disaster of main pipe

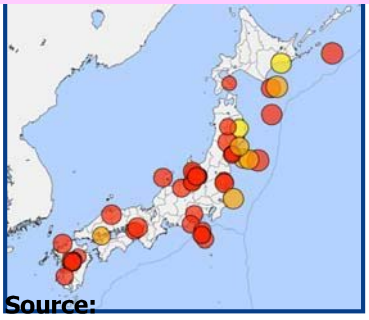
【The Great East Japan Earthquake 】

- Damage of water facilities by tsunami, salt damage of well.
- The effects of radioactive substances on water quality.
- Long-term power failure
- Wide range of liquefaction

【 The Kumamoto Earthquake 】

- Twice the occurrence of quake of Intensity 7
- Prolongation of the turbid water of the well water source.
- disaster of vulnerable facilities of small-scale water

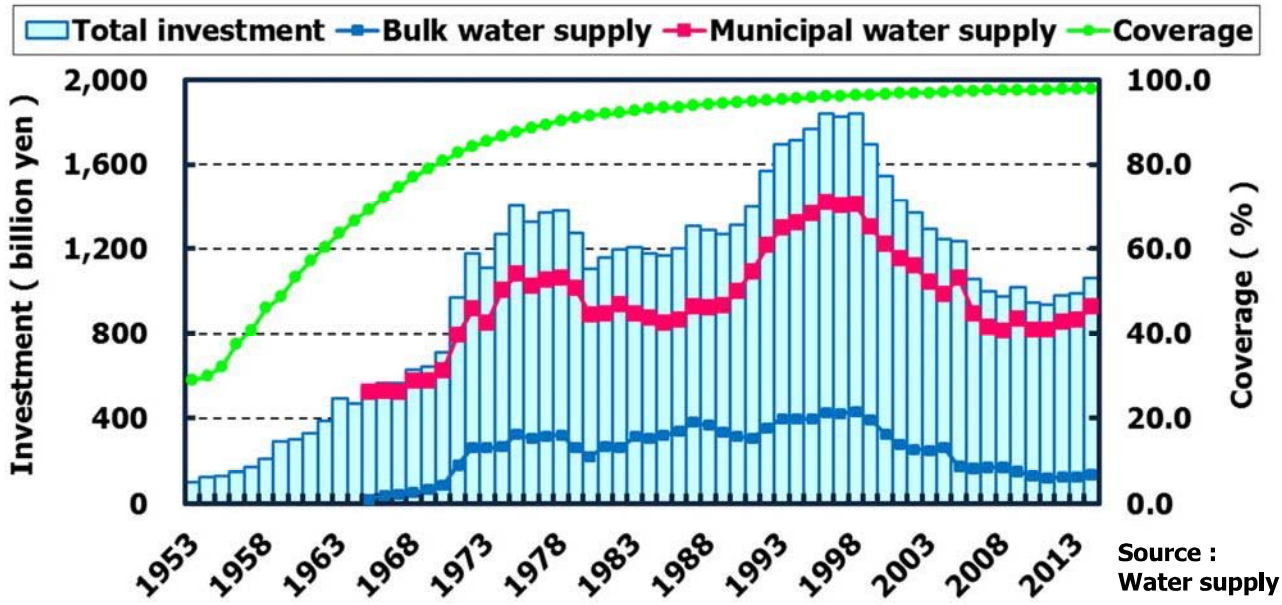
Earthquake location



Source:
Japan Meteorological Agency

Investment of the Water Supply System

- Total assets of water supply system was estimated about 64 trillion yen at 2014.3.
- A lot of facilities which installed during high economic growth period will require a large amount of renewals and rehabilitations from now.
- To ensure the renewals and rehabilitations cost, sound and stable management based on the water supply revenue will be required.



Source : Water supply statistics

Aging of water pipeline

The aging pipeline rate is expected to be increased rapidly, because the renewal of aging pipeline which installed during high economic growth period is slow (Legal durable year is 40 years in Japan).

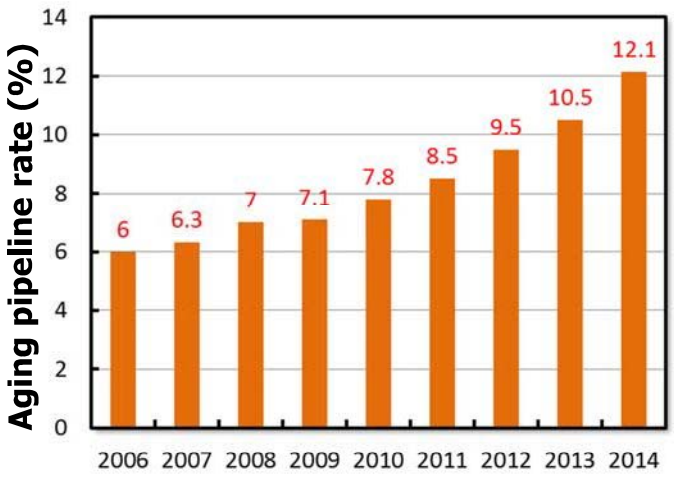
Aging pipeline rate (%)

$$\frac{\text{Pipe length in excess of the age of service 40 years}}{\text{Pipeline total length}} \times 100$$

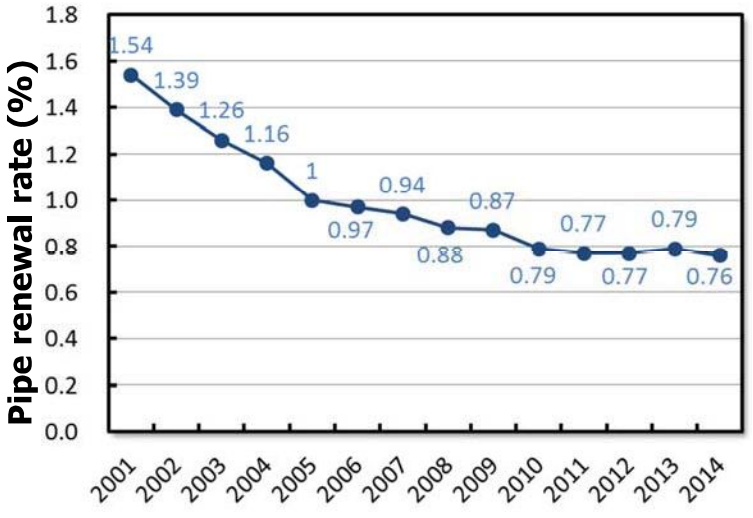
Pipe renewal rate (%)

$$\frac{\text{Total length of renewal pipeline}}{\text{Pipeline total length}} \times 100$$

Aging of pipeline surely progresses.



Renewal of pipeline has not been progressed.

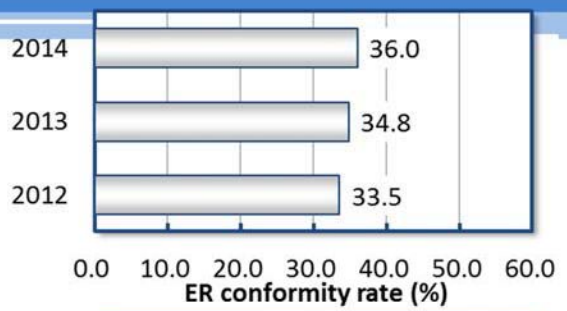


Source : Water supply statistics

Progress of earthquake resistance in water supply facilities (2014)

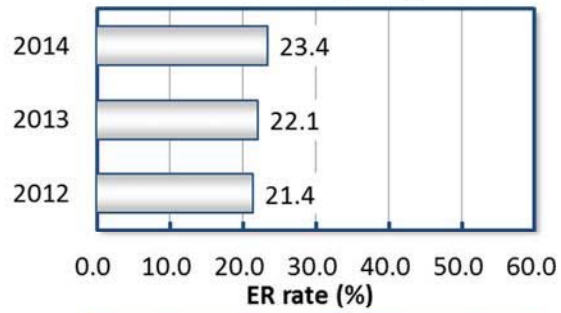
Main pipeline

- The situation that 1.2 points are risen from 2013, but it cannot be said that earthquake resistance advances.
- Progress of earthquake resistance in each of the water operators differ greatly.



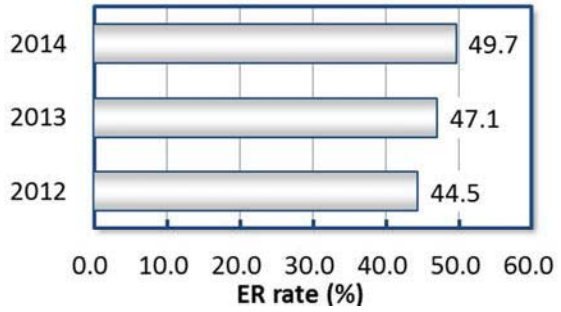
Purification Plant

- Earthquake resistance of the water purification plant, in many cases to be earthquake resistance at the time of renewal work of the water purification plant. Therefore, the slow progress of earthquake resistance rate of the water purification plant.



Distribution reservoir

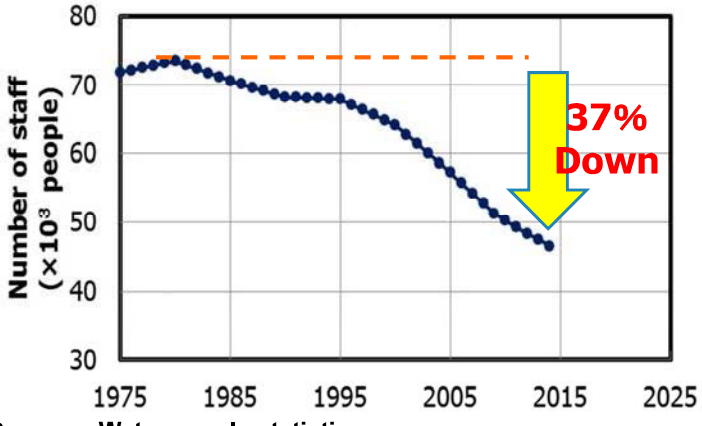
- In comparison with the construction of the water treatment plant, so easy to do the renovation of distributing reservoir, earthquake resistance of the distribution reservoir is progressing.



Trends in number of staff, and the age structure of the staff

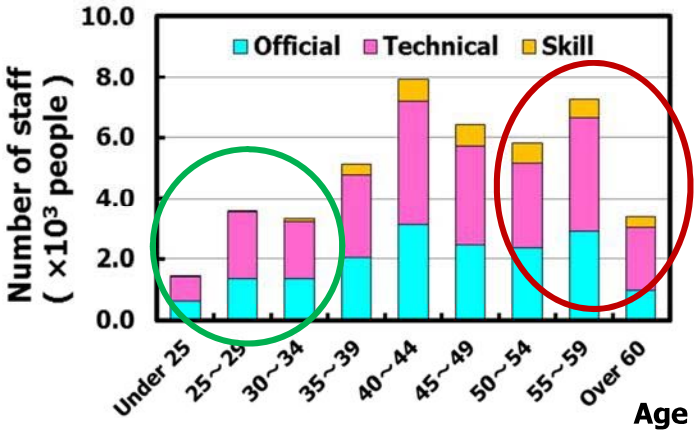
- The number of staff engaged in water supply business decreases more than 37% in comparison with a peak (about 35 years ago).
- Younger staff (<35) remains in approximately 20% while the expert staff (50<) occupies approximately 40%, and succession of the water supply technique becomes increasing challenge.
- To improve the operating foundations, business integration beyond the municipal border and public private partnership are key factors.

Reduction in the number of staff



Source : Water supply statistics

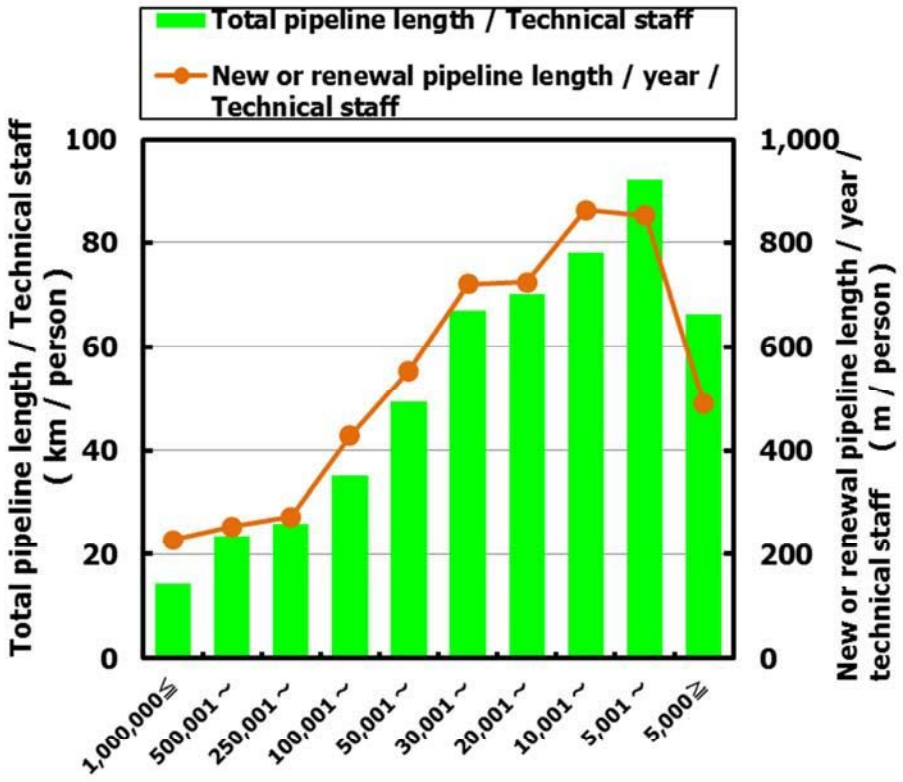
Age structure of the staff



Number of Staff at each business scale

Population	Staff number (ave.)			
	Official	Technical	Skill	Total
1,000,000≦	356	504	153	1,013
500,001 - 1,000,000	79	134	12	225
250,001 - 500,000	38	68	11	117
100,001 - 250,000	18	25	2	45
50,001 - 100,000	10	11	1	22
30,001 - 50,000	7	5	1	13
20,001 - 30,000	5	4	0	9
10,001 - 20,000	3	2	0	5
5,001 - 10,000	2	1	0	3
5,000≧	2	1	0	3

Source : Water supply statistics



The New Waterworks Vision and Concrete Measures

Release of the New Waterworks Vision

(Former) Waterworks Vision (2004)

- The Great East Japan Earthquake (March, 2011)
- Water supply in the population decline society

New Waterworks Vision (March, 2013)

【Concept】
Succession of reliable water supply to the future alongside communities

Keywords

driving forces

- Challenge
- Cooperation

Example of various policies

- ✓ Enforcement of the asset management
- ✓ Replacement and earthquake resistance of facilities
- ✓ Strengthening organization by Integration and Public private partnership

Promotion of the New Waterworks Vision

Key words	Safety	Resilience	Sustainability
Short-term Targets	**Securing safe water by cooperation**	**Earthquake-resistance of main facilities**	**Carrying out asset management**
Direction of measures	■ High quality water resources ■ Maintenance of the facilities ■ Water quality management in the processes of treatment ■ Establishing the publicity system	■ Gradual earthquake-resistance ■ Reinforcement of facilities to supply essential water in case of disaster ■ Securing emergency water supply and restoration by cooperation in case of disaster	■ Careful management and operation of whole facilities ■ Replacement of aging facilities ■ Strengthening of the financial basis ■ Securing staffs with specialty

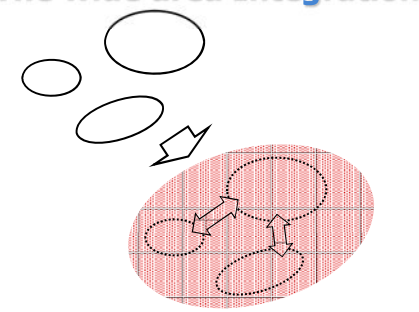
Measures currently discussed

The promotion of the wide area cooperation

Promotion in (example)

- Horizontal integration of water supply operators to each other
- Vertical integration of bulk water supplier and water supplier
- Consolidation of facilities
- Centralization of water quality management
- Joint of the facility management
- Joint management of water supply facilities
- Joint of the information system

The wide area Integration



Measures currently discussed

- Business support and Staffing to small and medium-sized businesses by the large-scale businesses
- Business support and guidance to the water business by prefectures

- Fostering and securing of human resources involved in the water supply business
- Strengthening the foundations of the water supply business

Measures currently discussed

The promotion of public-private partnership (PPP)

Promotion in (example)

Depending on the ability of such personnel and know-how that water operators have, take advantage of the PPP that can compensate for the weakness.

- Third party consignment
- PFI (Private Finance Initiative)
- Concession

etc.

This field does not much headway in Japan.

Measures currently discussed

- Promotion of public-private personnel exchange in consideration of the level-up. (technical, management)
- The promotion of human resources from the external.

- Fostering and securing of human resources involved in the water supply business
- Strengthening the foundations of the water supply business

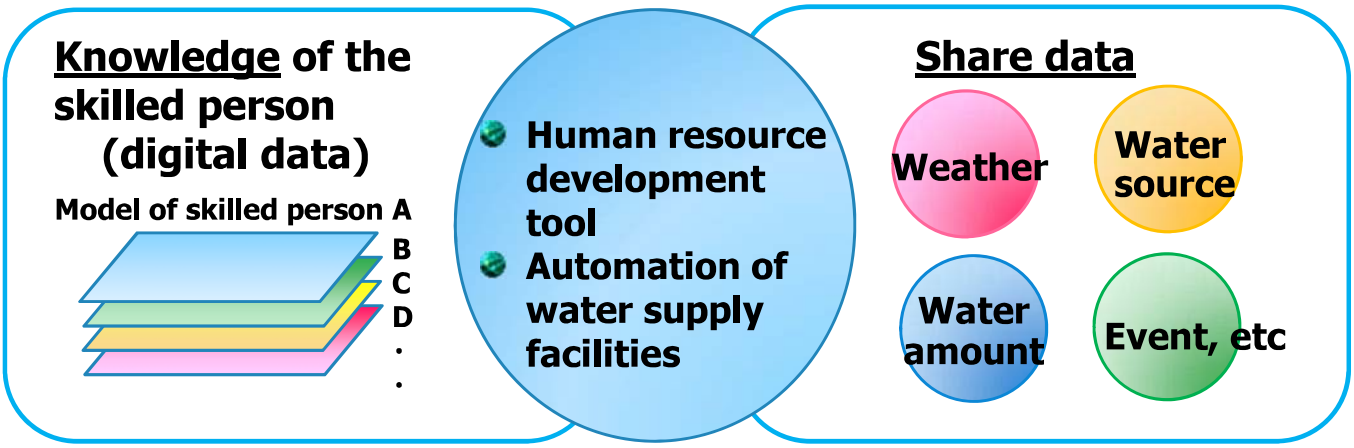
Measures currently discussed

Utilization of "Internet of Things (IoT)"

Promotion in (example)

- Remote measurement of water quality
- Remote monitoring and control of water supply facilities
- Water leakage monitoring of the pipe etc.

Measures currently discussed



Conclusion

- **Promotion of the New Waterworks Vision**

  Clarification of current and future water supply

- **Building measures to evolve in the water business in the population decline society**

  Wide area cooperation, PPP, use of IoT

- **Promotion of international cooperation**

  The provision of high-quality infrastructure system
  Human resource development based on the Japan of knowledge

Case Study

THAI WATERWORKS ASSOCIATION

(TWA)

Challenges for Human Resource Development : Towards Sustainable Water Supply

Presented by
Mr.Chayodom Kanchanomai
Thailand Waterworks Association (TWA)

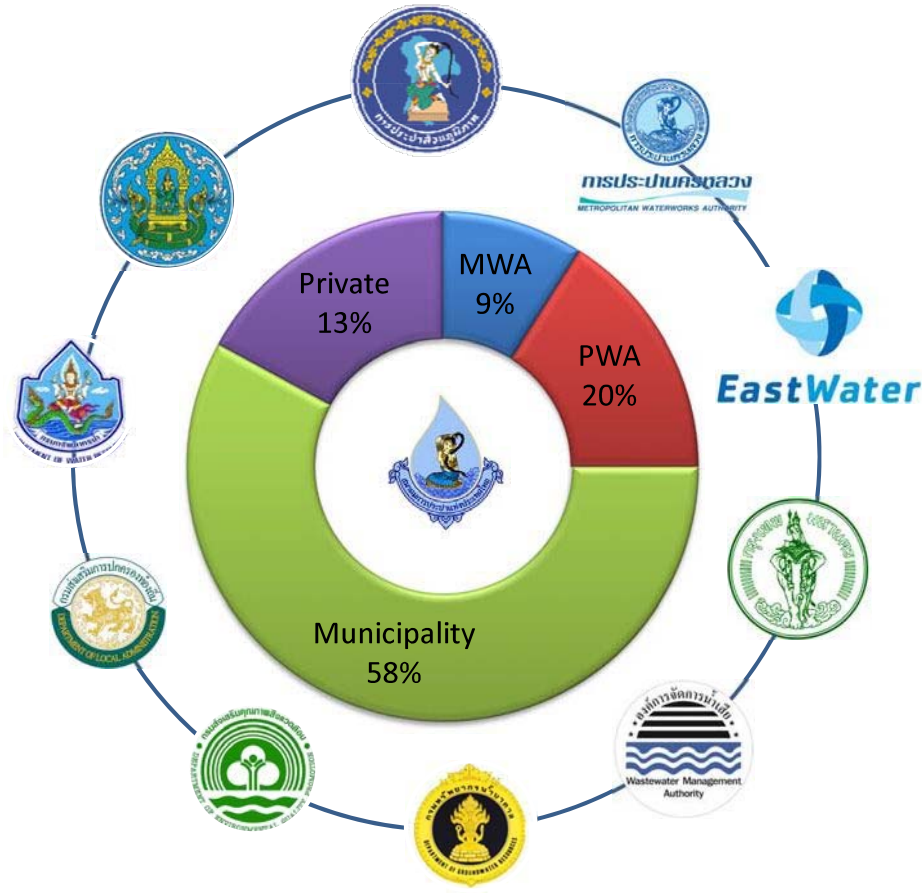
Present for : JWWA - 2016

Outline

- TWA
- Partnerships
- Training Program
- Output
- Future Program

Mission

- Center for promoting water supply occupation in Thailand
- Conduct research and disseminate water supply information and technology for safety and welfare of the public
- Support and provide consultation in determination of water supply material and equipment standard.
- Exchange know-how and experiences among members.
- Provide training to those who engaged in water supply



- Based on the amount of water meter in Thailand
- Responsible by 4 main sectors
- Government
- Private Sector

Training Program

Integrated Water Management Program

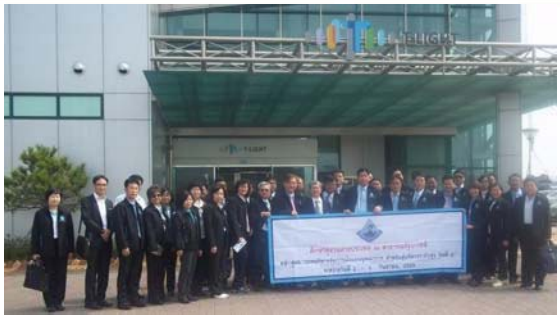
✓to enhance the knowledge and experience of the trainees

✓ The targets are the executives and the decision makers in water supply organizations, both public and private

✓can generate beneficial network between the executives

Training Program

Integrated water Management Training Course for Top Executive Batch 1 - 3



Integrated Water Management Training Course for Middle Executive

Training Program

Out line of training program

- Waterworks sector (government & private)
- Fundamental of waterworks
- Workshop & Group works
- Leader skills
- Knowledge sharing
- Site visit (case study of water

Out put

Organization

- Knowledge Sharing
- Knowledge Integrating
- Strategy Development

Human Resource

- Increase Personal Skill
- Knowledge Transfer
- Motivation Improvement

Relationship

- Networking
- Strengthening
- Organization Relationship

Future Program

- Target group-all partnership
- Program for - Executive level
- Program for - Operation level
- Knowledge Management
- International network

Thank you

WOPs in Indonesia

Dwike Riantara
Head of Performance Improvement Bureau

PERPAMSI
INDONESIA WATER SUPPLY ASSOCIATION
TIRTA DHARMA

WHAT ARE WOPs

Water Operators' Partnerships (WOPs) are peer support arrangements between water and sanitation operators.

- WOPs work by mobilizing the skills, know-how and goodwill within a strong 'mentor' to build the capacity of another operator – the 'mentee' – that needs assistance.
- WOPs progressively strengthen and empower the mentee operator at management, financial and technical levels to implement changes that will lead to better service.
- WOPs are always carried out on a not-for-profit basis.

PERPAMSI

Association of Indonesian water supply utilities, founded in 1972

Main task

to improve the performance of water utilities in providing better services to the people.

Members = 428

387 public water utilities (PDAMs)
26 private operators
15 service unit

11 million

Total house connections nationally

54 thousands

Total manpower working for water utilities nationally

Performance (2015)

of 364 auditable PDAMs

197	103	64
Healthy	Less Healthy	Unhealthy

53%
Well-performing

47%
Non-performing

Focus:
improvement in all aspects

WOPs initiative

The idea:
Well-performing utilities are requested by PERPAMSI to share best practices to non-performing ones

Establishing international and national WOPs:

→ International WOPs in collaboration with JICA, Waterlinks, ADB, etc.

→ National WOPs (among Indonesian water utilities) facilitated by PERPAMSI itself

Developing an Indonesian way of WOPs: employing local values, solidarity, self-finance to start

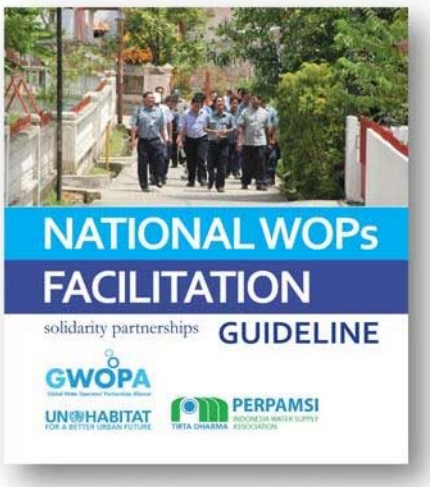
WHY NATIONAL WOPs?

- The national or domestic WOPs can be a better option than the international WOPs in terms of eliminating the constraints of languange, culture, inapplicable technology, and costs.
- Water associations should play a strategic role in promoting and facilitating national WOPs within the country, especially among its members.

Indonesian context

- Large number of water operators
- Performances vary: healthy, less-healthy, non-healthy
- Different range of scale
- History of solidarity, willingness to help one another
- PERPAMSI is considered as the one and only umbrella for all PDAMs
- PERPAMSI exists and be there for PDAMs

National WOPs
Facilitation Guideline



- Developed by PERPAMSI
- Containing the concept, structure, step-by-step WOPs process
- Can be downloaded from: http://gwopa.org/en/resources-library/national-wops-facilitation

Approaches

- Establishment of learning community
- Transfer of knowledge, skills, experiences, code of conduct, work culture, good governance.

Methods

- Pilot project
- On the job training
- Exchange visits
- Introduction of new technology
- Clinic
- Formal and informal discussion
- Use of social media

40 national WOPs since 2011

2011-2012

	MENTEES	MENTORS	FOCUS
1 2 3 4	PDAM Solo PDAM Magetan PDAM Wonosobo PDAM Kab. Semarang	PDAM Surabaya	NRW
5 6	PDAM Pekanbaru PDAM Cianjur	PT Adhya Tirta Batam	NRW
7 8	PDAM Jambi PDAM Gunungkidul	PDAM Palembang	NRW
9	PDAM Kutai Timur	PDAM Banjarmasin	NRW
10	PDAM Jayapura	PDAM Denpasar	Water quality

40 national WOPs since 2011

2012-2014

	MENTEES	MENTORS	FOCUS
1	PDAM Purworejo	PDAM Surabaya	NRW, SOP, Energy saving
2 3	PDAM Binjai PDAM Tanah Datar	PT Adhya Tirta Batam	NRW and SOP
4 5	PDAM Sijunjung PDAM Belitung Timur	PDAM Palembang	NRW
6	PDAM Kotawaringin Barat	PDAM Banjarmasin	NRW
7	PDAM Bangli	PDAM Denpasar	Financial Report Pump maintenance
8 9	PDAM Kerinci PDAM Kepri	PDAM Kab Bandung	NRW and Billing System
10 11	PDAM Simalungun PDAM Bengkalis	PDAM Tirtanadi	NRW and SOP
12	PDAM Karangasem	PDAM Badung	Financial Report

40 national WOPs since 2011

2014-2015

	MENTEES	MENTORS	FOKUS
1	PDAM Pematang Siantar	PT ATB	NRW, SOP
2	PDAM Belitung	PDAM Kab Bandung	Billing system
3	PDAM Klaten		
4	PDAM Lubuk Linggau	PDAM Palembang	NRW, SOP
5	PDAM Agam		NRW, SOP, GIS
6	PDAM Rejang Lebong		NRW, SOP
7	PDAM Blora	PDAM Surabaya	NRW, SOP
8	PDAM Rembang		NRW, SOP
9	PDAM Katingan	PDAM Banjarmasin	Billing, digital mapping
10	PDAM Sumbawa Barat		NRW, SOP
11	PDAM Kebumen	PDAM Kab Tangerang	NRW, SOP
12	PDAM Polewali Mandar		NRW, GIS, Business Plan

40 national WOPs since 2011

2016-2017

	MENTEES	MENTORS	FOCUS
1	PDAM Singkawang	PDAM Kab. Tangerang	NRW
2 3	PDAM Pesawaran PDAM Deli Serdang	PDAM Kab. Bandung	Billing system
4	PDAM Padang Panjang	PDAM Palembang	NRW
5	PDAM Buleleng	PDAM Mataram	NRW
6	PDAM Bungo	PT Adhya Tirta Batam	NRW

Results and Impact (2011-2015)

21 pilot DMAs → Recipients continue to establish and operate new **>60** DMAs after WOPs

Investment generated by mentees **USD 855,608**

3 – 55 %

NRW reduction at the DMA pilots (size: 250 – 1.500 connections)

Impact:

- Improved supply for 70K households
- 21 up to 24 hours supply
- Increase average revenue USD 700 in each pilot DMA

Results and Impact (2011-2015)

Capacity Building

- 375 staff acquire improved knowledge and skills
- Mentors and mentees continue the partnership after the program
- Past mentees encouraged to be mentors, requested to share knowledge with neighboring water utilities
- Mentors facilitated to established the centers of excellence in the respective regions

Performance Improvement

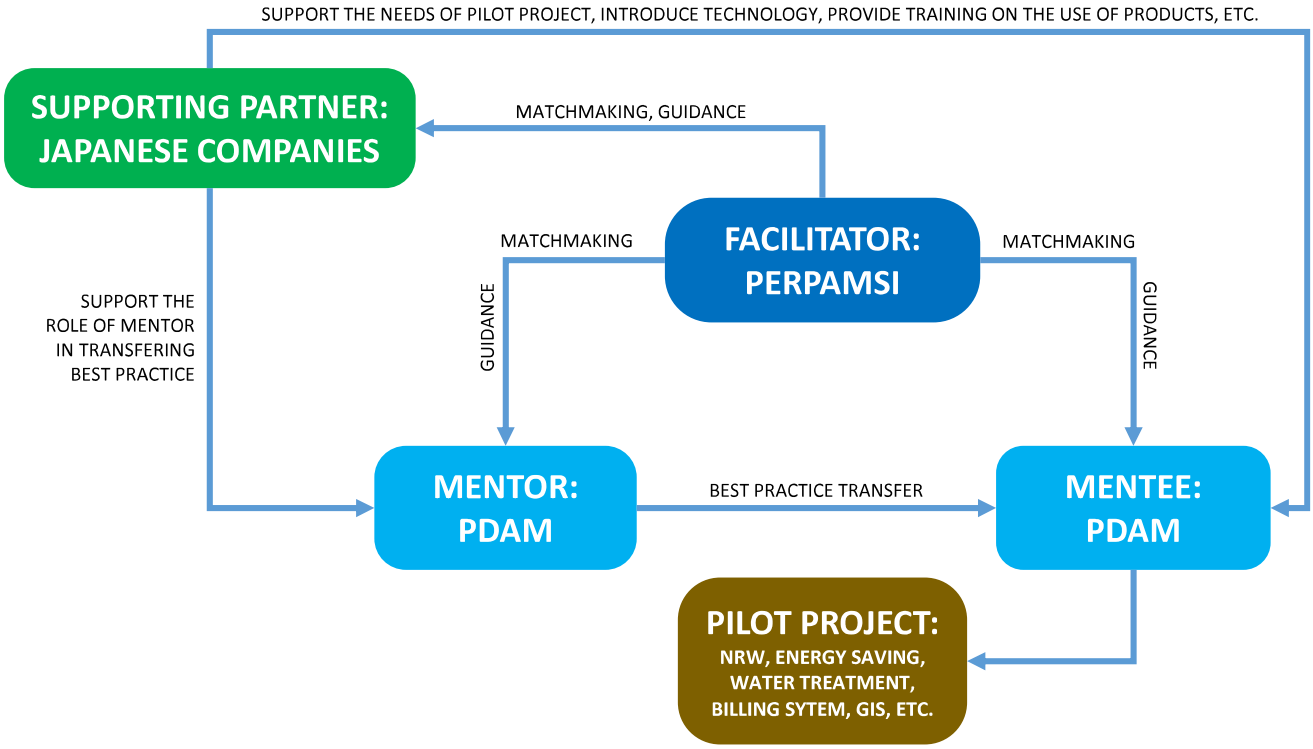
- Helped 8 PDAMs upgrade to "Healthy" category

Learning from failure and facts finding in the field

Challenges

- Improvement and capacity building for mentors and fasilitators
- Sustaining the changes/reforms
- Need of supporting partners to enhance and expand the WOPs activities in the future.

We need supporting partners



WHY

BECOME SUPPORTING PARTNER?

DIRECT ENTRY POINT TO BE A PARTNER OF INDONESIAN WATER UTILITIES

SUPPORT THE WOP PILOT PROJECT MEANS THAT YOU HAVE A CHANCE TO INTRODUCE AND DEMONSTRATE YOUR PRODUCTS ON SITE

OPPORTUNITIES TO PRESENT IN NATIONAL/REGIONAL SEMINAR/WORKSHOP/ TRAINING ORGANIZED BY PERPAMSI ATTENDED BY INDONESIAN WATER UTILITIES

If we all agree on a good idea

LET'S JUST DO IT!

Thank you

Challenge for Human Resource Development – Toward Sustainable Water Supply

Yang-Long Wu

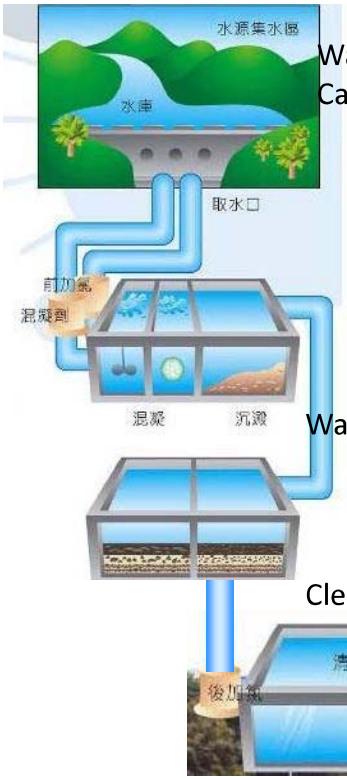
Secretary General

Chinese Taiwan Water Works Association

outlines

- **Human Resource of Water Works in Taiwan**
- **Challenges for Human Resource Development**
- **Human Resource Management-to find right men do right things**
- **Prospecting the Future**

Human Resource of Water Works in Taiwan



Water Source Catchment Areas

Water Dams

Water Intakes

Water Purification Plants

Booster Stations

Clean Water Tanks

Water Trunks

Capacity of distribution reservoirs: 412,000 CMD

Staffs of Water Works≈7000

Taiwan Water Company ≈5500

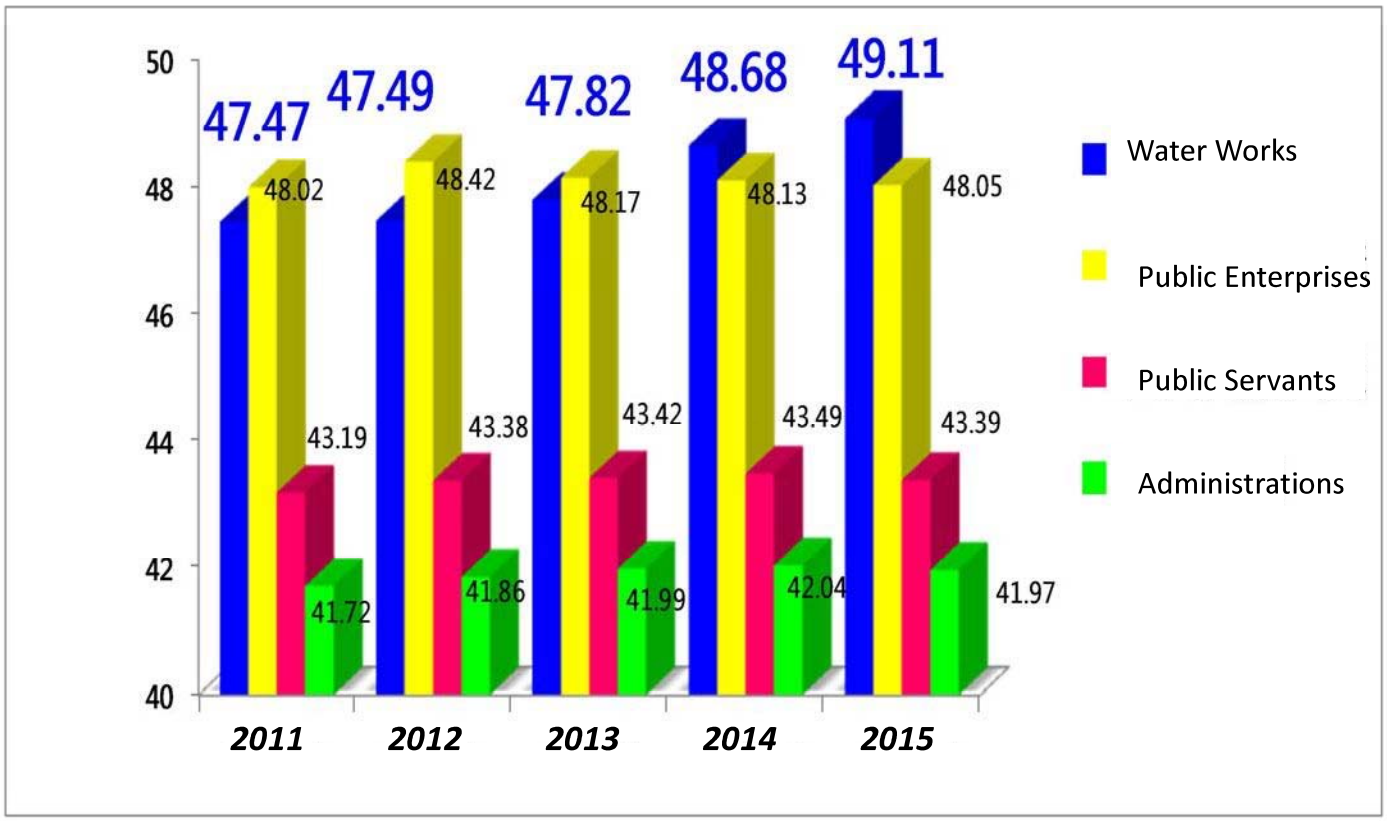
Taipei Water Department ≈1050

Other Water Works ≈450

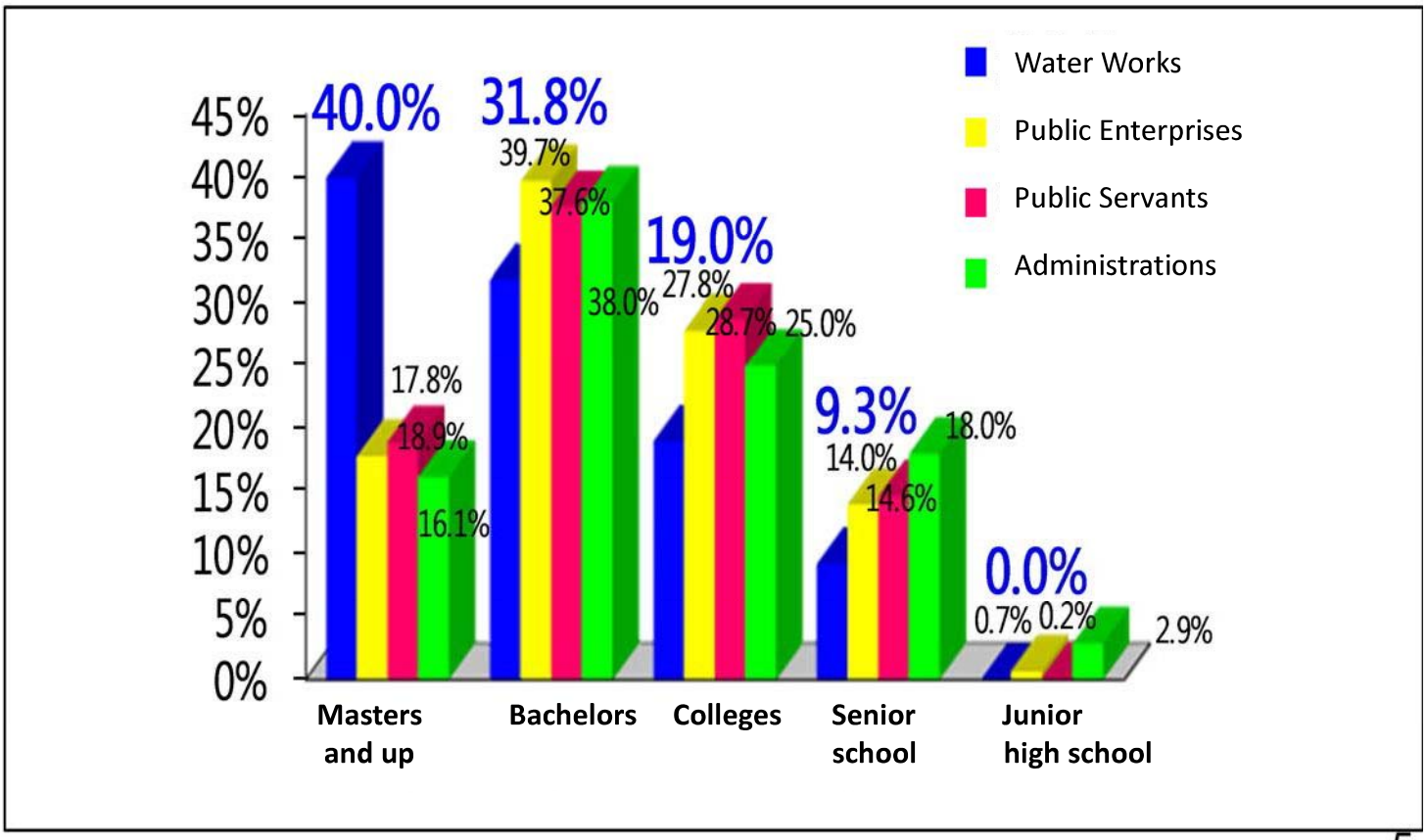
Water Distribution System

Total length of pipeline: 68,500km

Comparison Average Age of Staffs



Comparison of Education Level with TWD



Challenges for Human Resource Development

- Globalization-Economy, Climate Change…
- New Skills and Technologies
- Managing change-GIS, SCADA, DMAs…
- Human and Intellectual capital
- Teamwork and Workforce Partnerships
- Customer and Market Response
- Budget and Cost containment

Managing change-GIS, SCADA, DMAs…

- Attracting and Understand
- Education and Training
- Testing and applying
- Evaluation and Adjustment
- Competition and Encouragement

Budget and Cost containment

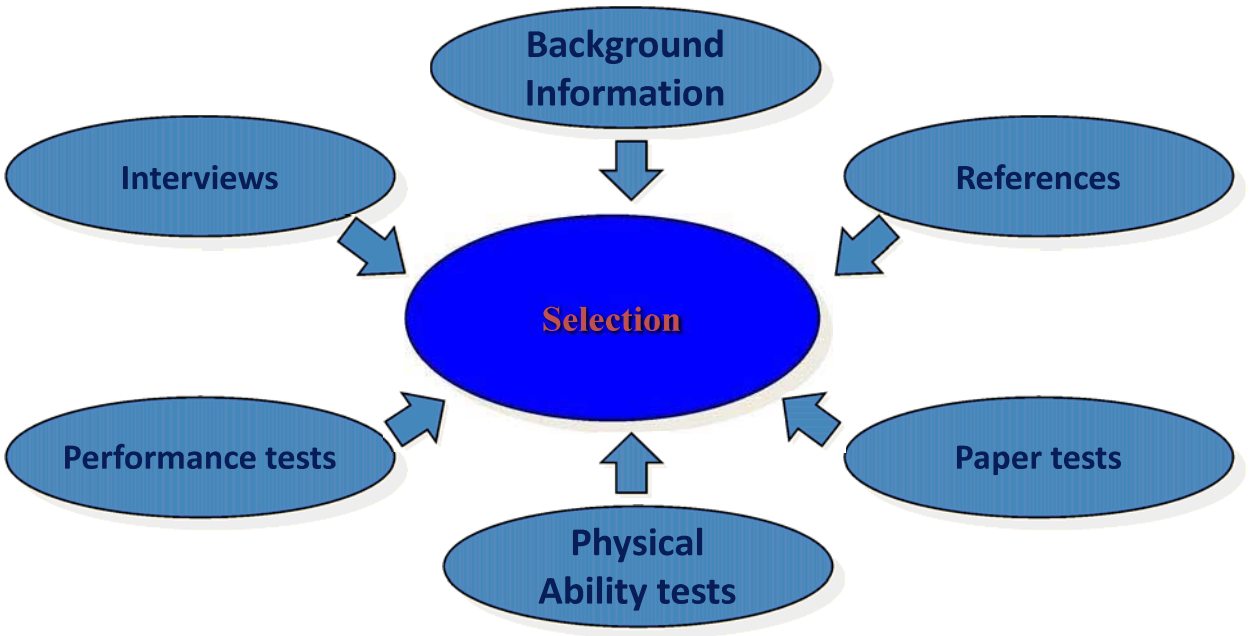
- Organization Downsizing
- Creates Reorganization for Efficiency
- Forces Outsourcing
- Encourages Temporary Workforce
  - Volunteers
  - Temporary Workers
  - Contract Employees/Leasing

HUMAN RESOURCES MANAGEMENT

-Find right men do right things-

- Staffing/Planning
- Broader Job Design
- Recruitment
- Selection
- Training Staff
- Development
- Performance Management
- Compensation Management / Incentive
- Labor Relations / Teamwork

Recruitment and Selection Tools

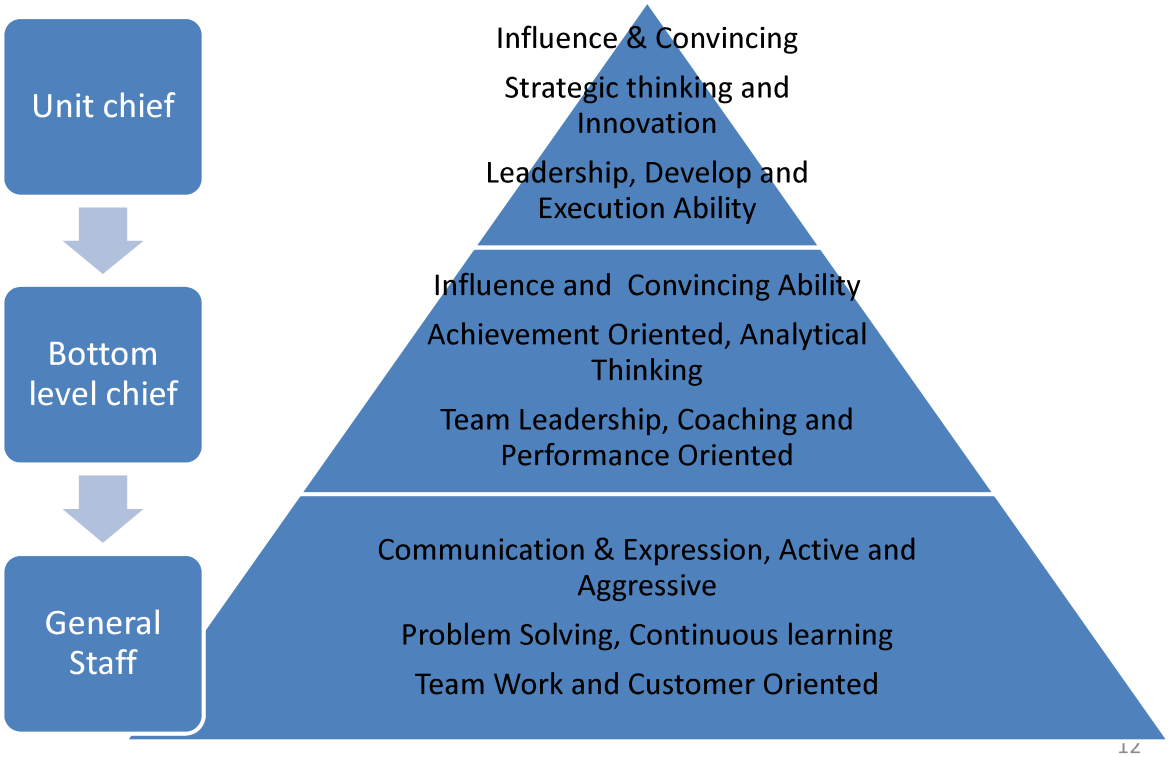


Mentoring Program
-Training recruits and staffs-

- The key of success is the support from all organization.
- A good mentor or coach can teach good working skill, shorten the learning curve of newly recruited and incubate good staff.
- Good working attitude and manners that are helpful in learning program.
- Mentoring has two-way advantage, it helps the mentee and reinforce the mentor.

Job's Competence Analysis

- Analyze and establish the key competence of various jobs needed by general staff, bottom level chief and unit chief.

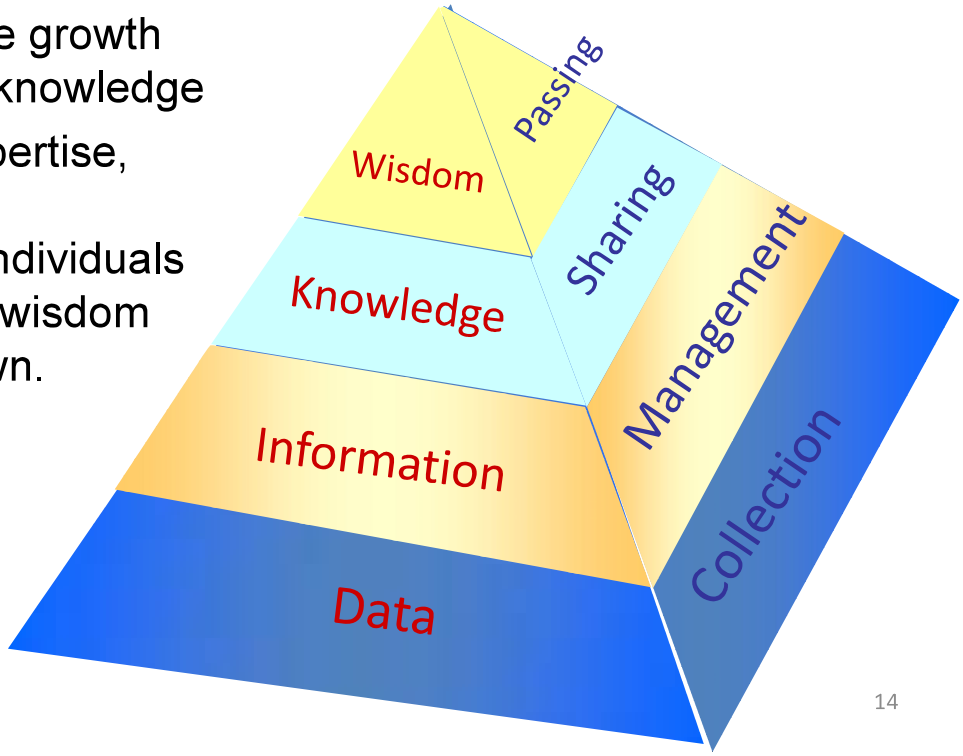


Job Rotating System

- No more 4 years on a job or a position.
- Establishing map and ranking of job rotation
- The purpose of job rotation
  - Incubating new talent
  - Establishing human relations
  - Increasing personal eyesight
  - Advancing the abilities of handling problems
  - Preparing for upward mobility

Knowledge Management System

- Objectives of KM system
  - Collecting and sorting data effectively and efficiently
  - Converting the data into information for management
  - -- Accelerating the growth and sharing of knowledge
  - -- The implicit expertise, techniques and experience of individuals developed into wisdom for passing down.



TWD's KM System established 6 Platforms

- ✓Dissemination
- ✓Browsing
- ✓Subscription
- ✓Feedback

Web browser access

TWD Knowledge Center

INTRANET-BUSINESS FRAMEWORK

- Creation Platform
- Learning Platform
- New Knowledge Platform
- SOP Platform
- Project Platform
- Strategic Platform

New Training Park of TWC

Location : Tainan

Budget : NT$ 526.4 million (US$17.5 million)

Completion Time : 2019

Prospecting the Future

- Keep training the staff become the most important roles on going toward sustainable water supply.
- Human resource development on building a robust water supply system to face and solve the coming problems and disasters.
- Enforcing the knowledge, skills and abilities of individuals on developing a sound water works.


Thanks for your attention

American Water Works Association

Dedicated to the World's Most Important Resource™

WATER RESEARCH FOUNDATION™

ADVANCING THE SCIENCE OF WATER®

Human Resource Challenges

Colin Chung

AWWA International Relationship Manager

2016 JWWA General Assembly & Research Conference

November 10, 2016

Order of Presentation

- Introduction
- US Water Challenges
- Aging water workforce
- Why be Concerned?
- Initiatives to Mitigate the Problem
- Knowledge management
- Q&A

US Water Utility Challenges

- Aging infrastructure
- Climate change
- Meeting water demand
- Water quality
- Water affordability
- **Aging workforce**

Average Age of US Water Utility Worker

- Water utility workers → 44.7 years old
- Wastewater workers → 45.4 years old

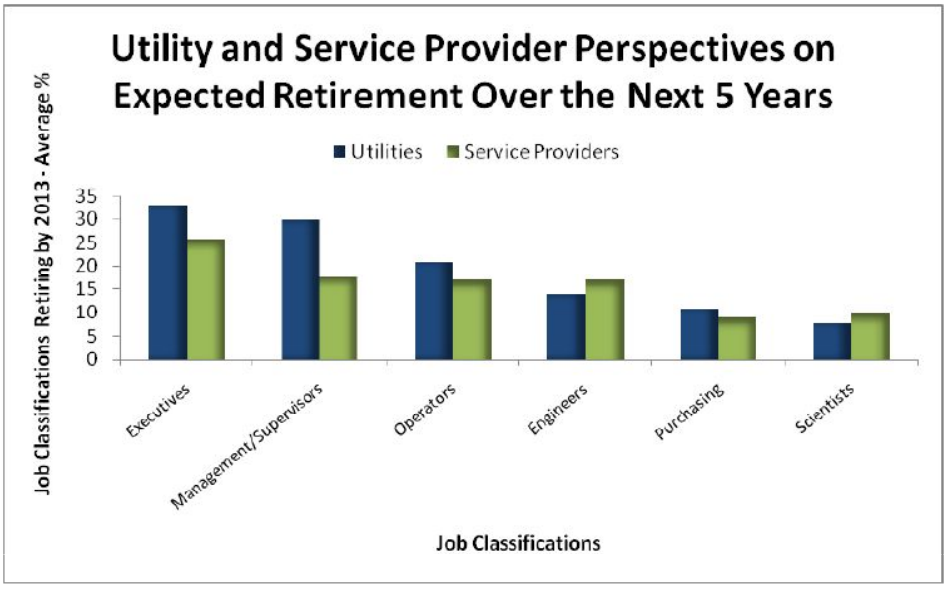
- Average retirement age for utility personnel is 56

Baby Boomers Exodus

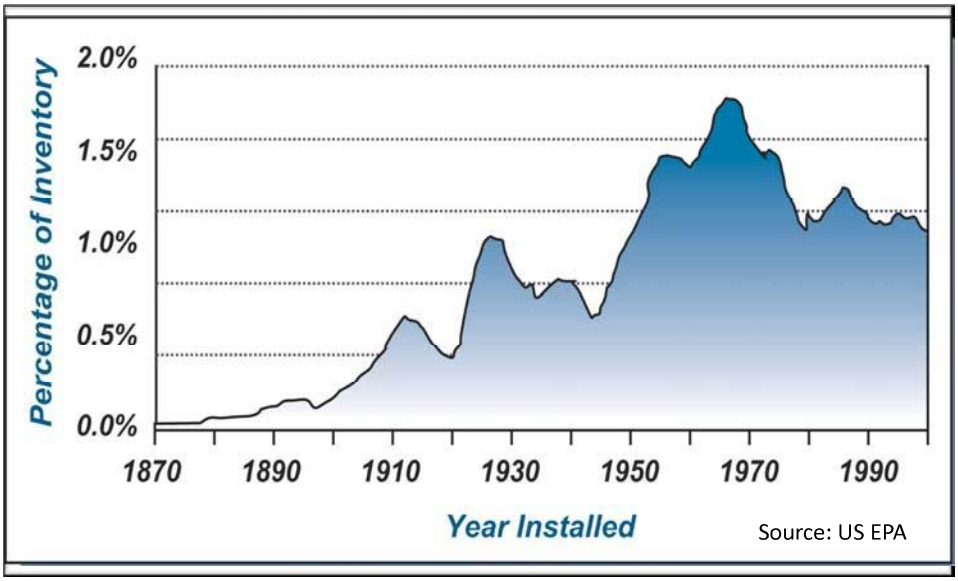
- Baby boomer retirement began about five years ago and is estimated to continue over the next 10 to 15 years
- Anticipated loss of current utility employees at between 30 to 50 percent within the next 10 years

Who is Retiring?

- Expected retirement over the next 5 years by job classification



Why Should We be Concerned?



Why the Gap?

- Aging baby boomers
- Civil and environmental engineering
  - Not sexy
  - Doesn't pay as much
  - Technology does not advance quickly
  - Need professional license
- Declining government funding

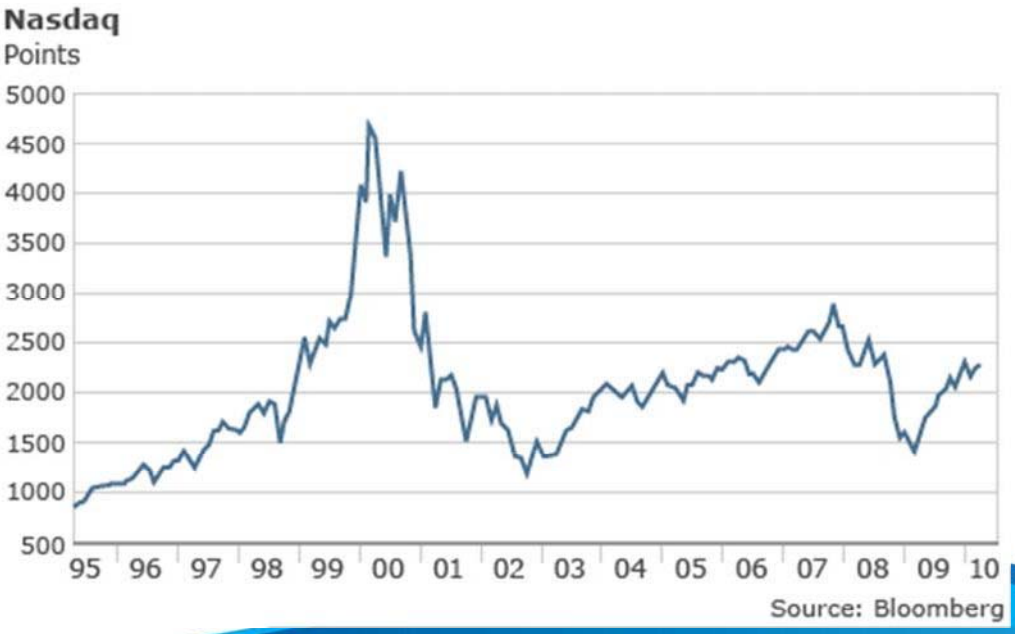
Civil Engineering is Losing Attraction

Sexy

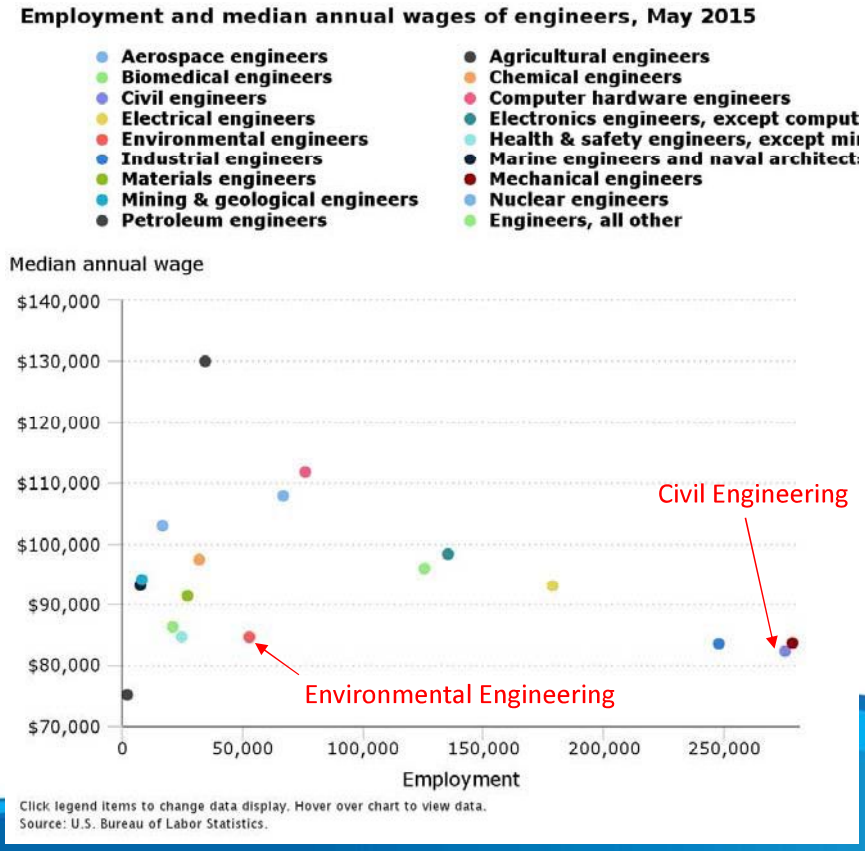
Maybe not so sexy

Lost Engineers to DOTCOM

- Growth trend of DOTCOM



Median Engineering Salary



Declining STEM Education in US

- STEM (Science, Technology, Engineering, & Math)
  - US faces a shortage of engineers and scientists
  - Number of students earning bachelors or masters degrees in STEM declined from 1 in 6 in 1960 to 1 in 10 in 2000
  - US has not effectively promoted and funded advanced education in technical skills and knowledge in STEM
  - US now faces a shortage of new workers with the right mix of technical and interpersonal skills to replace those exiting the workforce

What Needs to be Done

- Increasing STEM funding
- Increase civil engineering pay
- Educate about the importance of infrastructure / sustainability (industry importance and branding)
- Define water sector career pathway
- Use of new tool and technology
- Develop an organizational culture more suited to younger generation
- Communicate
- Training / employee development
- Capture existing knowledge

What Needs to be Done Immediately?

Knowledge Management

- Goal:
  - Right knowledge is systematically collected, stored, organized, and transferred to the appropriate employee in a timely and effective manner
- Objectives:
  - Identify key knowledge holders
  - Assess criticality of knowledge and knowledge holder
  - Provide a simple and convenient way for staff to document asset related knowledge in a structured and readily accessible knowledge database

Core Elements of Knowledge Management

1. **Assets** – what practices, procedures and policies (current and historic) relevant to a specific asset should the organization understand to lead towards achieving/sustaining the business mission?
2. **Business Processes** – what asset life cycle based business process knowledge should be managed that ties to achieving and sustaining the business mission?
3. **Documents** – which documents, formal and informal (notes, working drafts, personal files, worksheet, etc.), are important?
4. **History** – what knowledge of history at the enterprise, plant, system, network or major process level should be captured and managed?

Knowledge Holder Criticality

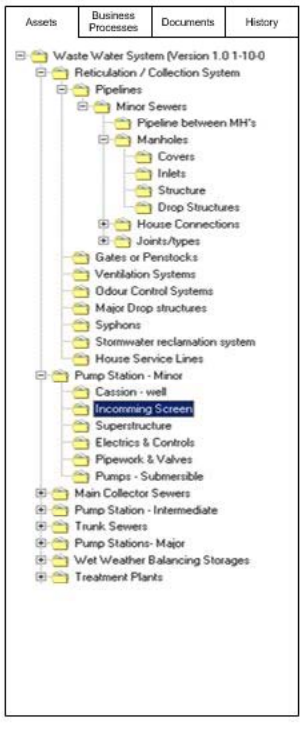
Key Knowledge Roster

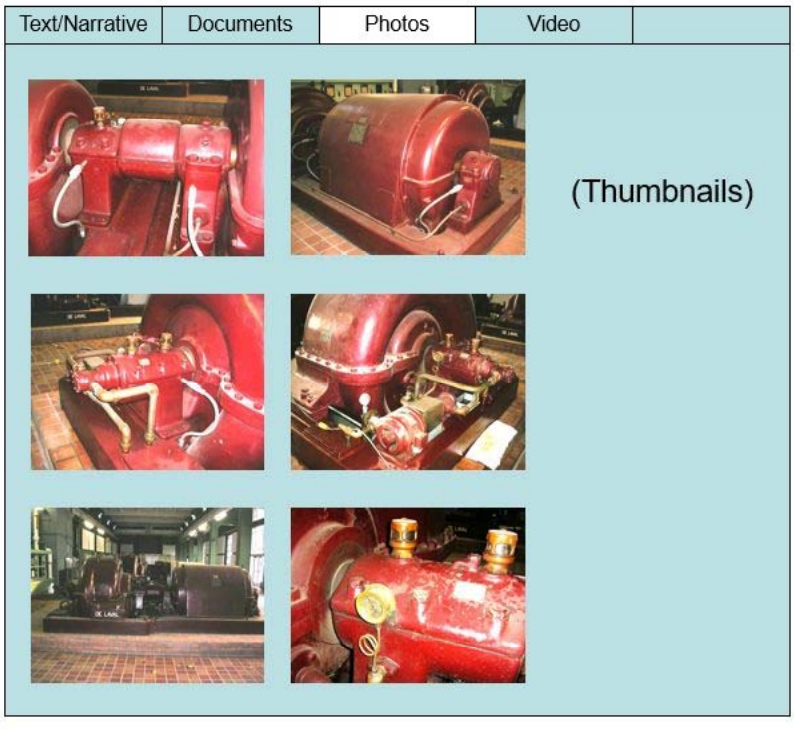
Organization Unit	Name	Position	Hire Date	Eligibility to Retire	Knowledge About				Interview Priority	Interview Time Required	Eligibility Score	Knowledge Score	Total Score
					Critical or at Risk Assets	Key Business Processes	Location of Key Documents	Organizational History					
Mgr/Supervisors	Werner, Randy	Public Works Supervisor - Water/Recycl	10/6/1971	N	H	H	H	H			4	12	48
Administration	Bequette, Kathleen S.	Senior Clerk	9/2/1997	N			H	H			4	6	24
Mgr/Supervisors	Dozier, Michael	Public Works Supervisor - Maint	8/2/1999	2	H	H	H	H			2	12	24
Operations	Truesdell, Jimmie L.	WR Supervising Operator	1/20/1986	2	H	M	H	H			2	10	20
Administration	Cuadra, Carla A.	Division Clerk	8/28/1997	2		H	H	M			2	7	14
Collections	Durflinger, Steven B.	WW Collections Systems Worker II	8/8/1994	2	H	M	M	H			2	8	16
Maintenance	Accornero, Mary	Senior Clerk	9/14/1999	2	M	H	H	M			2	8	16
Maintenance	Hall, Andrew T.	Instrument Tech	7/22/2002		H	H	H	H			1	12	12
Operations	Kepler, Kevin D.	WR Supervising Operator	5/19/1997		H	H	H	H			1	12	12
Maintenance	Kenney, Brian	Mechanic II	1/13/2003	2	H	M	M	M			2	6	12
Maintenance	Kumar, Rajesh	WR Coordinator - Instrumentation	8/14/2000		H	M	H	H			1	10	10

Capture Knowledge

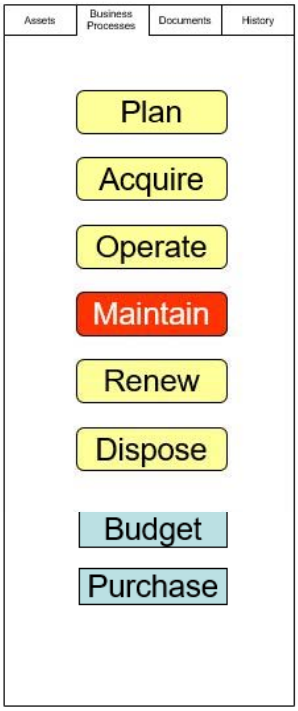
Name	Knowledge Area	Knowledge (Business Processes, Documentation or Organization)	Where Info Held	Other Knowledgeable Colleagues	Recommendations
Werner, Randy					
	Assets	WRD Water Services Timeline			
	System operation	Most economical operation is taking water outside the Clearwell Patterson Treatment Plant and pumping up to tanks. Our tanks will feed water. *(Randy refers to map to discuss turnouts and feeds, CalWater and Zone 7 lines)* Both turnouts feed into airport zone. Doolan Water Tank finished 2008. Airway PS 2006. Numerous connections to Zone 7 lines. WRD has ten turnouts. **Emergency Plan** in binder. Limited access to Helen, Darren, Randy. Helen has hard copy. Health Dept. has copy for security reasons. After vulnerability assessment, did Emergency Action Plan. Used Pleasanton's as template. Unfinished operation plan, so off the radar with health dept. Do not have emergency operations plan. Major telemetry is at Vasco Rd. which goes up to Dalton Tank, then back up to Altamont tank. Telemetry between them. Most efficient is pumping up to those tanks and letting them gravity feed down. If pump station non-operable, Vasco Rd can pump into Zones 2 & 3. Operates on tank levels, not on pressure, so tanks stay full all the time. Break point	Limited system info in Scada (In progress)	Dave Lenner has maps of turnouts.	Configuration management for post earthqu
	Old part of the system	Original tracks in low part of Springtown 1963. *(Refers to map and build-out sequence)* All A/C lines in Springtown. One steel line. Joyce St. Cast Iron pipe cracked after 1995. All cast iron converted to plastic PVC 1987-88. System not that old. No major rehab investments or failures yet. Only Isabel needed to be relocated CalTrans freeway project. Springtown has "hot" alkaline soil that disagrees with copper. WRD replaced old copper service failures with plastic PVC. Greenville/Vasco assesment district backbone pipes			
	Trevarno PS	*First Pump Station. Old, but not unique. Supposed to rehab by 2015. May not make it that long. Security fencing recently installed to deter vandals. Cameras not yet installed. Station turned on for exercise occasionally, but No wear. Back-up station. Only PS with no emergency generator backup. Four Pumps - 600 GPM. Two 1200 pumps 1000 Gallon. Motors - Three 50 Horsepower and one 25. MCC Center for controlling four pumps. Zone 7 has a turnout infront of PS and have access to their electronics there. One or*		Jim, Dean	*Put Power Monitoring in Scada. Eg: Peak h pumping*
	Key Business Processes				
	Water projections	Have to go out to 2030 - 20 years out. Now based on per capita - 20/20 law recently passed. Trying to find service area population (cumbersome). Can currently only use year 2000 census data and calculate forward (2010 census not completed), or dept. of finance data (must be well documented). Will overlay service area boundary over surface tracks to get service area population. WRD receives a checklist from Dept of Water Resources (DWR) of areas to address in Urban Water Management (UWM) plan report, then sends it to DWR for review. Randy projects consumption for 2030 in UWM based on how much each service connection uses on average multiplied by the number of services = X million gallons. Randy bases the five year water supply demands request for Zone 7 projected connections. Randy has a spreadsheet for this. He takes service connections on July 1st of each year, depending on fiscal or calendar year calculation, and uses 40 years worth of average use per service data, averaged in 10 year increments. Drought brings		Helen top director, and Michelle working with Randy and Jim to gather info and modify old docs for DWR.	
	REVENUE BUDGET	*Randy uses Lotus spreadsheets w/ customer numbers. He calculates monthly running average of water consumed on 3 tiers, and how much water on each tier sells for. He calculates all months by tier at year end and figures how much will sell in various tiers going forward. Unaccounted water from flushing and leaks (7-8%). Use same percentages for years ahead with tiers and service connections. Fairly accurate (usually within 5%) when level (unchanging) amount of water used. Be more realistic than optimistic. Uses trending data and consumption to get accurate number and ballpark number. Used to do all own rate case studies, now consultant does some updates. Used to be simpler: would calculate what Zone 7 would use, guessed how much to put toward reserves. REVENUE: City Engineering (Joel) now handles CIP's for WRD. CIP's have not yet included line replacement, just new tanks. Funding is based on Craig Lawson's (Utility Consultant) Report from 3 years ago. Randy puts together the budget for O&M. CIP budget is separate from O&M, and should be based on growth. City has policy on operating reserves. Large projects funded by connection fees tracked in Fund 251, then likely transfered to 259. Connection fees for recycled and potable water have been blended together. Fund 259 is a fairly new Renewal and Replacement fund, but is possibly not being controlled. A replacement reserve used to be in 250, which is now 259. 250 still has an operating reserve. Concern that politicians will see reserve and want to re-allocate funds. Fund 239 is Sewer - w/ different sources, including West Valley. Zone 7 rate increases for the last three years have been 9%, 16.5% & 11% and could not be passed on. The*	*Randy can print out fund activity in Pentamation (Finance Plus). Dan's detailed fund balance policies are on drive and in hard copy.Randy has a budget book.*	*Michelle and Kathi familiar with Funds. Darren decides end of year fund transfers. Dan has fund policies.*	*Michelle using Municast forecasting via det excel spreadsheets. Wants to use historica for future projections. Michelle wants foreca model to plug numbers into for future. Wan projections to go a few years. Randy Weav suggests Probability Failure Projections/Calculations. Tie together rever projections and R&R needs to make case f increases/revenues.*
	Calculating Revenue - (Randy Style)	Two ways. First keep historical records of revenue for many years. Calculate how much water you will buy in a particular year (calculated by filling in blanks on page in Lotus - *Michelle copies this*) Figure how much water you estimate you will sell - easy if level. Bookends are historical amounts - knowing accurate meter count, and fixed charges (12 months of meter charges = $ amount), then put revenue projections to residential and commercial. Other bookend is service charges (usually guessed) b/c either end of December/ first of January gives you a balance on the two 6 month periods. Usually service numbers go up or stay the same, so having a number mid-year indicates what revenue will be for annual service charges. Randy calculates how many gallons of water per service and adjusts per history. Then three tiers. Numbers identical when no rate increases. Figure how much you will sell, split it between tiers for residential and commercial. Figure out split between residential and commercial (residential about 62%, commercial 38%), then figure how much sold on both tiers of commercial. Randy projects consumption by individual years. Can revise and publish mid-year budget. Finance	Historical data in Lotus spreadsheets. Tier consumption and other Reports in Pentamation and Community Plus. Eric in Finance provides service class data and		Electronic Dashboard with straightforward m can input cells or populate data via Commu Plus or Finance Plus (montly usage, conne Plug in variables or eventually have auto po from different sources.

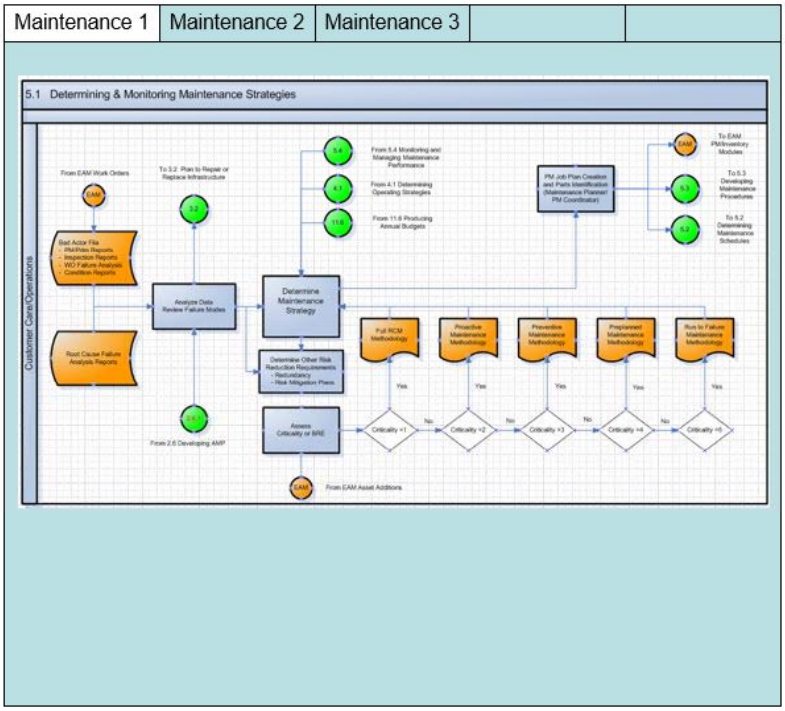
Knowledge Management System





Knowledge Management System





Questions?

Japan National Young Water Professionals

International Water Forum 2016

Challenges for Human Resource Development

- Towards Sustainable Water Supply –

10th Nov., 2016

YWP and Capacity Development

Japan-YWP Yasuhiro Asada

What is YWP?

◆ IWA (International Water Association)

- Global network of water professionals
- **Young Water Professionals (YWP) program:**
  To assist students and young professionals in the water sector to become global water leaders in the future

➢ Activity of IWA-YWP

- Networking young water professionals
- Providing opportunities for research, discussion, and career development

Japan YWP | Japan National Young Water Professionals

IWA-YWP program

Chair: Dr. Abdullah

East Asia & The Pacific chapter

Other regional chapters

- Australian chapter
- Malaysian chapter
- Korean chapter
- Japanese chapter (Japan-YWP)

JWWA
JSWE
Support

Kick-off symposium

- established in 2010 for active contribution to academic research and practical action associated with water issues.

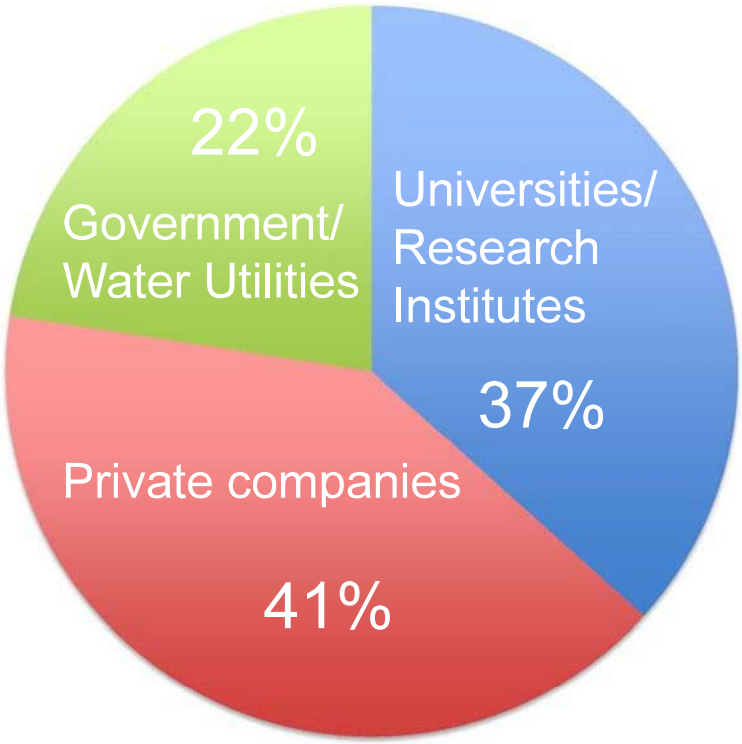
Japan YWP

Japan-YWP: Members

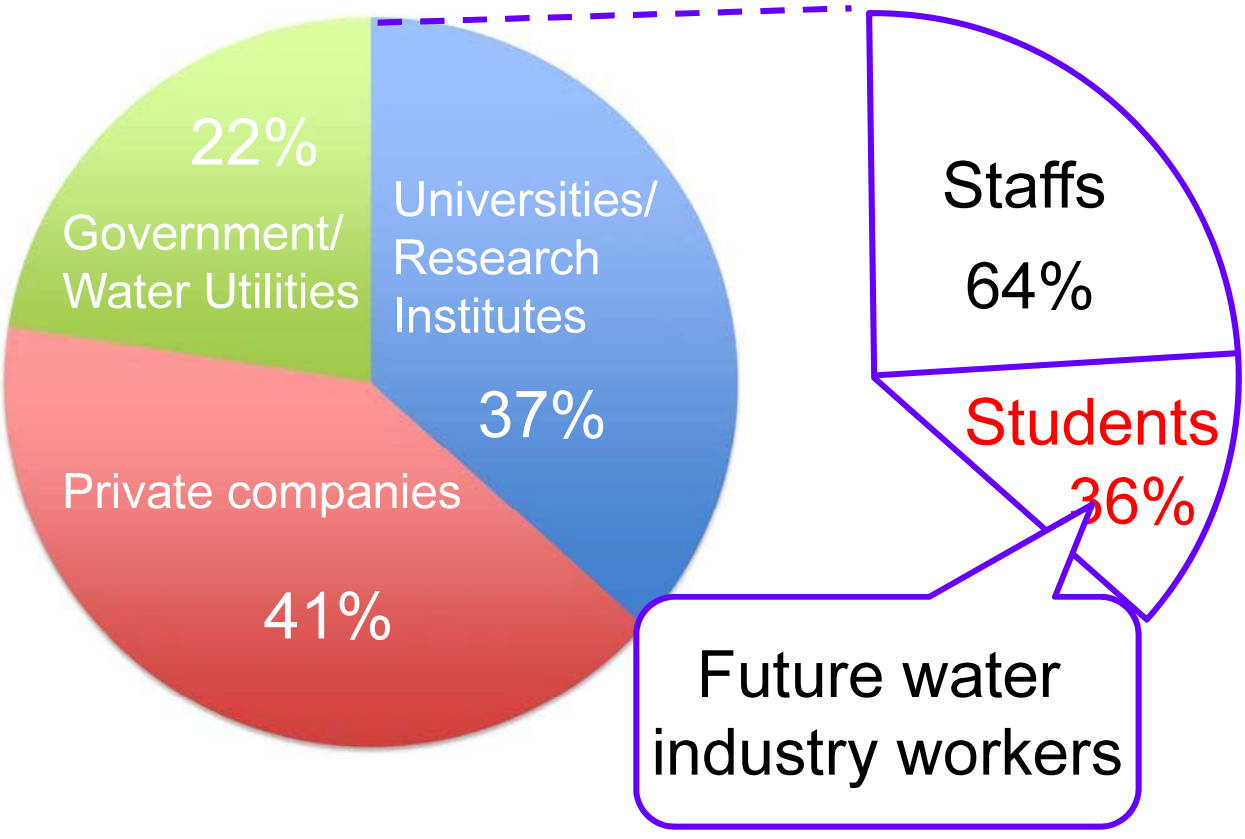
Total members:390

Average age：33.8

(IWA: up to 35 years old)



Japan-YWP: Members



Japan YWP | Japan National Young Water Professionals

Activities of Japan-YWP

Contents	Event	Collaboration	Target age
Seminar	Seminar on Water supply (three times a year)	Japan water research center (JWRC)	24-30
Carrier	International symposium in WET conference (carrier development)	Japan Society on Water Environment (JSWE)	21-25
Symposium	International Forum on Water Supply *Today!*	Japan Water Works Association (JWWA)	All
Seminar	Evening seminar		18-35
Seminar	Seminar on Sewage	Ministry of Land, Infrastructure, Transportation and Tourism (MLIT)	28-40
Recruit	Recruiting seminar		18-24
Seminar	Annual meeting and seminar		All
Carrier	Carrier development seminar	Japan Society on Water Environment (JSWE)	18-25

Activity: Seminar/Workshop

Providing valuable opportunities for face-to-face communication by organizing several domestic and international events

One of the ways to communicate: Party

Annual meeting and Seminar

Outline and Objective:

- This is the largest event of Japan-YWP. We generally report our annual activity.
- After the meeting, seminar is held.
- Three or Four presentation was given and sometimes workshop was carried out.
- Name card exchange is also carried out one by one at the end of the event.

Evening Seminar

Outline and Objective:

- The evening seminar is organized by Japan-YWP alone.
- This is free style talk session and two researcher give a lecture about their current works. Because all the participant is young, more active discussion has been made between audience and presenter.
- We hope some collaboration or new concept will be born from the discussions.

International symposium on WET conference

Title: Development of international academic career

Outline and Objective:

- This event is given for young researcher or students.
- To promote going abroad, prominent young researchers who have studied in foreign countries give a presentation about his life or how much it was good.
- Not only Japanese, but also foresing researcher made a presentation.

Carrier development seminar in JSWE

Outline and Objective:

- This seminar is given for the students who joined in JSWE conference.
- In the seminar, some senior water professionals working in company, university and utility (water works) will give a presentation about their daily job.
- Sometimes, we had seminar about writing paper or leading edge research in water field.

Recruiting seminar

Outline and Objective:

- Most of young students do not have a chance to know details about water companies.
- To meet the water companies and students, matching event was held every year.

- The point is that all the explainer of company side is young professional member. So, students can easily ask a question and feel more comfortable.

JWRC Water Workshop

Outline and Objective:

- Water sectors are facing many challenges. Not only are there new challenges, but also the past challenges must all still be addressed. Now we want to know how the other professionals address these challenges and share the know-hows.
- In the workshops, water professionals from public and private sectors make presentations about their water related activities. After the presentation, all participants discuss the problems and share their experiences.

International symposium for water treatment

Title: learning Water technologies from the past

Outline and Objective:

- Inviting prominent professors; Prof. Mark Loosest, Prof. Bruce Littman, Prof. Chen, Prof. Yoshimasa Watanabe, Prof. Ekamer and Prof. Shin.
- The purpose of this event is to learn about the history about the water treatment technologies. Each professor has established new style of water technologies but most of young professionals did not know about their history.
- To catch up and develop these technology, we has asked to give a presentation about the detail history of their carrier and researches.

The 10th International Symposium on Water Supply Technology - IWA Japan-YWP Special Session -

Title: Water supply for future
~ How to overcome changes and the uncertainty? ~

Outline and Objective:

- This seminar was aimed to discuss the vision from the viewpoint of Young Water Professionals to overcome the enormous changes and challenges which the water sectors were going to face in the near future.
- Prof. Helmut Kroiss, IWA President presented a keynote speech in the session. And three more young water professionals made presentations about the leading ideas and practices of their own regions. Eventually, the session was a great success, with more than 50 participants.

Activity: Networking through media

Website

- Event report
- Event announcement
- News Letters

Mailing list

- Announcement of water-related events
- Knowledge sharing

Activity: NEWS LETTER

For 7 years, 12th news letter was published.

Contents

1. Event report
2. Event announcement
3. (News exchange with other YWP chapter)
4. Letters from Senior professional to young

- We have published three newsletters a year.
- Each include the announcement of the YWP event and comment from Distinguish water leaders to young professionals.
- From the last year, we exchange the articles with Christian. Christian interviewed to INSA and we translated from English to Japanese.
- This is good to learn English as well as water news. We hope continue this activity with the other chapters.

Japan YWP | Japan National Young Water Professionals

Symposium toward IWA Tokyo 2018

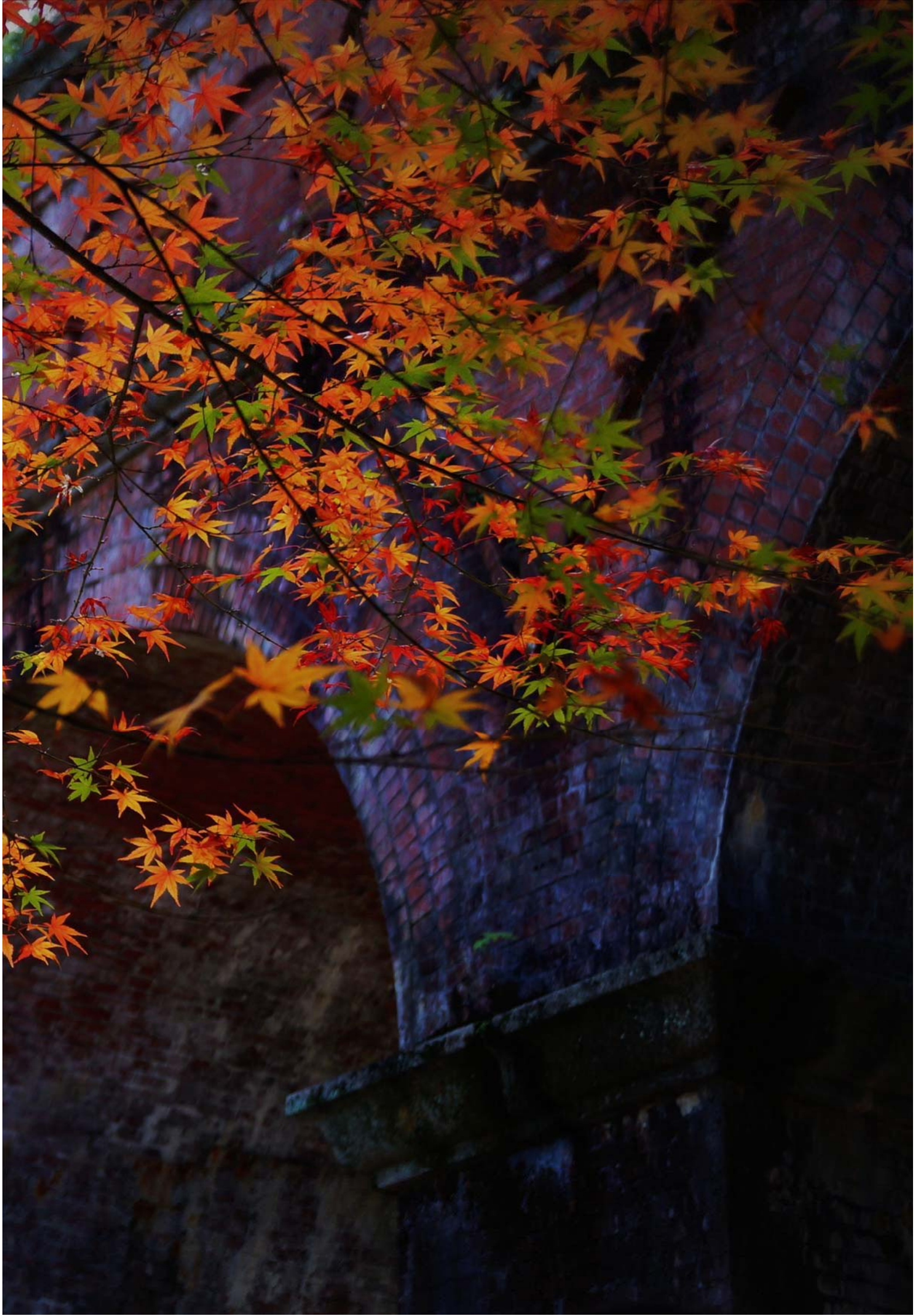
Chapter Leaders Forum on 2018 at Kyoto
(pre-symposium of IWA2018 at Tokyo)

Outline and Objective:

- In Japan, population will be decreasing and we are now facing the downsizing of the water networks. To overcome this situation, we are now discussion what we should do and what want to be. This is a vision of Young Water Professionals in Japan.
- Now, we are now discussing about our action plans to 2050.
- And we are planning to hold this meeting on January 2018 at Kyoto.

Japan YWP | Japan National Young Water Professionals

Thank you for your attention!!



Japan Water Works Association

4-8-9, Kudan-Minami, Chiyoda-ku, Tokyo 102-0074, JAPAN
TEL +81-3-3264-2307 Email kokusai@jwwa.or.jp

Cover and back cover : Elevated Aqueduct (in Nanzen-ji)
Photo by http://www.plazahotel-photos.com/