



Decentralized wastewater treatment system and its legal **framework** in Japan

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Outline

1. History of Wastewater Treatment and current situation

2. General information on johkasou

3. Legal Systems on On-Site Treatment

Dr.Johkasou



1. History of Wastewater Treatment and Current Situation

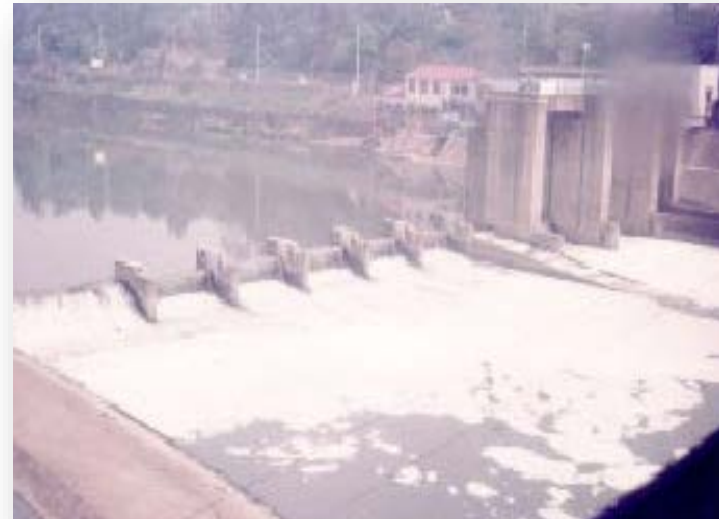
- Water pollution in Japan during rapid economic growth



Sumida River (Tokyo) in '70s



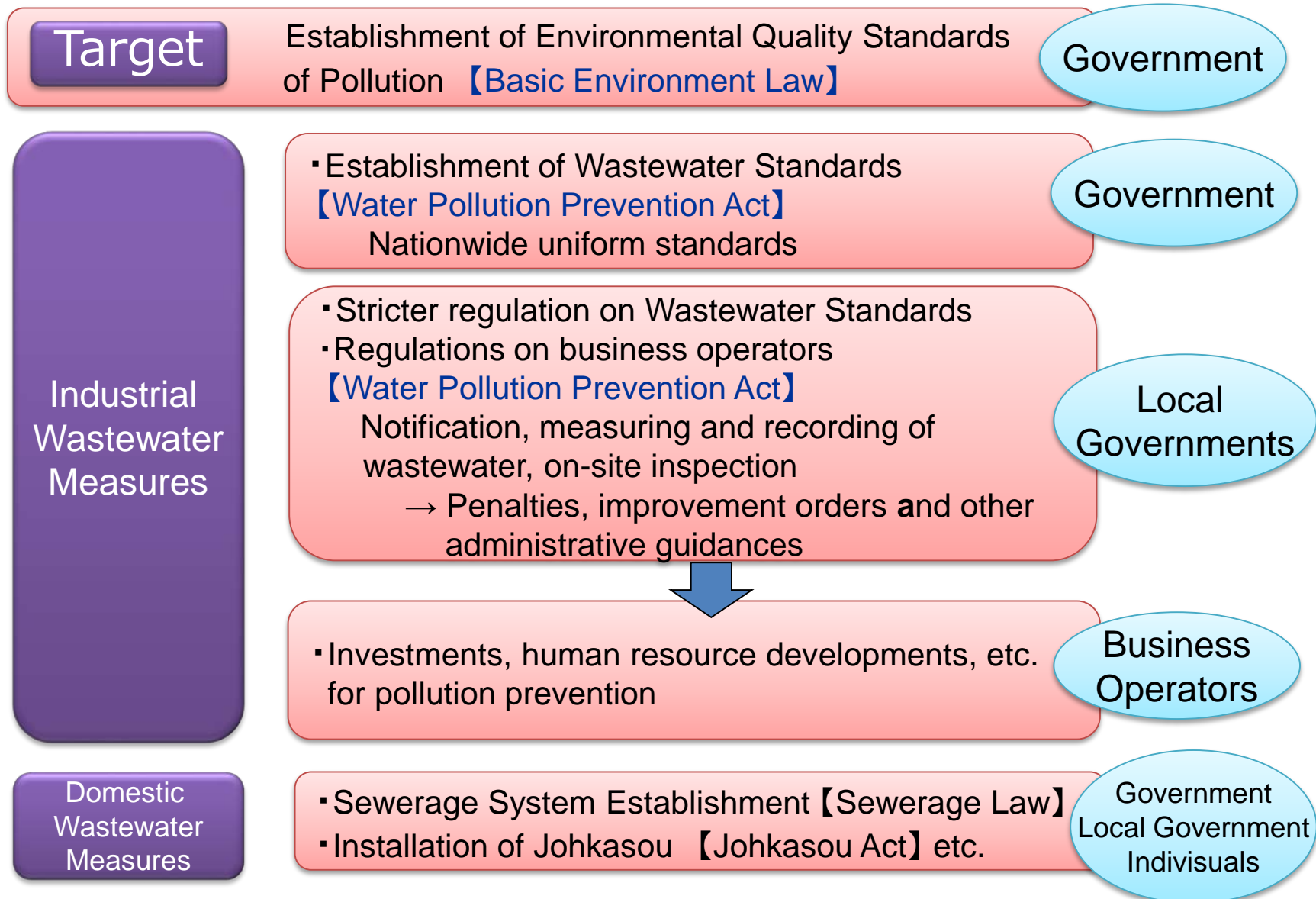
Dohkai Bay (Kitakyushu) in '60s



Chofu Weir, Tama River (Tokyo) in '70

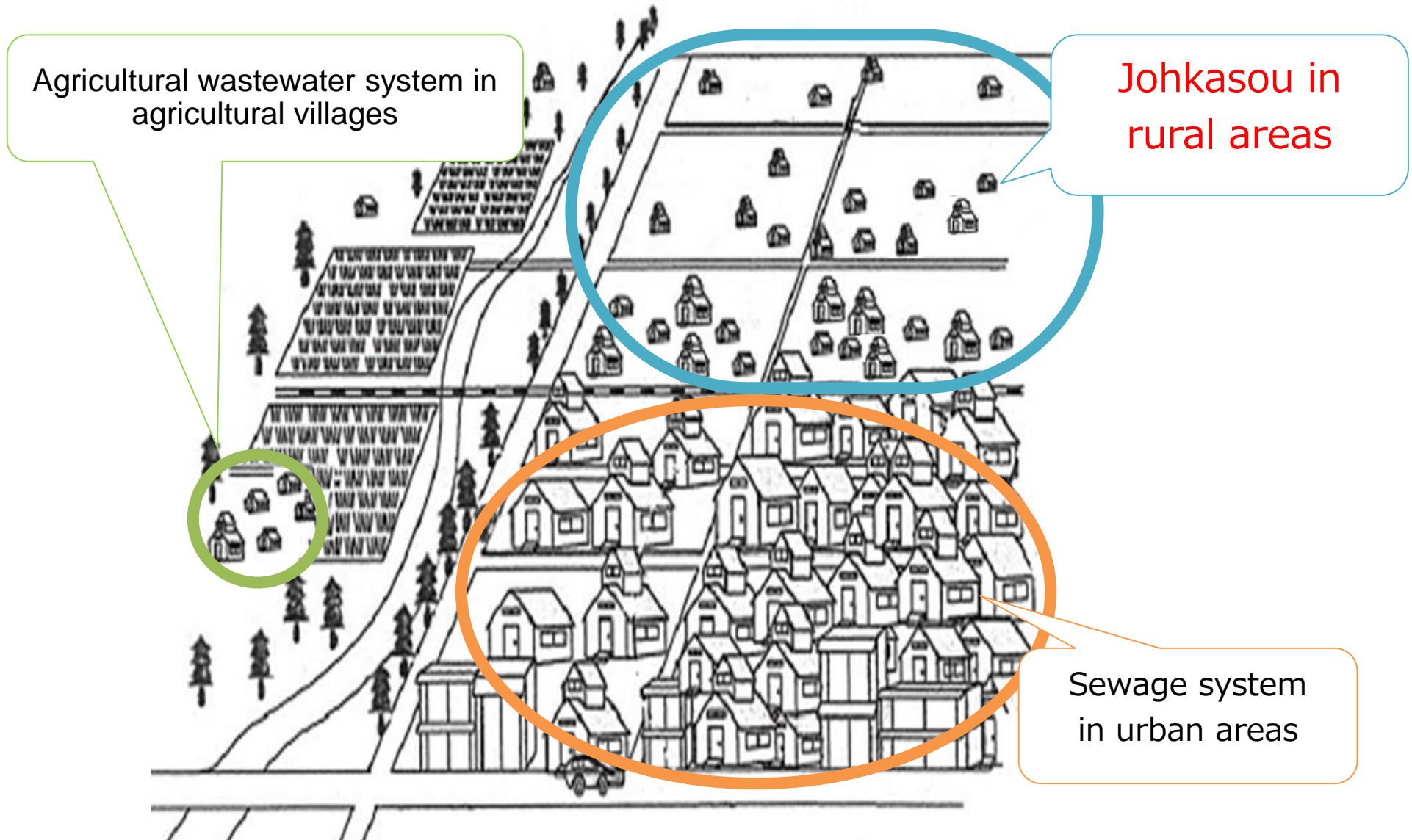
1. History of Wastewater Treatment and current situation

• Overall concept of water environment improvement



1. History of Wastewater Treatment and Current Situation

- Demarcation of wastewater treatment systems



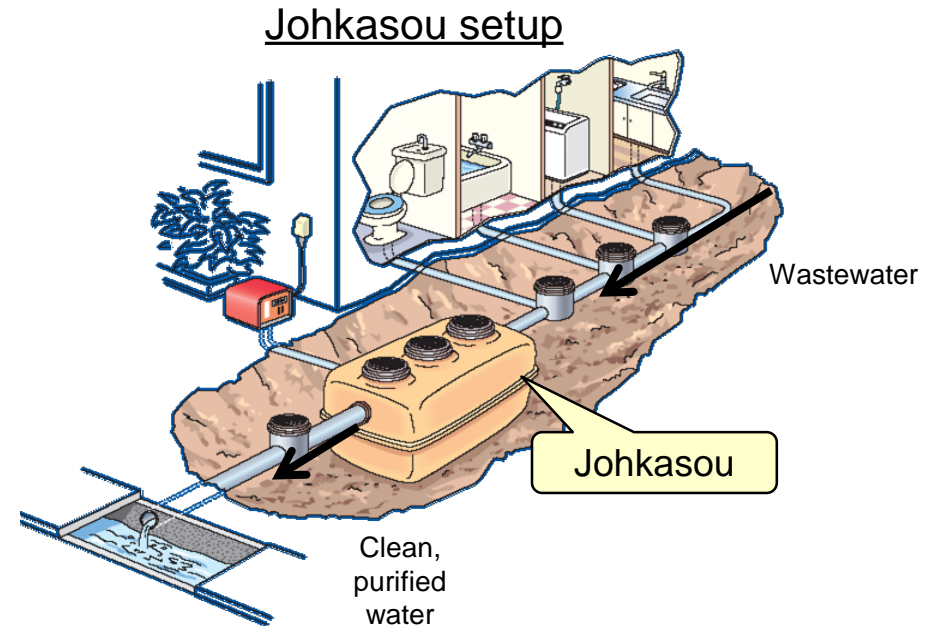
2. General Information on Johkasou and Its Pending Issues

• General idea of johkasou

- Johkasou are decentralized wastewater treatment devices that are designed for individual households or other structures and typically handled by the private sector
- Johkasou have a combined purification structure capable of treating both night soil (black water) and domestic wastewater (gray water)

Key features of johkasou

- Utilizes the purification capacity of microorganisms to turn out treated water on par with water treated at municipal sewage treatment plants (BOD 20mg/L or less)
- Low-cost equipment
- Efficient wastewater treatment equipment in hilly, mountainous, and other rural areas
- Installation is quick, requiring only about a week
- Can be set up in a compact space (equivalent to just one parking spot)
- Treated water is discharged on location, contributing to sound water cycles and maintaining consistent river flow volume
- Resistant to earthquakes, supporting swift recovery in the wake of a disaster



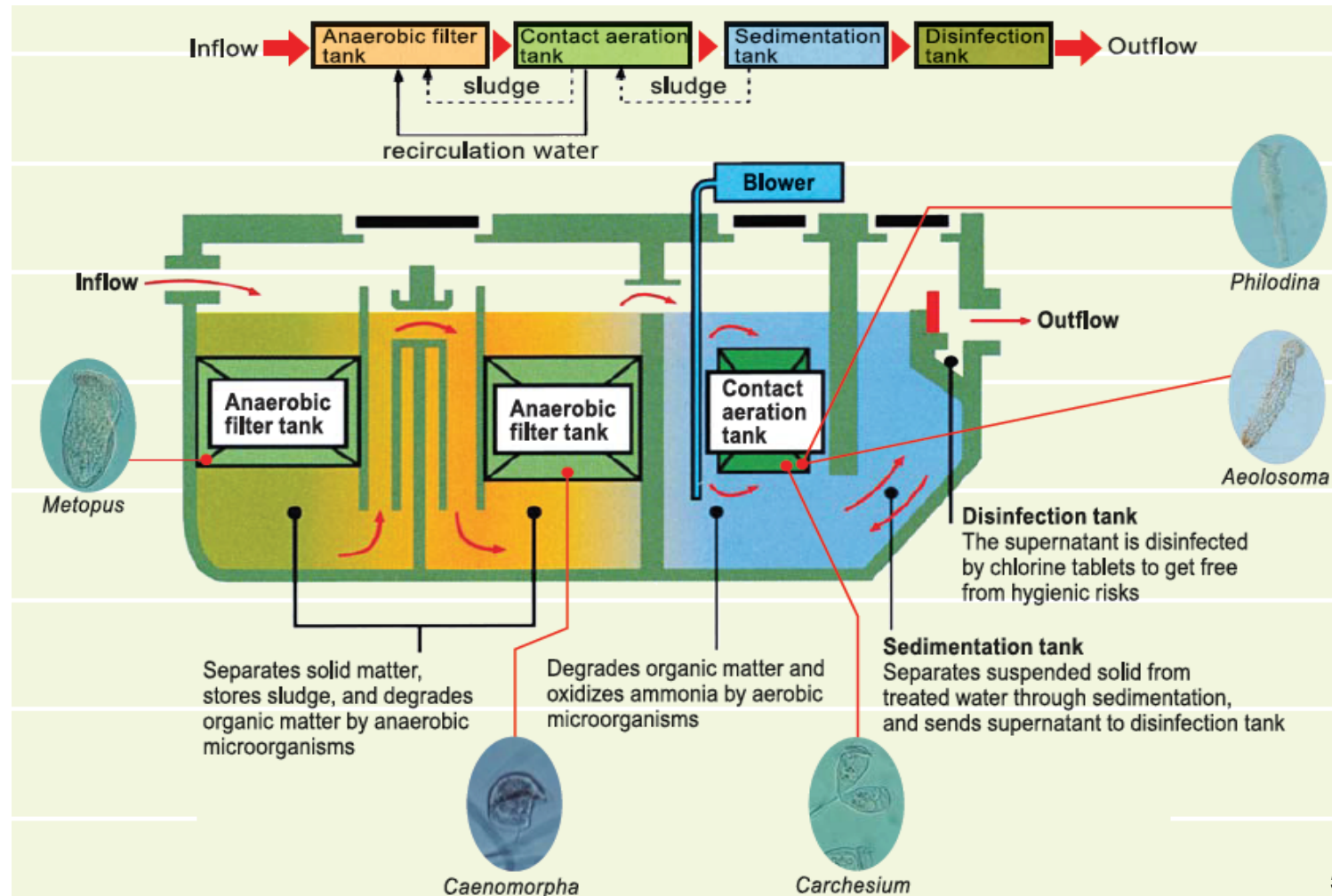
Size comparison (example)



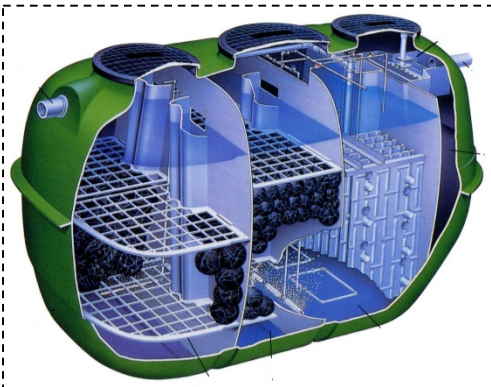
2. General Information on Johkasou and Its Pending Issues

▪ Structure and treatment principle of Johkasou

- Johkasou tanks contain bacteria and other microorganisms, which are used to break down and purify the contaminants contained in wastewater
- They include a solid-liquid separation function, sludge storage function, and disinfection function in order to maximize purifying capabilities



Graphic representation



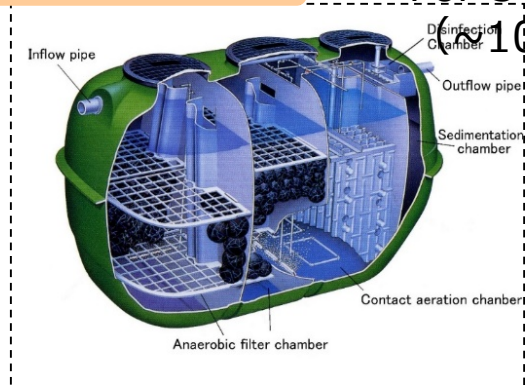
2. General Information on Johkasou and Its Pending Issues

▪ Capacities of johkasou

- Size of the johkasou is for a minimum of 5 people, the maximum is several tens of thousands people.
- Depending on the size of the city, you can change the size of johkasou.
- In Japan, johkasou are installed in each household, so the size for five to ten people is widely used.
- Johkasou **with advanced treatment performance are capable of removing** BOD to 10 mg/L or less and **removing** phosphorus and nitrogen.

Small size

For 5~50 people
($\approx 10\text{m}^3/\text{day}$)



Case of overseas installation



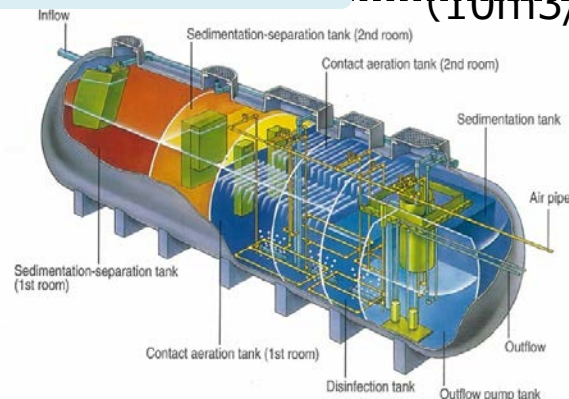
Restaurant(China: $10\text{m}^3/\text{d}$)



Hospital(Vietnam: $250\text{m}^3/\text{d}$)

Middle/large size

For 51~
($10\text{m}^3/\text{day}\sim$)



Employee dormitory
(Saudi arabia: $530\text{m}^3/\text{d}$)



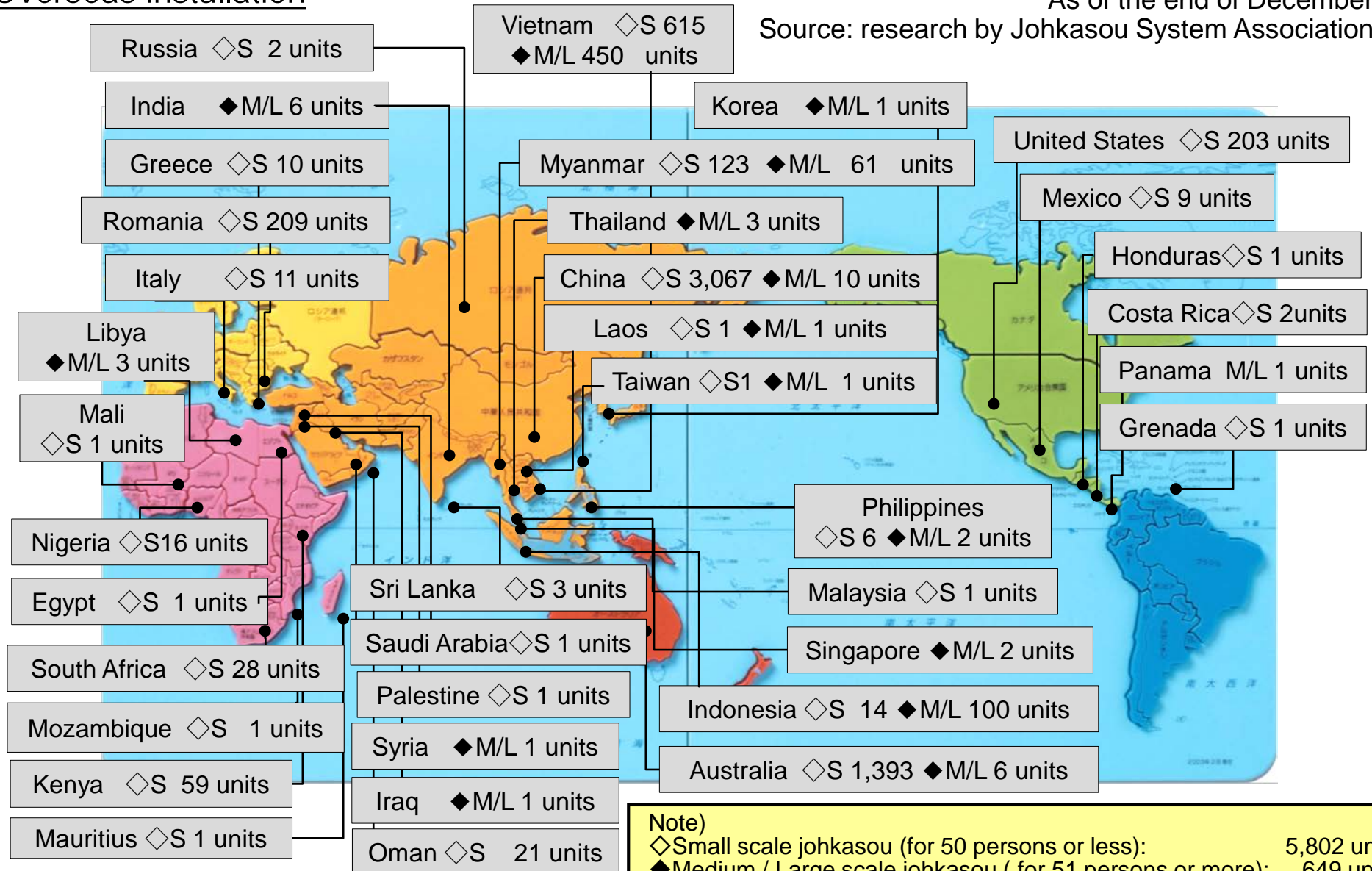
Factory(Myanmar: $30\text{m}^3/\text{d}$)

2. General Information on Johkasou and Its Pending Issues

Overseas installation

As of the end of December 2016,

Source: research by Johkasou System Association (JSA)



Note)
 ◇ Small scale johkasou (for 50 persons or less): 5,802 units
 ◆ Medium / Large scale johkasou (for 51 persons or more): 649 units
 Total: 6,451 units

3. Legal Systems on On-Site Treatment

- Purpose of Johkasou Act

Promotion of human waste and gray water treatment by johkasou for;

- Conservation of water quality in public water area,
- Preservation of the living environment and
- Improvement of public health

⇒ Articles in the Law

- ① Johkasou installation (✕ related to “Building Standard Law”)
- ② Operation/maintenance of johkasou
- ③ Approval of johkasou models
- ④ Johkasou business for Installation and Operation/Maintenance
- ⑤ Nationally qualified “Johkasou technicians”
- ⑥ Miscellaneous and penalties

3. Legal Systems on On-Site Treatment

- Approval process for types of johkasou (Article 13)

- Parties intending to manufacture johkasou in production plants shall obtain approval from the Minister of Land, Infrastructure, Transport and Tourism for the type of johkasou to be manufactured (does apply to test manufacturing).
- This process is subject to Performance Evaluation System.
- Parties intending to manufacture johkasou in production plants overseas for export to Japan may also obtain approval from the Minister of Land, Infrastructure, Transport and Tourism.

Benefits

- Ensures structural optimization
- Ensures proper capacity
- Simplifies/speeds up construction certification inspections and similar processes

Overseas approval

- Parties manufacturing johkasou overseas for export to Japan may also obtain approval, meaning that the johkasou type approval process eliminates trade friction in the form of so-called non-tariff barriers

3. Legal Systems on On-Site Treatment

- Flow of Evaluation System

Performance Evaluation Test (approx. 6 months)

••• by The Building Center of Japan



Application for Performance Evaluation Test (test result, technical data & drawings)



Evaluation by Special Committee



Issuance of Performance Evaluation Document



Approval by the MLIT Minister and for Model Adaptation



Model Approval by Johkasou Act and application for registration (in case for the subsidy of ≤ 10 persons)



Put into the market

3. Legal Systems on On-Site Treatment

- Water quality standards (Article 4-1)

Technical standards for discharged water quality

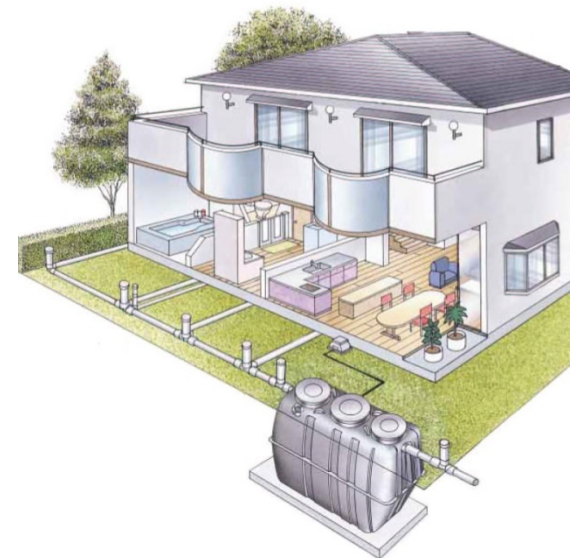
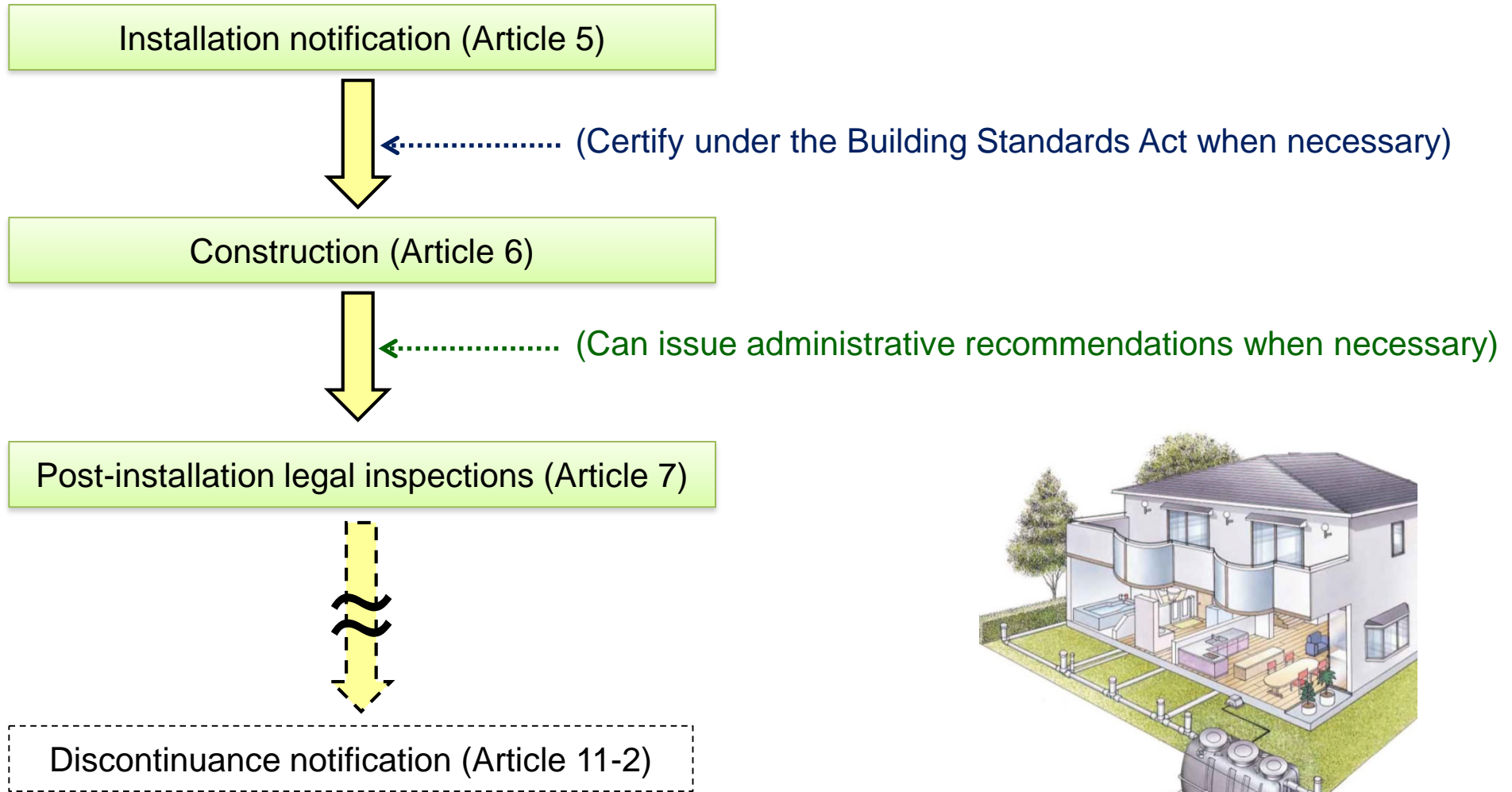
- Water discharged from gappei-shori johkasou must have a biochemical oxygen demand (BOD) concentration of 20 mg/L or less
- $(\text{Influent BOD} - \text{effluent BOD}) \div \text{influent BOD} \geq 0.9$

(Johkasou Enforcement Ordinance Article 1-2)

- The above regulations were created to reflect current technological standards in light of best available technologies (BAT) or best available techniques not entailing excessive costs (BATNEEC) according to the development and spread of johkasou.

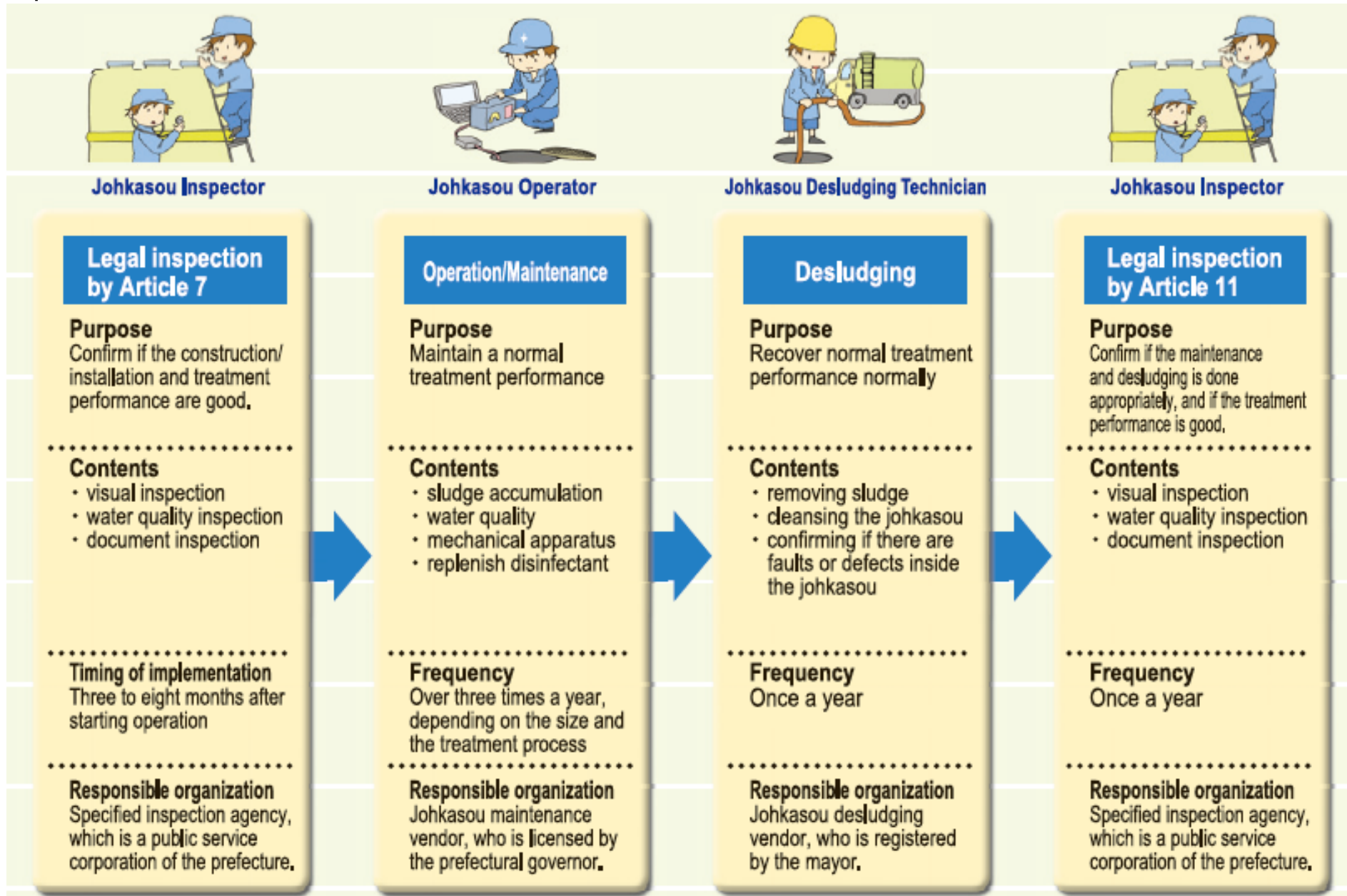
3. Legal Systems on On-Site Treatment

- Johkasou Installation Procedure



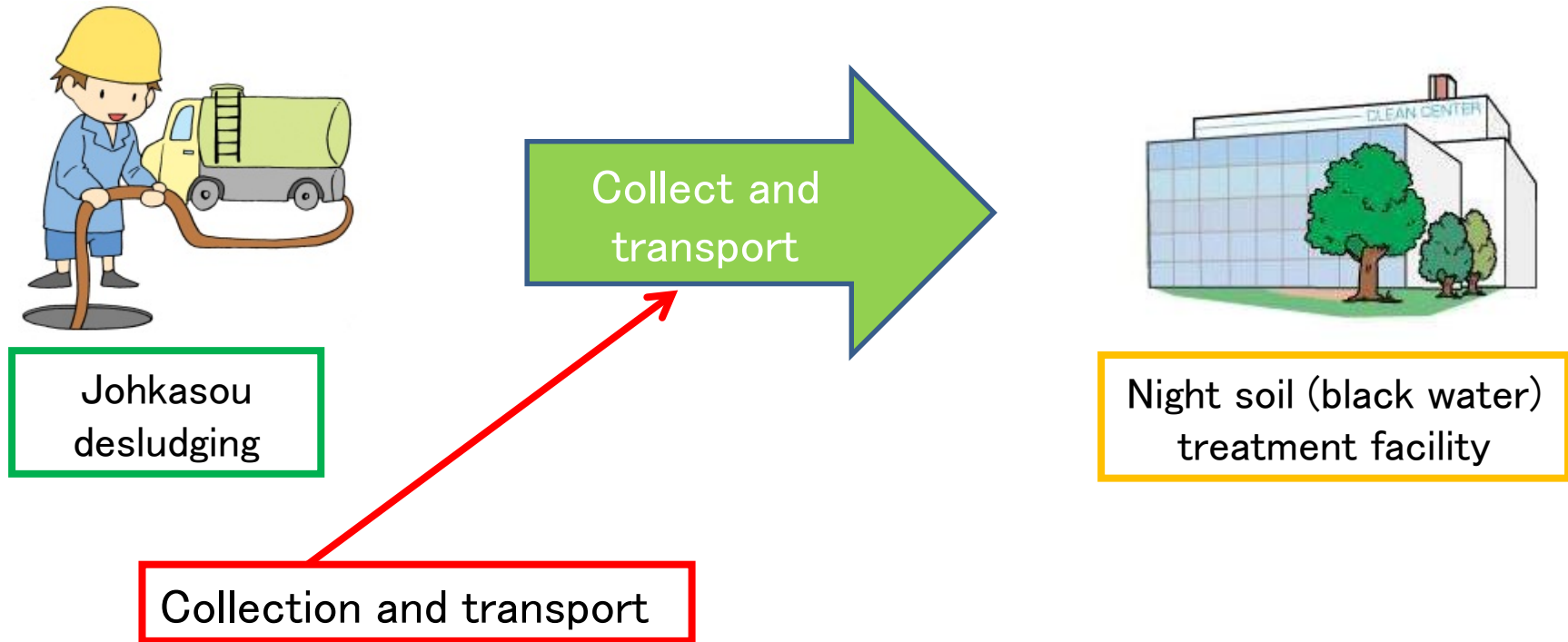
3. Legal Systems on On-Site Treatment

Inspections and Maintenance



3. Legal Systems on On-Site Treatment

- Sludge collection and transport (Waste Disposal Act)





Municipalities shall, in line with their general waste treatment plans, collect and transport johkasou sludge (general waste) in a manner that poses no threat to the maintenance of healthy living environments or public health, and treat the sludge at a black water treatment facility

(Article 6-2 of the Waste Management and Public Cleansing Law)

3. Legal Systems on On-Site Treatment

- National johkasou qualifications

National qualification	Description	Certifying agency
Certified Johkasou Installer	Person certified to supervise johkasou construction	 <p>Ministry of Land, Infrastructure, Transport and Tourism</p>
Certified Johkasou Operator	Person certified to carry out maintenance inspections on johkasou	 <p>Ministry of the Environment Government of Japan</p>

3. Legal Systems on On-Site Treatment

▪ Johkasou corporate registration process

▪ National qualifications

Prefecture

Registration

Instructions, advice, recommendations, etc.



Johkasou construction company

【Certified Johkasou Installer】
Person certified to supervise johkasou construction



Municipality

Approval

Instructions, advice, recommendations, etc.



Johkasou Desludging Technician

Johkasou desludging company

【Certified Johkasou Operator】
Person certified to supervise johkasou construction

Prefecture or other

Registration

Instructions, advice, recommendations, etc.



Johkasou Operator

Johkasou maintenance inspection company



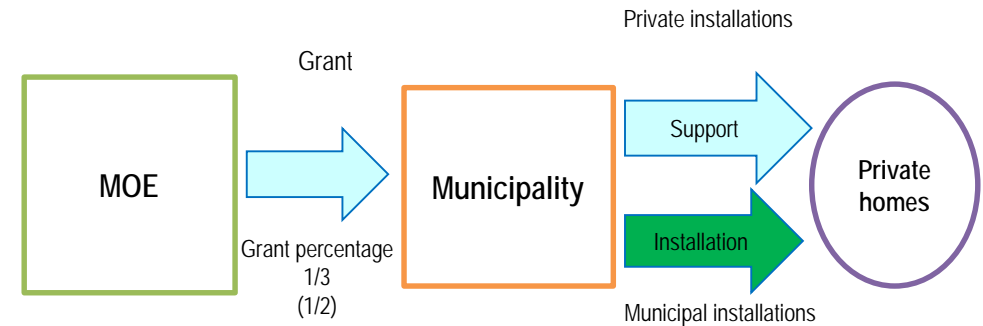
3. Legal Systems on On-Site Treatment

Subsidies for Johkasou Installation

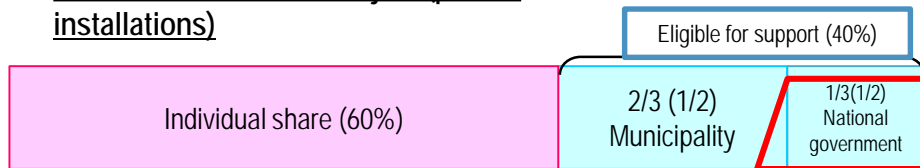
- There are still **some 1.3 million people who do not have wastewater treatment**, particularly in Japan's hilly rural areas, which have a low population density. **This issue requires urgent resolution.**
- Three Japanese ministries (MLIT, MAFF, and MOE) are working together to require municipalities to revise their wastewater treatment facility development plans with the aim of rapidly **setting up sustainable wastewater treatment facilities (generally within the next 10 years).**
- Johkasou have several advantages, including **(1) treatment capabilities on par with municipal sewage systems, (2) low-cost installation, and (3) seismic resistance.** These features become even more important in sparsely populated areas.
- There are still about **4.37 million tandoku-shori johkasou** in operation, though new installations are now prohibited. There is an **urgent need to convert them** to gappei-shori johkasou **as soon as possible.**
- The goal in promoting johkasou infrastructure development is to **conserve local water environments and build a society of independent, decentralized communities.**

Project overview

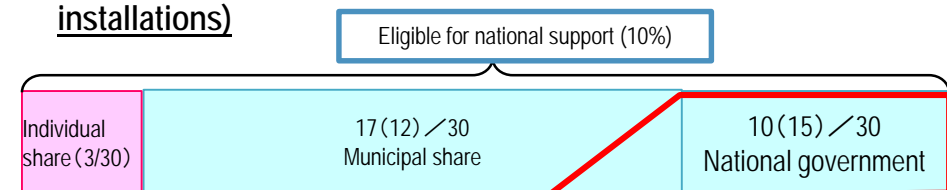
- **Johkasou Installation Project (private installations)**
Subsidizes municipalities supporting their residents (private citizens) with johkasou installation
- **Johkasou Municipal Installation Project (municipal installation)**
National subsidy program for municipalities taking the lead in installing johkasou systems. The municipality is responsible for operations and maintenance.



Johkasou Installation Project (private installations)



Johkasou Municipal Installation Project (municipal installations)





THANK YOU FOR YOUR KIND ATTENTION.

At kikuchi gorge, Kikuchi City, Kumamoto Prefecture