



Governmental approach for the treatment of gray water by using Johkasou

4th November, 2022

Ms. Rio OWADA
Section Chief, Office for Promotion of Johkasou

Dr. Johkasou



環境省

Ministry of the Environment
Government of Japan

Office for Promotion of Johkasou
Waste Management Division
Environmental Regeneration and Material Cycles Bureau
Ministry of the Environment
Government of JAPAN

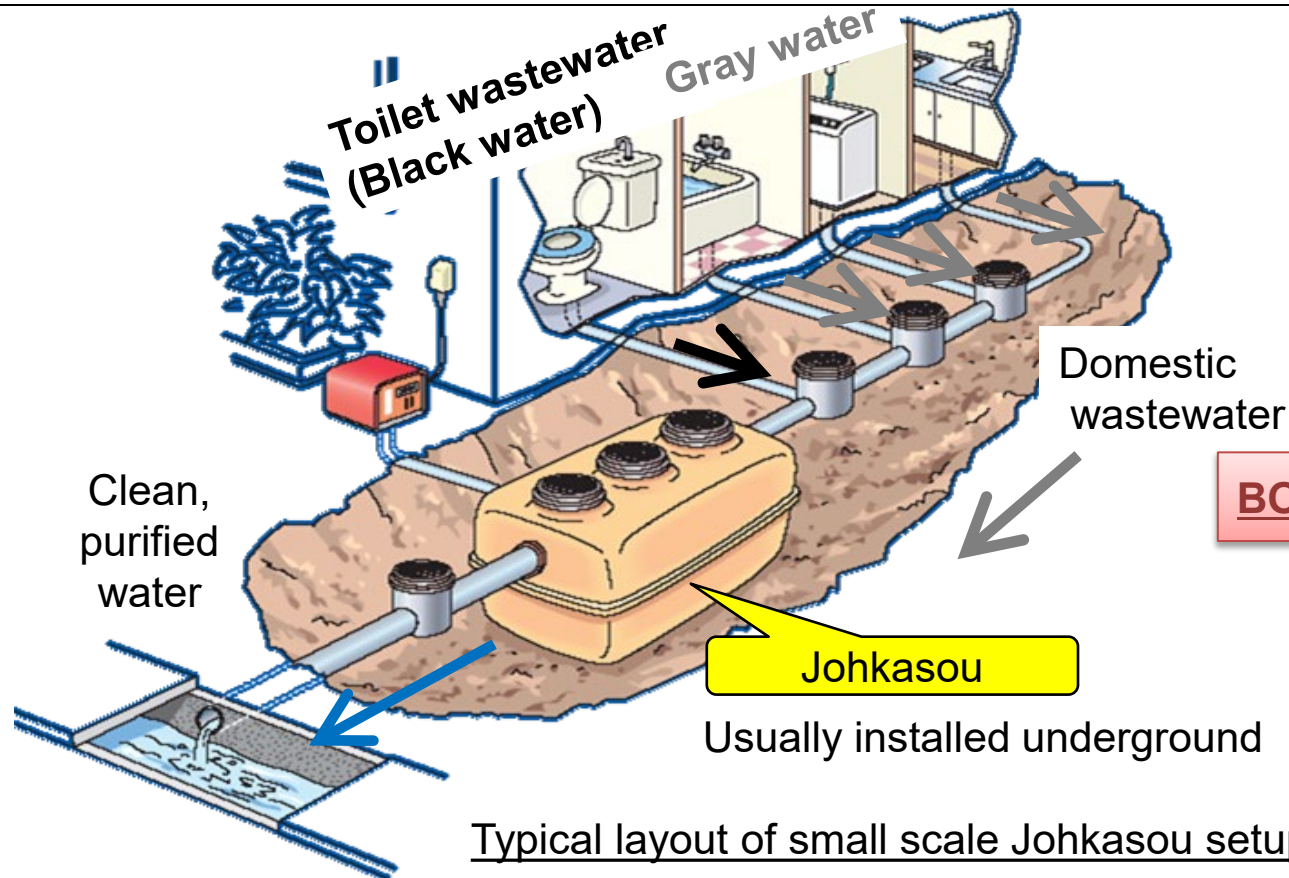
Introduction of Japanese regulation on the decentralized
wastewater management

Table of content

1. Introduction
2. Legal Framework of Johkasou
3. Treatment of Gray water
by old type and current Johkasou
4. Measures for promoting Johkasou with including
the conversion from old type to current ones

1. Introduction

- “Johkasou” is categorized as decentralized wastewater treatment system for domestic wastewater discharged by household, apartment and so-on and it can be installed beside these building structure without long pipeline.
- Johkasou have a combined purification structure capable of treating both toilet wastewater (Black water) and domestic wastewater other than toilet wastewater (Gray water).
- Johkasou attains high and stable performance as same as that of sewage treatment plant. And, Johkasou is certified by the government for performance and maintainability, and it is manufactured in factory with adequate quality control. As a result, it has extremely reliability.



Industrial wastewater, Domestic wastewater

Sewage treatment, Decentralized treatment

Septic tank, wetland, DEWATS, etc., Johkasou

BOD removal, Nitrogen and/or Phosphorous removal

Positioning the Johkasou
in water infrastructure

Typical layout of small scale Johkasou setup for household

1. Introduction

■ Water pollution in Japan during rapid economic growth

Sumida River
(Tokyo)
In '1970s



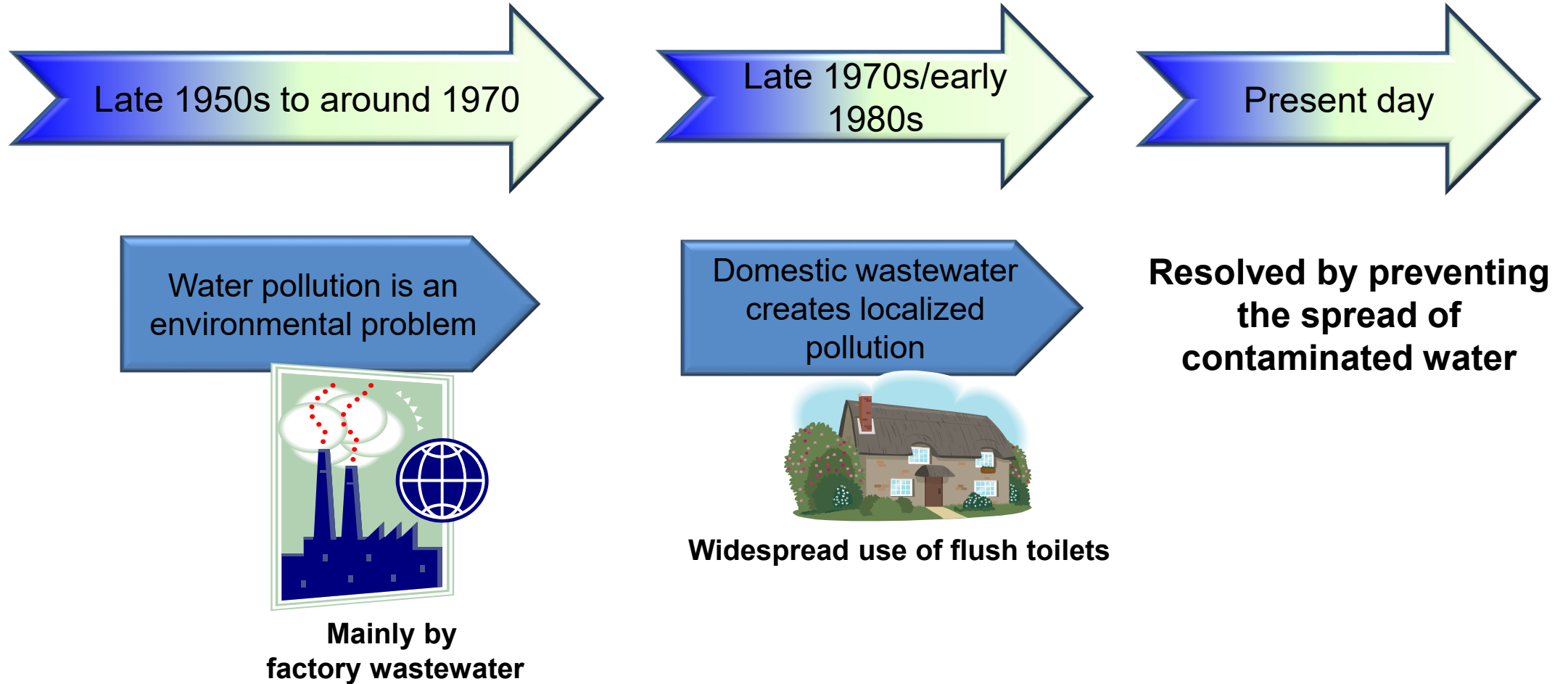
Dohkai Bay
(Kitakyushu)
in '1960s

Chofu Weir,
Tama River
(Tokyo)
in '1970



1. Introduction

■ Domestic wastewater issues and outcomes over time



2. Legal framework of Johkasou

■ History of Johkasou Act

Year	Item
1960 to around 1980	With increasing population of flush toilet, rapid installation of tandoku (old type) Johkasou to treat black water only
1983	Johkasou Act enacted (legislation introduced by a Diet member, came into force in 1985)
2000	Amendment: New installation of tandoku-shori (old type) Johkasou was prohibited
2005	Amendment: Stricter water quality management systems introduced
2019	Amendment: <ul style="list-style-type: none">➤ Strengthening the authority of prefectural governors for conversion from tandoku Johkasou (old type) to gappei Johkasou (current type)➤ Clarification for proceeding Johkasou installation as a public works➤ Others

■ Purpose of Johkasou Act

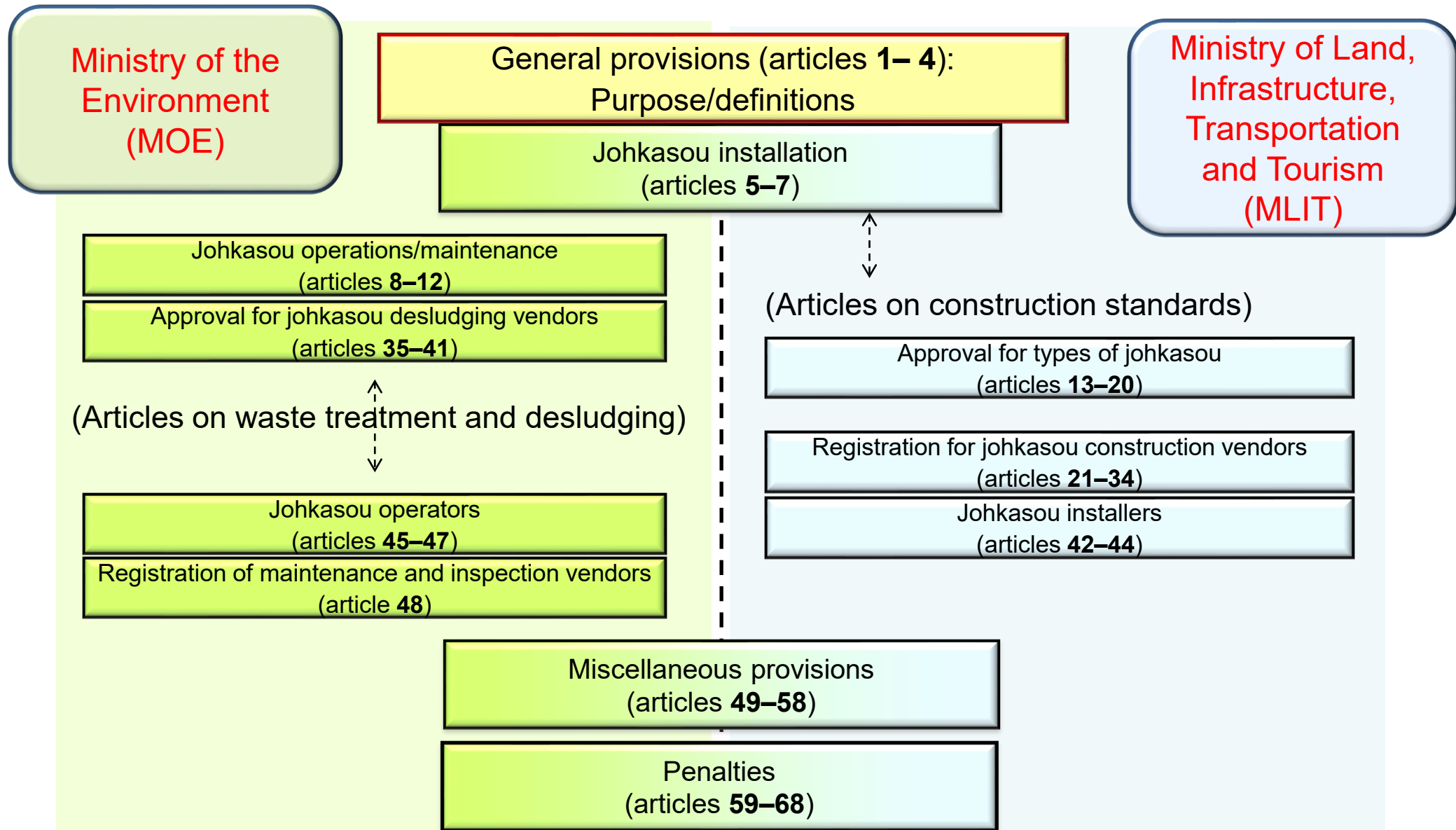
- ✓ Promotion of domestic wastewater (both black and gray water) treatment by Johkasou for;
Conservation of water quality in public water area,
- ✓ Preservation of the living environment
- ✓ Improvement of public health

■ Structure of Johkasou Act

- 1) Johkasou's manufacture and sales
- 2) Johkasou's notification of installation
- 3) Johkasou's installation and certification system of installation engineer
- 4) Johkasou's report of start date to use
- 5) Johkasou's operation
- 6) Johkasou's water quality inspection after installation
- 7) Johkasou's maintenance and certification system of maintenance engineer
- 8) Johkasou's desludge (Cleaning)
- 9) Johkasou's periodical check
- 10) Penalties for violating the Johkasou Act

2. Legal framework of Johkasou

■ Outline of each article from 1 (one) to 68 (sixty eight) and its jurisdiction in Johkasou Act



3. Treatment of Gray water in old type and current Johkasou

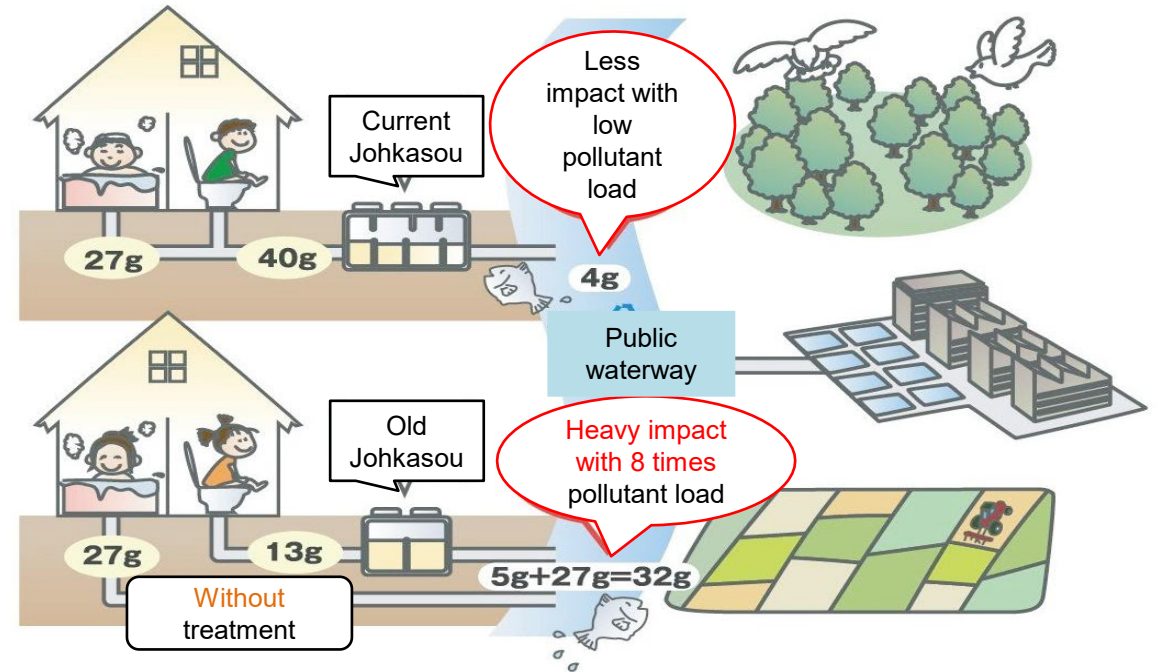
■ What is domestic wastewater?

Domestic wastewater = Toilet wastewater (Black water) + Gray water

○ Current Johkasou (Called "Gappei Johkasou")

Both Toilet wastewater & Gray water are treated.

BOD Load
= 4g/day·PE
in Effluent



✗ Old type Johkasou (called "Tandoku Johkasou")

Only Toilet wastewater is treated.

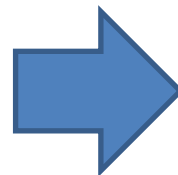
⇒ Heavy impact with 8 times

BOD Load
= 32g/day·PE
in Effluent



Before

Dirty effluent with using old type Johkasou in 1970's



Clean effluent with using Current Johkasou in 1990's

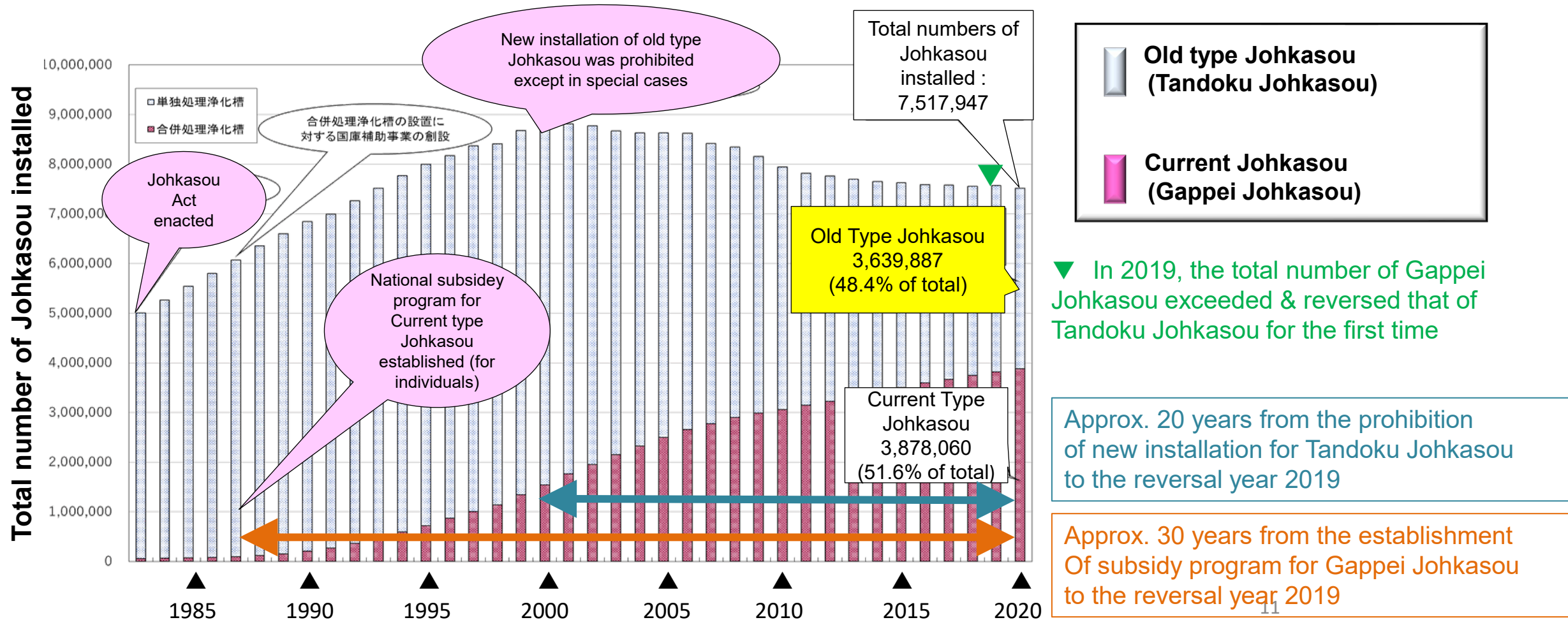


After

3. Treatment of Gray water in old type and current Johkasou

■ Configuration of old (Tandoku Johkasou) & current Johkasou (Gappei Johkasou)

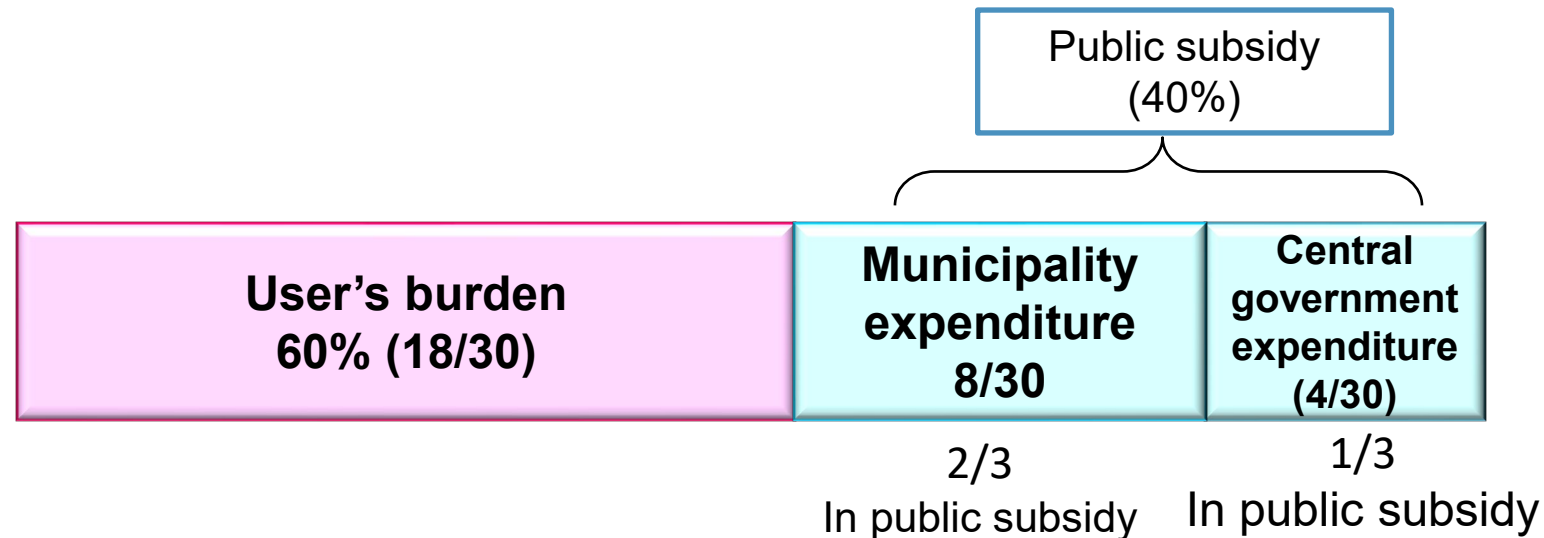
- Though new installation of old type Johkasou (Tandoku Johkasou) was prohibited at 2000, approx. 3.6 million sets of old type Johkasou are still used in Japan.
- Encouraging the conversion to Current Type Johkasou is a big challenge.



4. Measures for promoting Johkasou with including the conversion from old type to current one

■ Subsidy for Johkasou private installation for house owner

- Subsidizes municipalities supporting their residents (private citizens) with current Johkasou (Gappei Johkasou) installation for equipment fee and its installation fee

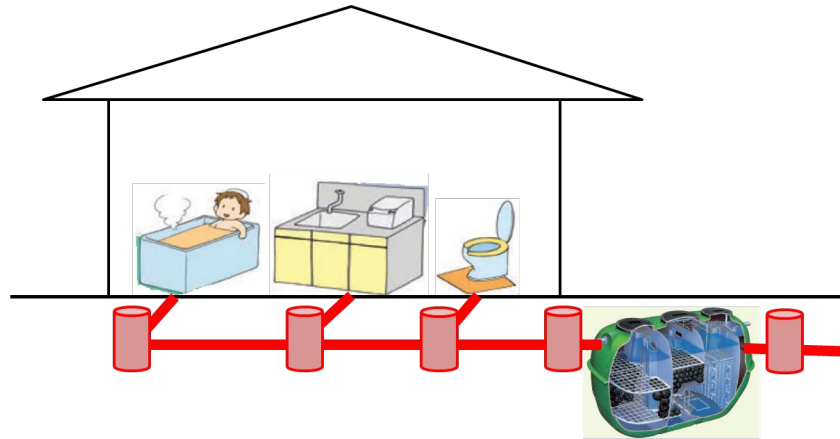


- Since 1987

- Owner of Johkasou is responsible for operation and maintenance.

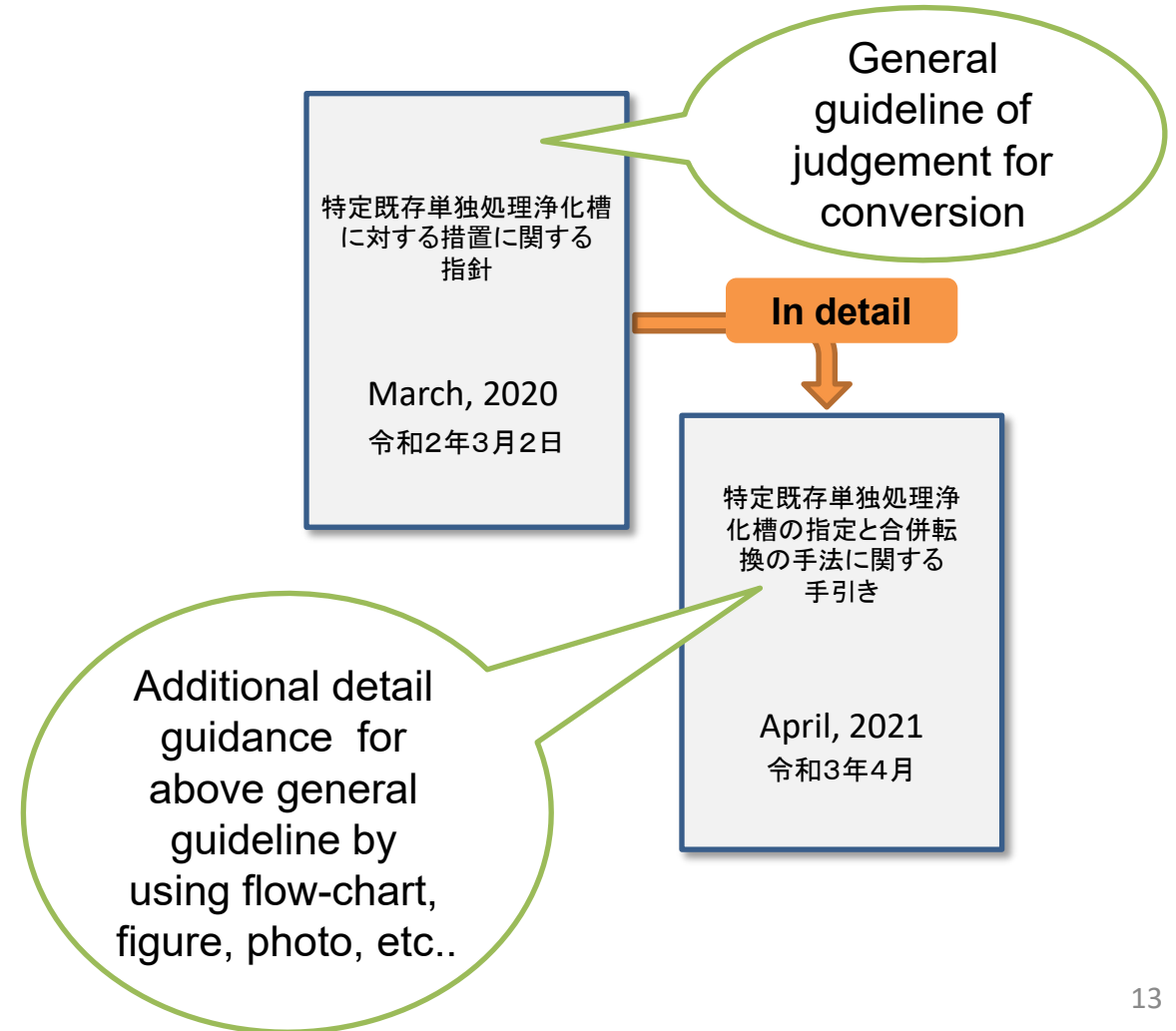
4. Measures for promoting Johkasou with including the conversion from old type to current one

■ Additional subsidy for installing in-house piping works at the conversion from old type Johkasou to current Johkasou



- Subsidizes municipalities supporting their residents (private citizens) for in-house piping work

■ Furnishing the conversion manual



4. Measures for promoting Johkasou with including the conversion from old type to current one

Ref: 300 projects as of 2016 (total municipalities in Japan 1,718 as of 2021)

■ Municipal Installation Project

- Municipal installs Johkasou as a public infrastructure like a Sewage treatment system
- Municipal also carries out O&M works with collecting fee from house owners.

User's burden 10% (3/30)	Municipality expenditure (Local bond can be applied) (17/30)	Central government expenditure (10/30)
---	---	---

□ Advantage:

If applying this scheme, it would be more easier to convert old type Johkasou to current one due to municipality implement the conversion at once where many old type Johkasou are still remained.

□ Disadvantage:

Responsibility for finance and management would be a burden of Municipalities.

4. Measures for promoting Johkasou with including the conversion from old type to current one

■ Application of Johkasou PFI project in Japan

Type of PFI scheme is “BTO” (Built, Transfer and Operate)

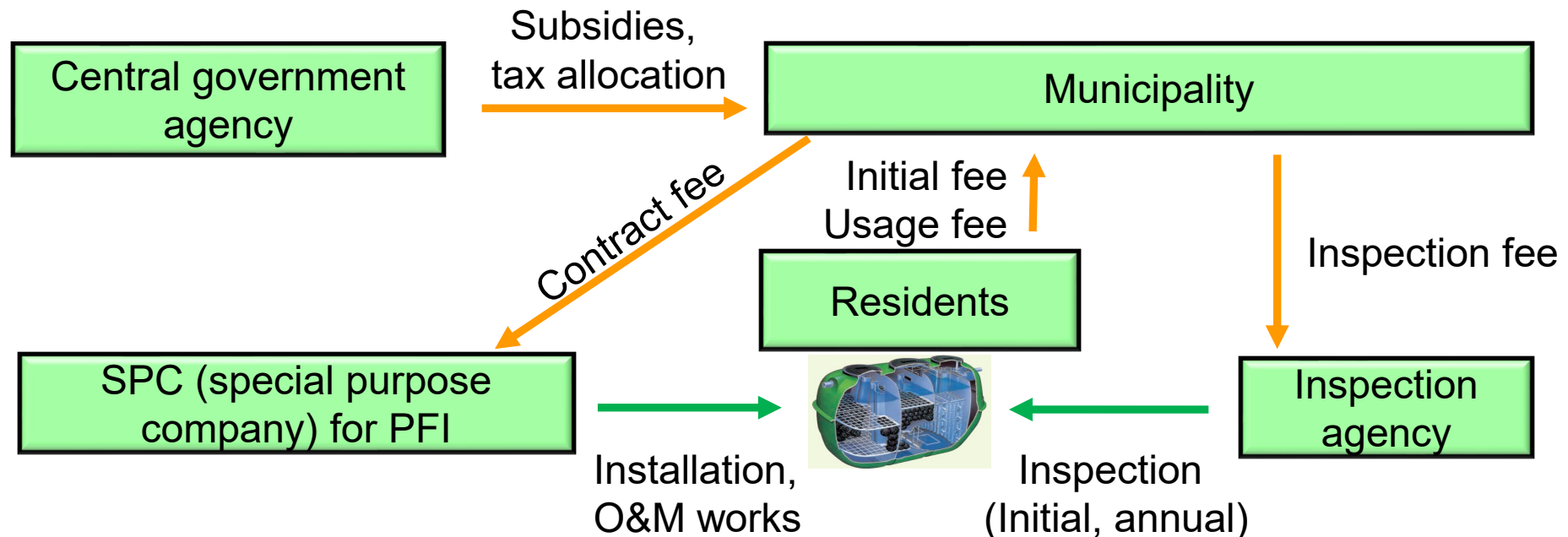
Disadvantage of Johkasou Municipal Installation Project

- Increase of financial burden on municipalities
- Increase of workload on municipalities without enough human-resource



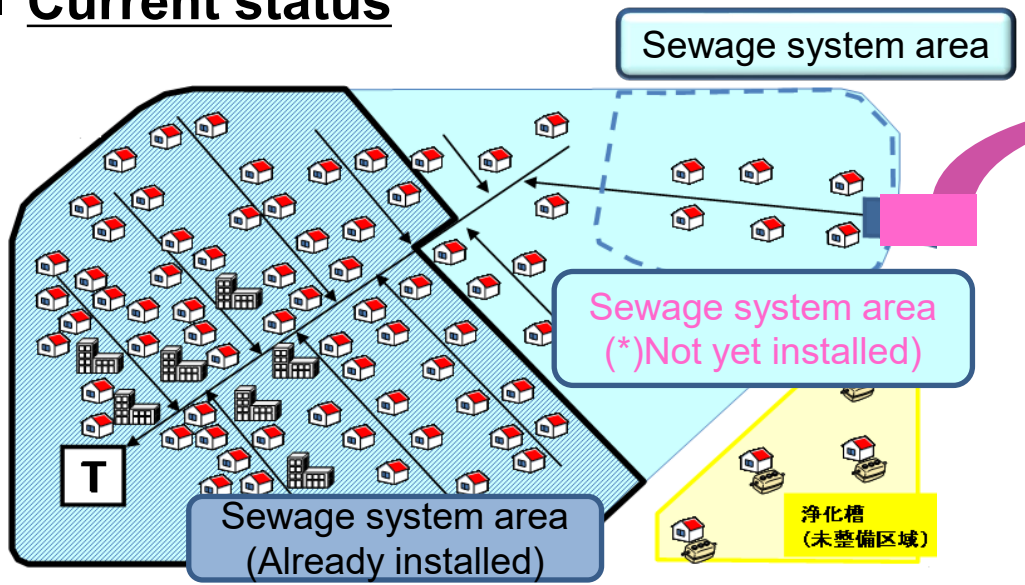
Advantage of Johkasou PFI projects

- PFI operators are responsible for installation, operation and maintenance.
- Municipalities can utilize private financing, technology and know-how on business.
- Decrease of overall project cost and workload on municipalities, and improvement of residential services due to the bulk contract and implementation by private business.



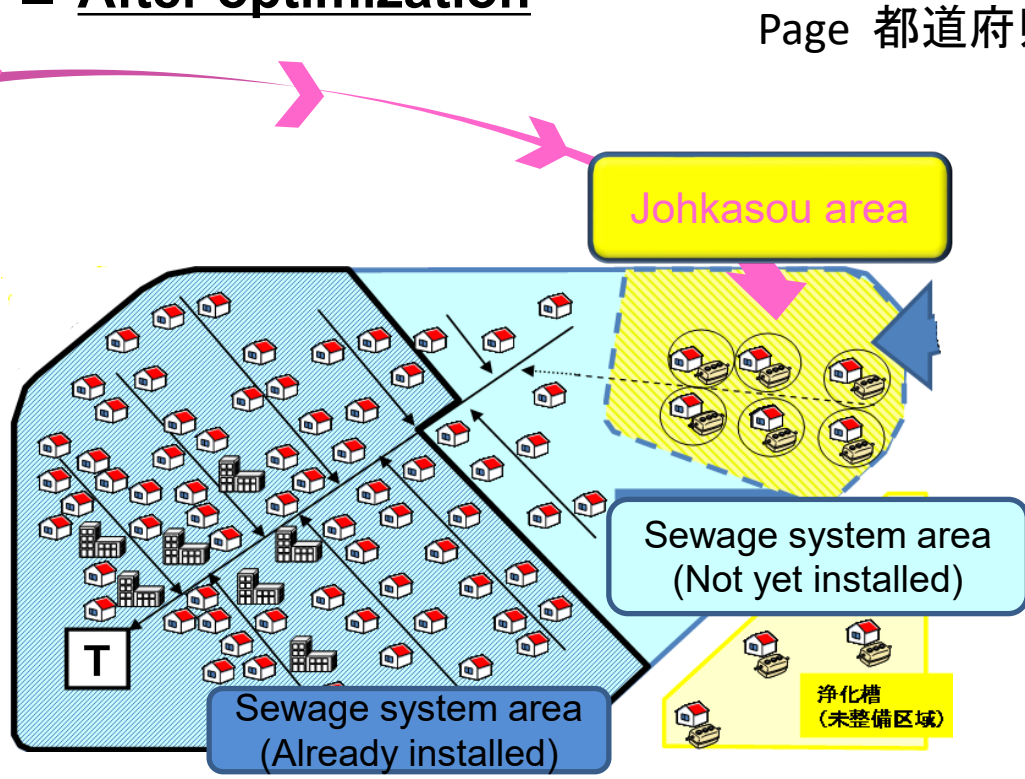
4. Measures for promoting Johkasou with including the conversion from old type to current one

■ Current status



(*) Not yet installed and more than 10 years would be needed for complete the Sewage system.

■ After optimization



Page 都道府県構想

■ Countermeasure: Collaborating with Municipalities, Prefectures shall revise and optimize the area-plan for sustainable management of domestic wastewater. Then, some area would be changed from Sewage system area to Johkasou installation area.

(As of July 2020, 52 municipalities have optimized the area-plan)

4. Measures for promoting Johkasou with including the conversion from old type to current one

■ Annual amount for operation & maintenance works for usual 5 P.E. Johkasou in Japan

		1 US\$ = 140 JPY
Item		Amount (Approx.)
Operation & Maintenance works for 5 P.E. Johkasou		US\$ 430/year
<u>Item</u>	<u>Frequency, etc. for 5 P.E. Johkasou</u>	
● Maintenance work	(3 times/year)	
● Desludging work	(1 time/year)	
● Legal inspection	(1 time/year)	
● (Electrical consumption fee)	(Continuous use)	
● (Equipment replacement fee)	(Average per year)	



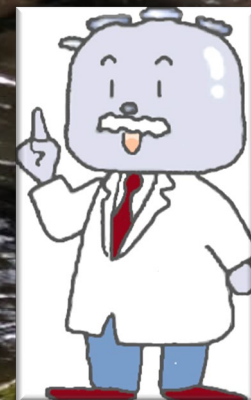
4. Measures for promoting Johkasou with including the conversion from old type to current one

- Example of Municipal Subsidies for Maintenance and Operation, Alphabetical order

M: Maintenance, C: Cleaning, LI: Legal Inspection

Name of Municipality	Subjects of Subsidy	Amount of Subsidy (Approx. US\$)
Fujisawa City, Kanagawa Pref.	Cleaning	Approx. US\$ 20 in case of 2m ³ plus Approx. US\$ 7 x (α(m ³) – 2m ³)
Fukaya City, Saitama City	M, C	Approx. US\$ 140
Fukuroi City, Shizuoka Pref.	M, C, LI	(M+C+LI of Johkasou) – Sewage usage fee (assuming)
Iida City, Nagano Pref.	Cleaning	Min (Approx. US\$ 110, or half of Cleaning fee)
Kakogawa City, Hyogo Pref.	M, C, LI	Approx. US\$ 140
Kawagoe City, Saitama Pref.	Legal Inspection	Approx. US\$ 50
Kiyosu City, Ehime Pref.	Cleaning	40% of cleaning fee
Kumagaya City, Saitama Pref.	M, C, LI	Approx. US\$ 110 in case of 5 P.E.
Machida City, Tokyo Metropolitan	M, C, LI	Approx. US\$ 140 in case of 5P.E.
Matsumoto City, Nagano Pref.	Cleaning	Half of Cleaning fee, Maximum Approx. US\$ 140
Mitoyo City, Kagawa Pref.	M, C, LI	Approx. US\$ 210
Ogose Town, Saitama Pref.	M, LI	Approx. US\$ 70
Tachika City, Tokyo Metr.	Cleaning	Around Approx. US\$ 70 (depended on tank volume)
Tatebayashi City, Gunma Pref.	Cleaning	Approx. US\$ 70 in case of 5 P.E.
Yokkaichi City, Mie Pref.	M, C, LI	Appox. US\$ 90 in case of 5P.E.

THANK YOU FOR YOUR KIND ATTENTION.



At kikuchi gorge, Kikuchi City, Kumamoto Prefecture

