



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

September 24, 2019



環境省

Ministry of the Environment
Government of Japan

Environmental Regeneration and Material Cycles Bureau
Ministry of the Environment
Government of JAPAN

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Promotion of Johkasou
Waste Management Division
Ministry of the Environment
Government of JAPAN

Outline

1. History of Wastewater Treatment and development of measures

2. General information on Johkasou

3. Legal system and measures on Johkasou

4. Overseas Promotion of Johkasou

Dr.Johkasou



1. History of Wastewater Treatment and Development of Measures

- 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 Development of Measures

• Overall concept of water environment improvement

Target

Establishment of Environmental Quality Standards of Pollution **【Basic Environment Law】**

▪ Establishment of Wastewater Standards **【Water Pollution Prevention Act】**
Nationwide uniform standards

▪ Stricter regulation on Wastewater Standards
▪ Regulations on business operators **【Water Pollution Prevention Act】**
Notification, measuring and recording of wastewater, on-site inspection
→ Penalties, improvement orders and other administrative guidances

▪ Investments, human resource developments, etc. for pollution prevention

▪ **Sewerage System Establishment 【Sewerage Law】**
▪ **Installation of Johkasou 【Johkasou Act】 etc.**

Industrial Wastewater Measures

Domestic Wastewater Measures

National Government

- Vision
- Law & Regulations
- Technical Standards
- National Subsidies

Sharing Responsibility

Local Government

- Treatment Master plan and its implementation
- Ordinance
- Construction, Operation and Management of sewerage facilities
- Advice and guidance on Johkasou operation and maintenance

1. History of Wastewater Treatment and Development of Measures

MDGs

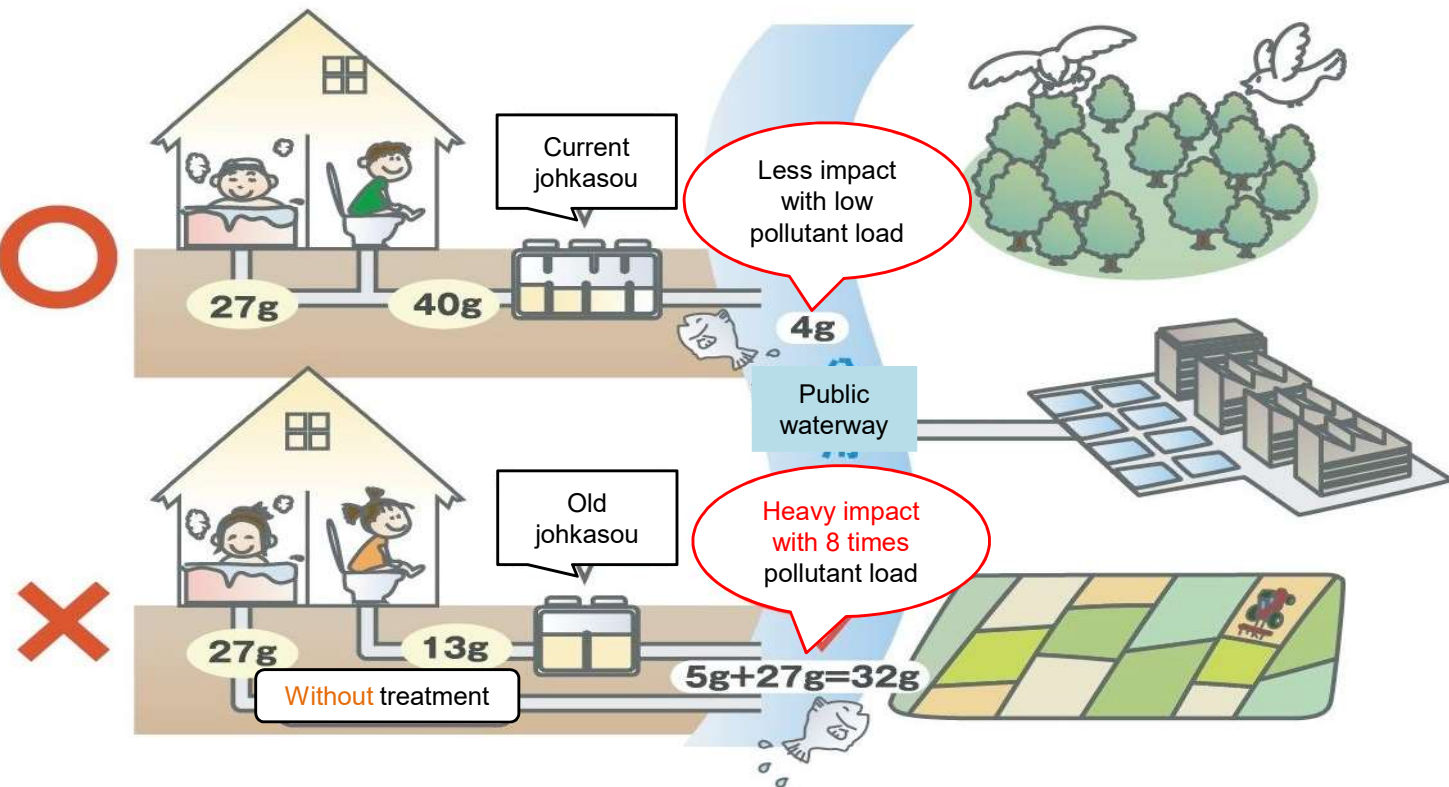


SDGs

Target 6.3
Having the proportion of untreated wastewater

- Sanitary improvement
- Expansion of flush toilet (1960s ~ in Japan)

- Environmental protection
- Treatment of all domestic wastewater (Black water + Gray water)



Current type Johkasou

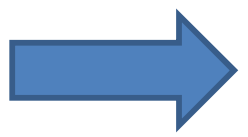
- ✓ To treat both black & gray water
- ✓ BOD 4g per person daily discharged to public water

Old type Johkasou

- ✓ To treat black water only
- ✓ BOD 32g per person daily discharged to public water
- ✓ New installation was prohibited from 2001

1. History of Wastewater Treatment and Development of Measures

MDGs



SDGs

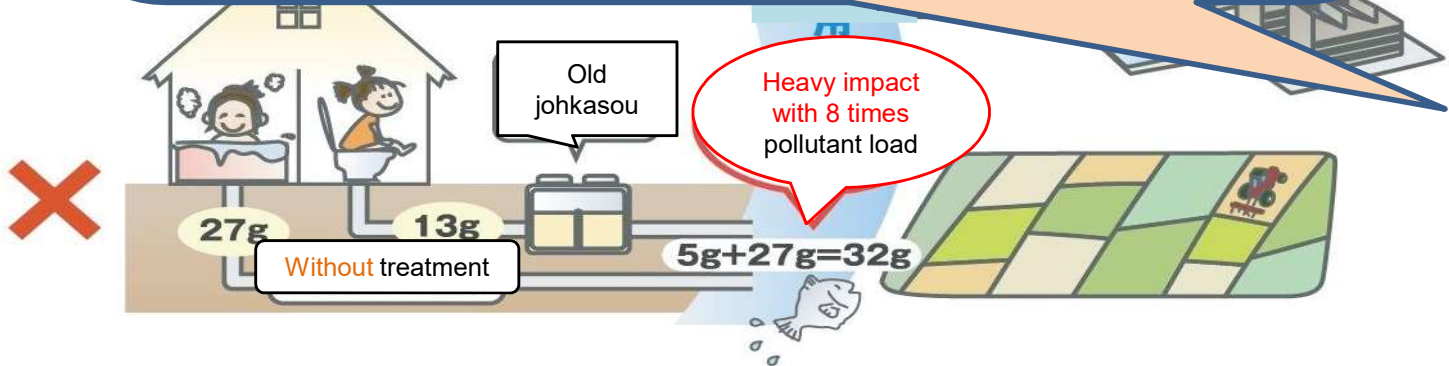
Target 6.3
Having the proportion of untreated wastewater

Our biggest challenge!!!
Still, half the number of operating Johkasou is old type installed before 2001, harming the environment!!
Shall be converted into current type.

Water pollution
of all domestic wastewater (Black water + Gray water)

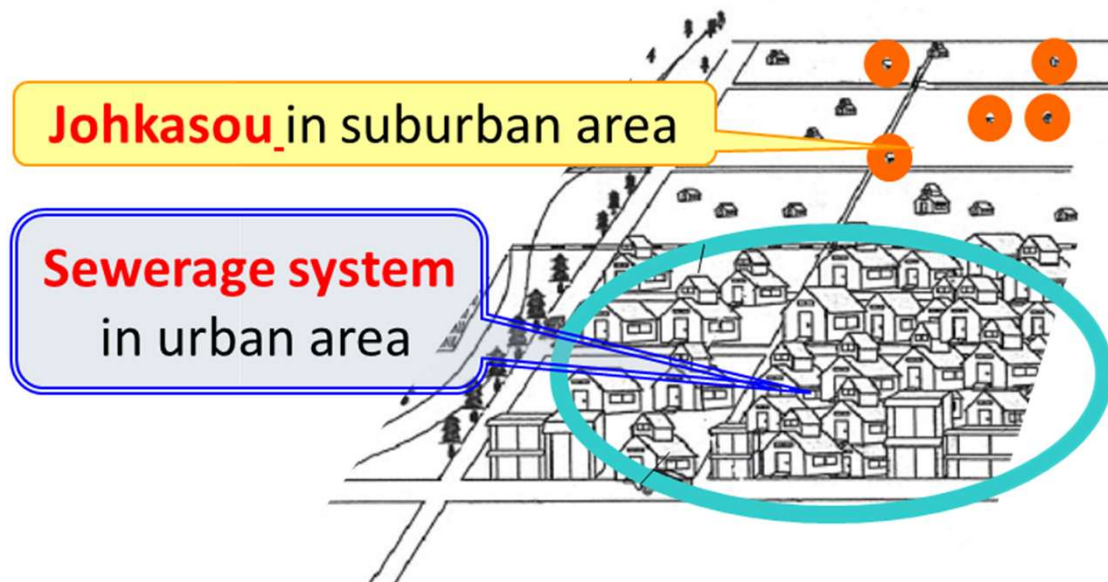
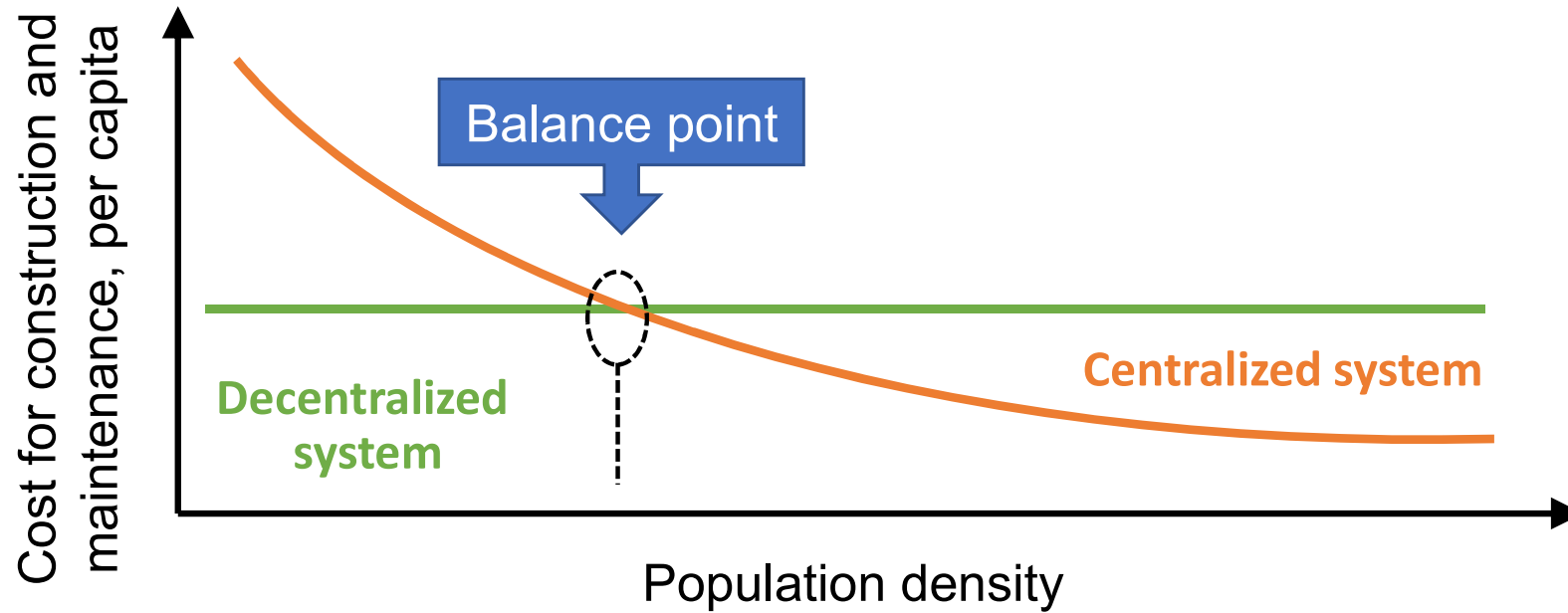
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1. History of Wastewater Treatment and Development of Measures

Demarcation of wastewater treatment systems



Local governments are responsible for Master Plan of wastewater treatment scheme including this demarcation in each region.

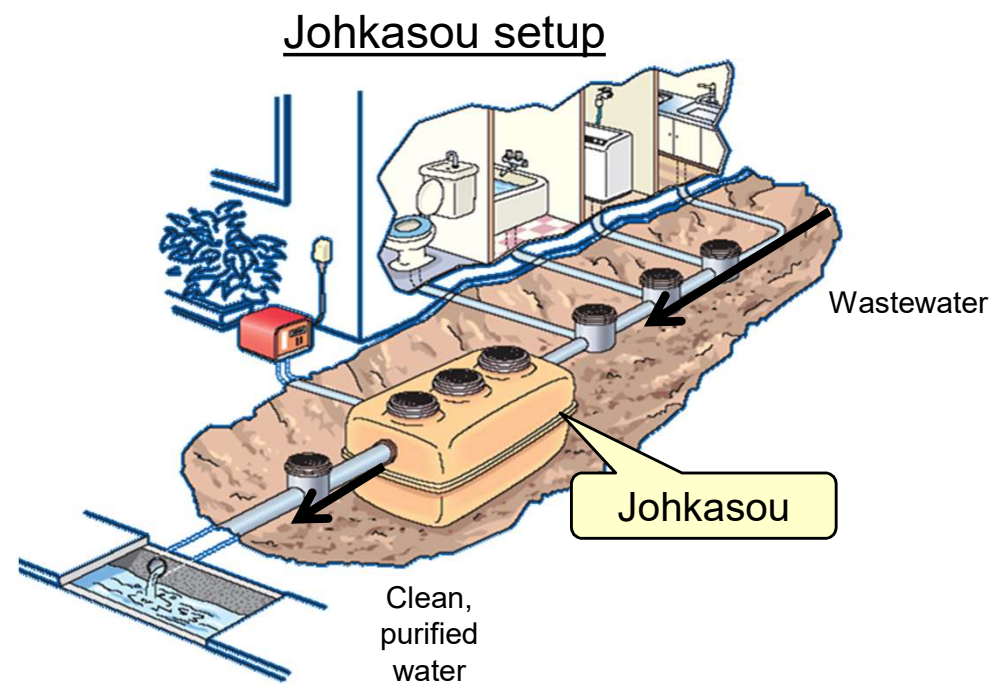
2. General Information on Johkasou

• 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. Example of overseas installation



Hospital(Vietnam:250m³/d)



Restaurant(China:10m³/d)



Factory (Vietnam:5m³/d)



Employee dormitory
(Saudi arabia:530m³/d)



Factory (Kenya:40m³/d)



Factory(Myanmar:30m³/d)

3. Legal Systems on On-Site Treatment – **Johkasou Act**

History of Johkasou Act

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)
1987	National subsidy program for gappei (current type) johkasou (to treat both black and gray water) established
2000	Revised: New installation of tandoku-shori johkasou systems basically prohibited
2005	Revised: Stricter water quality management systems introduced, defining water quality conservation targets

During high economic growth period, water pollution accelerated.

To promote the spread of gappei johkasou and the replacement of tandoku johkasou systems

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 and measures on On-Site Treatment

Water quality standards (Article 4-1)

Technical standards for discharged water quality

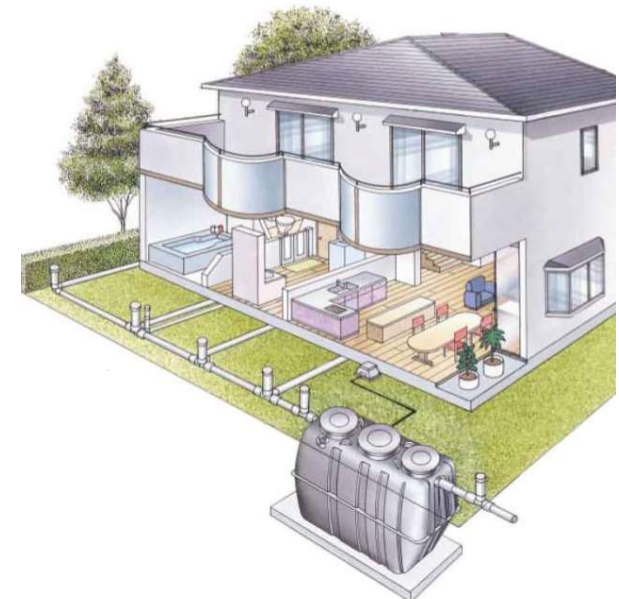
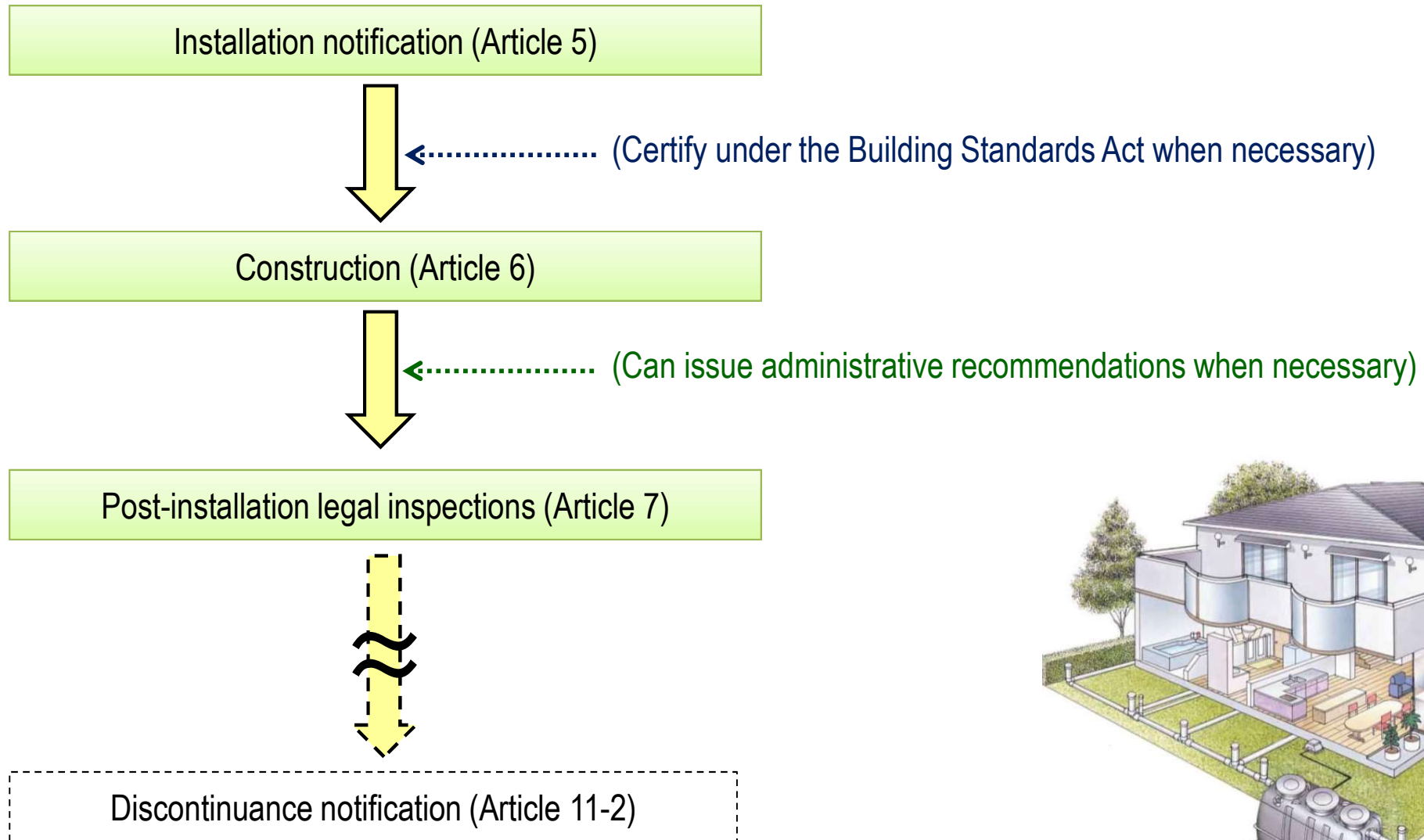
- Water discharged from gappei-shori johkasou must have a biochemical oxygen demand (BOD) concentration of 20 mg/L or less
- $(\text{Influent BOD} - \text{effluent BOD}) \div \text{influent BOD} \geq 0.9$
 - * Comparable to the treatment level of sewerage treatment plant

(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 and measures on On-Site Treatment

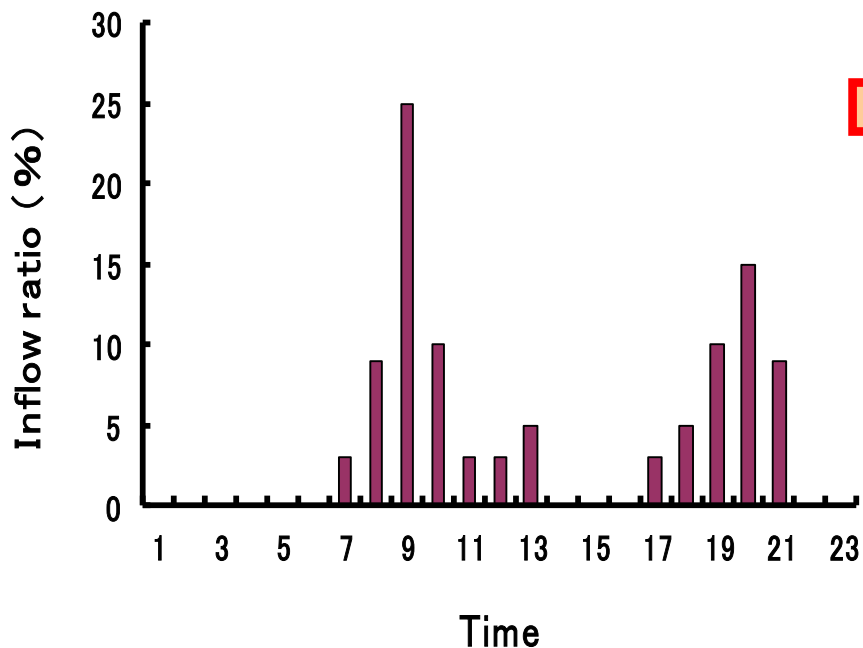
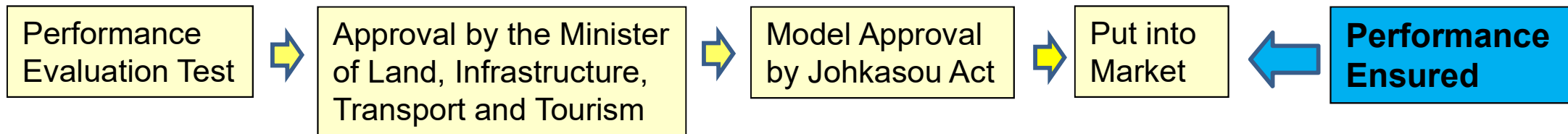
▪ Johkasou Installation Procedure



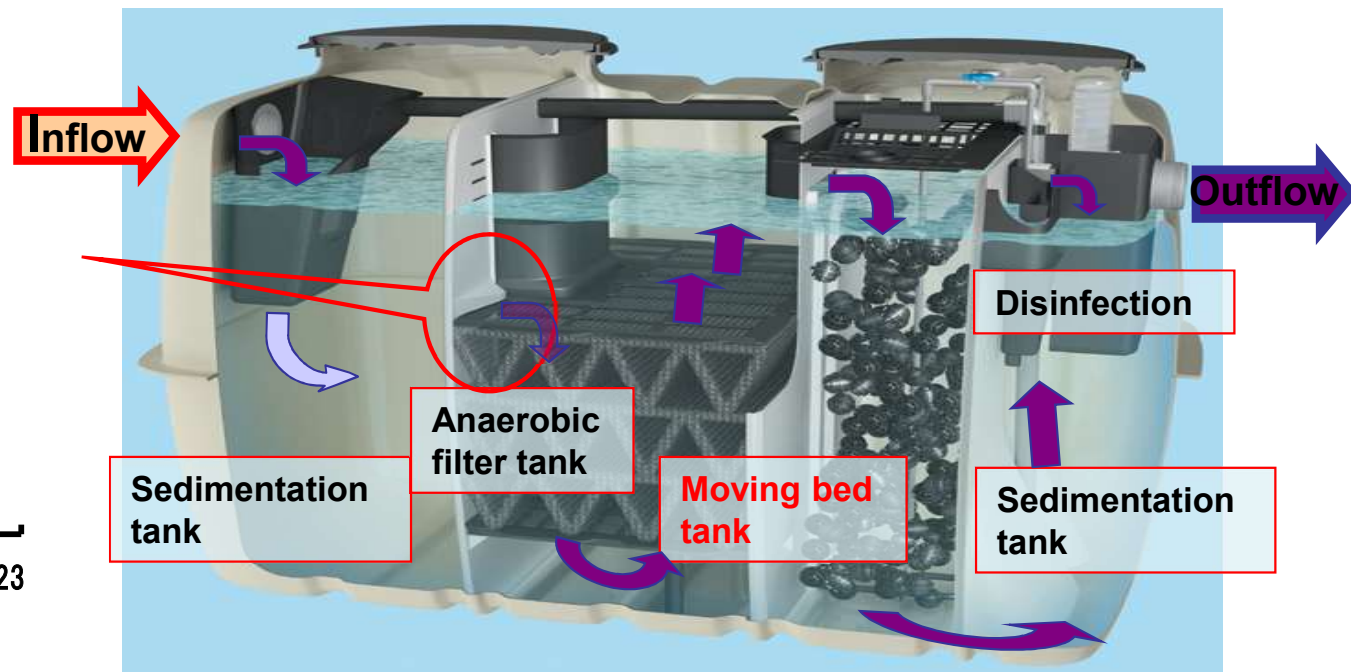
3. Legal Systems and measures on On-Site Treatment

Approval process for types of Johkasou (Johkasou Act Article 13)

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



Inflow Pattern



Performance Evaluation Type Johkasou

“Policy Dialogue and Network Building of Multi-stakeholders on Integrated Decentralized Domestic Wastewater Management in ASEAN Countries”(PoDIWM)

- Fund: **Japan–ASEAN Integration Fund (JAIF)**
- Project Proponent: Ministry of Public Works and Housing, Indonesia
- Implementation Agency: **National Institute for Environmental Studies (NIES), Japan**
- Project duration : July 2018–July 2020

【Objectives】

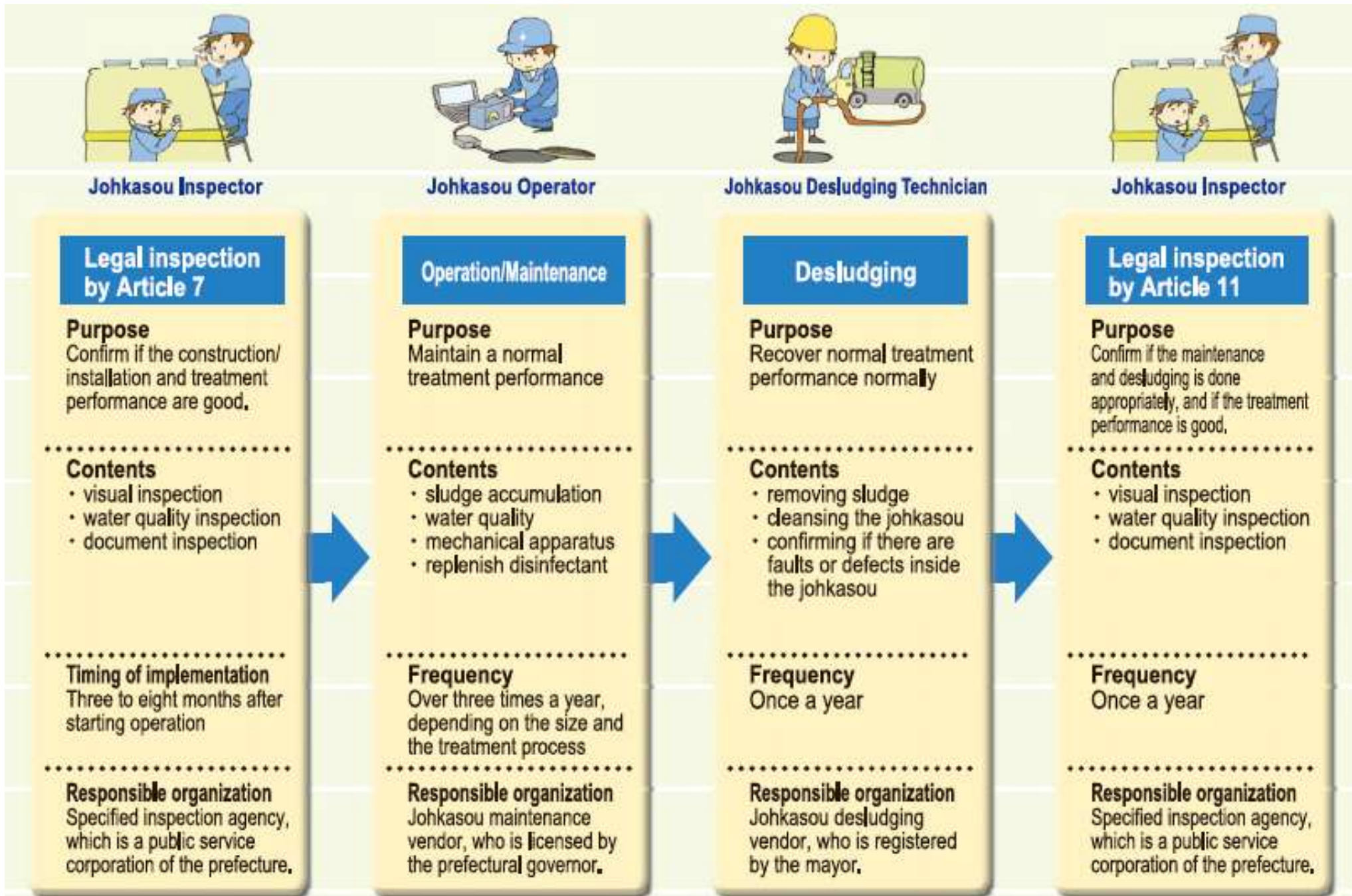
- 1) Policy and institutional design development platform for multi–stakeholders on integrated domestic wastewater management.
- 2) Technology showcase of decentralized domestic wastewater treatment

Project activities :

- 1) **Assessment** of the status of legal policy systems and technology on integrated domestic wastewater management in 9 AMSs
- 2) **Fact–finding survey** on legislation/policy/program/initiatives such as certification system about integrated decentralized domestic wastewater treatment in 9 AMSs
- 3) **Policy dialogues of 10 AMSs** (Singapore will be invited as a resource person) on initiatives for integrated decentralized domestic wastewater treatment and its implementation
- 4) **Round–robin test** of decentralized domestic wastewater treatment facilities manufactured to be tested in Indonesia, Thailand and Japan
- 5) **Capacity development trainings** of multi–stakeholders for policy implementation in Japan
- 6) **Policy consultation in each 9 AMSs** on domestic wastewater management including policies, standardization, **Performance Evaluation Test**, public and market initiatives for integrated decentralized domestic wastewater management

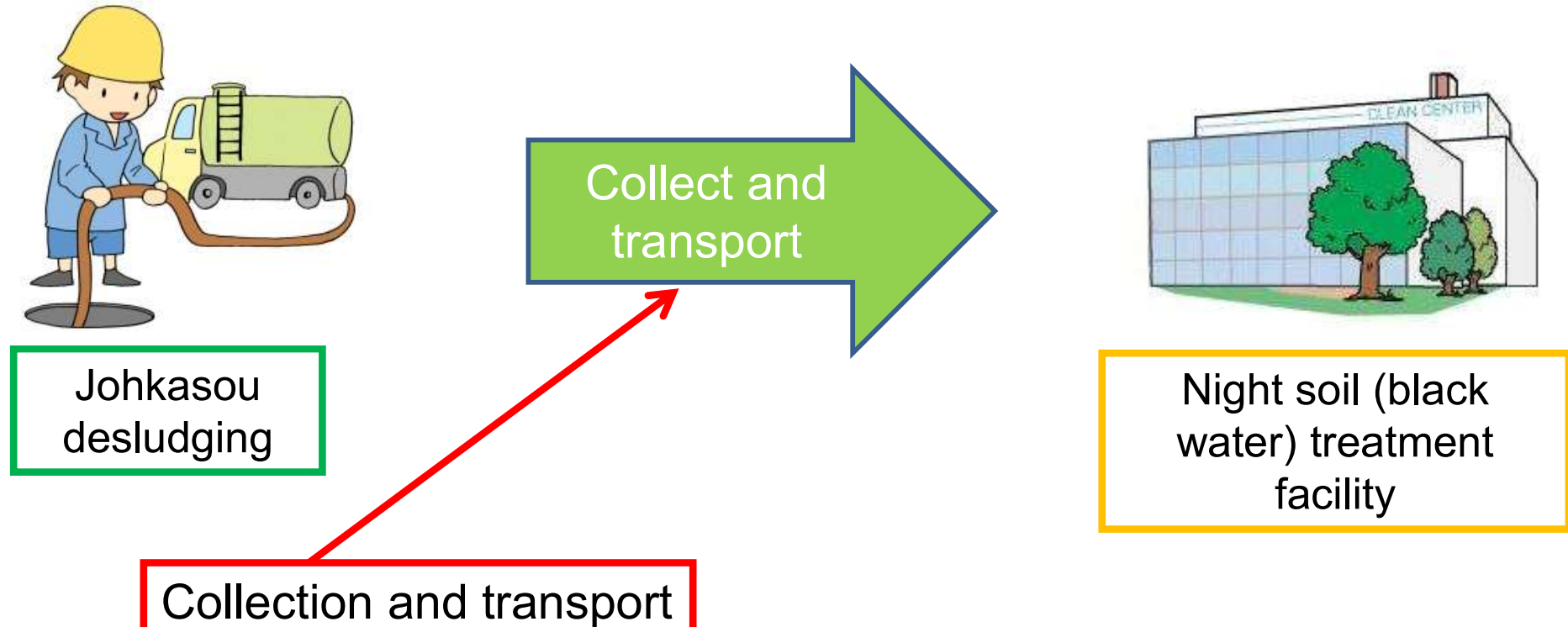
3. Legal Systems and measures on On-Site Treatment

• Inspections and Maintenance



3. Legal Systems and measures on On-Site Treatment

Sludge collection, transport and treatment (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 and measures on On-Site Treatment

▪ Johkasou corporate registration process

Prefecture

Registration

Instructions, advice, recommendations, etc.



Johkasou construction company

▪ National qualifications

【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 (Human Resource Development)

MOE is hosting [Seminars for Top Leaders and Regional Seminars](#) for municipal governments, and [Johkasou Forum](#) for residents and stakeholders such as NPOs.

For Johkasou Technicians by Japan Education Center of Environmental Sanitation (JECES)

- ◆ Johkasou technicians should be equipped with extensive knowledge on not only wastewater treatment/johkasou, but also water environment conservation and public health.
- ◆ Curriculums for johkasou operator and johkasou installation worker are as shown below.

Johkasou operator		Johkasou installation worker	
➤ Fundamental of johkasou	8 H	❑ Fundamental of johkasou	8 H
➤ Laws and regulations related with johkasou	4 H	❑ Laws and regulations related with johkasou	3 H
➤ Structure and function of johkasou	22 H	❑ Structure and function of johkasou	15 H
➤ Introduction to installation of johkasou	4 H	❑ Management of johkasou installation	8 H
➤ Operation and maintenance of johkasou	30 H	❑ Introduction to O&M and desludging of johkasou	3 H
➤ Water quality management of johkasou	10 H		
➤ Introduction to desludging of johkasou	2 H		
		Total	37 Hours
Total	80 Hours		

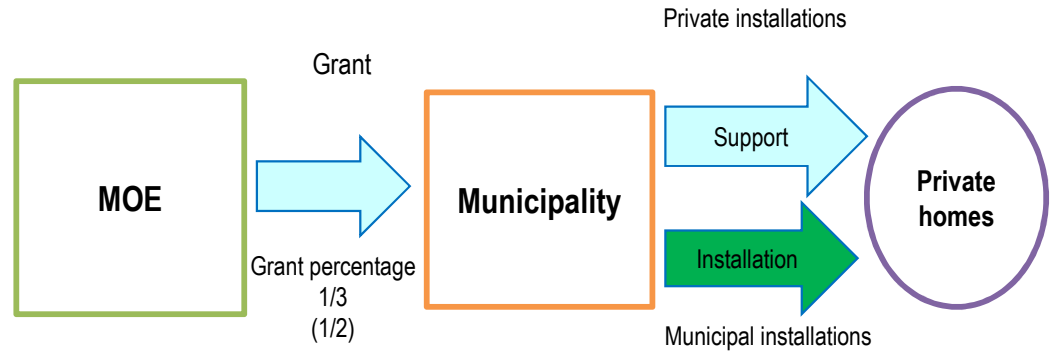


3. Legal Systems and measures on On-Site Treatment

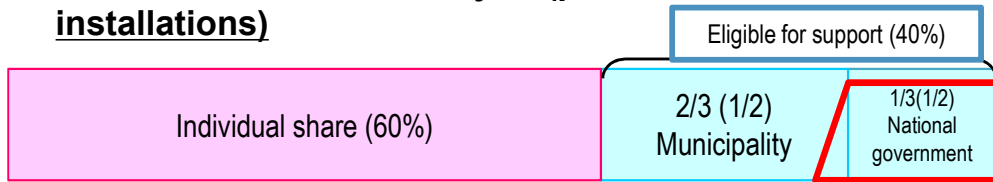
Measures to accelerate Johkasou installation and conversion of old types

Subsidies from the government and municipalities

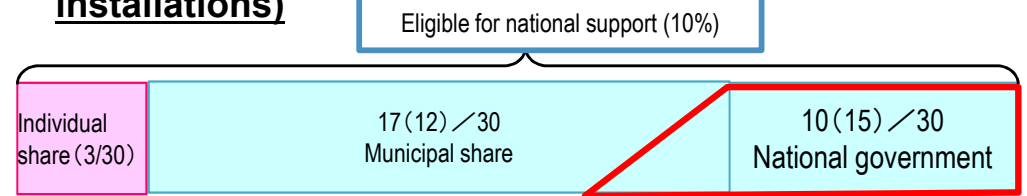
- **Johkasou Installation Project (private installations)**
Subsidizes municipalities supporting their residents (private citizens) with johkasou installation
- **Johkasou Municipal Installation Project**
National subsidy program for municipalities taking the lead in installing johkasou systems. The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



Johkasou Installation Project (private installations)



Johkasou Municipal Installation Project (municipal installations)



PFI (Private Finance Initiative) Projects

- #### Demerits of Johkasou Municipal Installation
- Increase of budget burden on municipalities
 - Increase of workload on municipalities



- #### Merits of 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.

3. Legal Systems and Measures on On-Site Treatment

Promotion of Johkasou Renovation by MOEJ

- Conversion of old type to current type Johksou including in-house piping works.
- Streamlining of management utilizing Johkasou data base system.

Conversion to current type



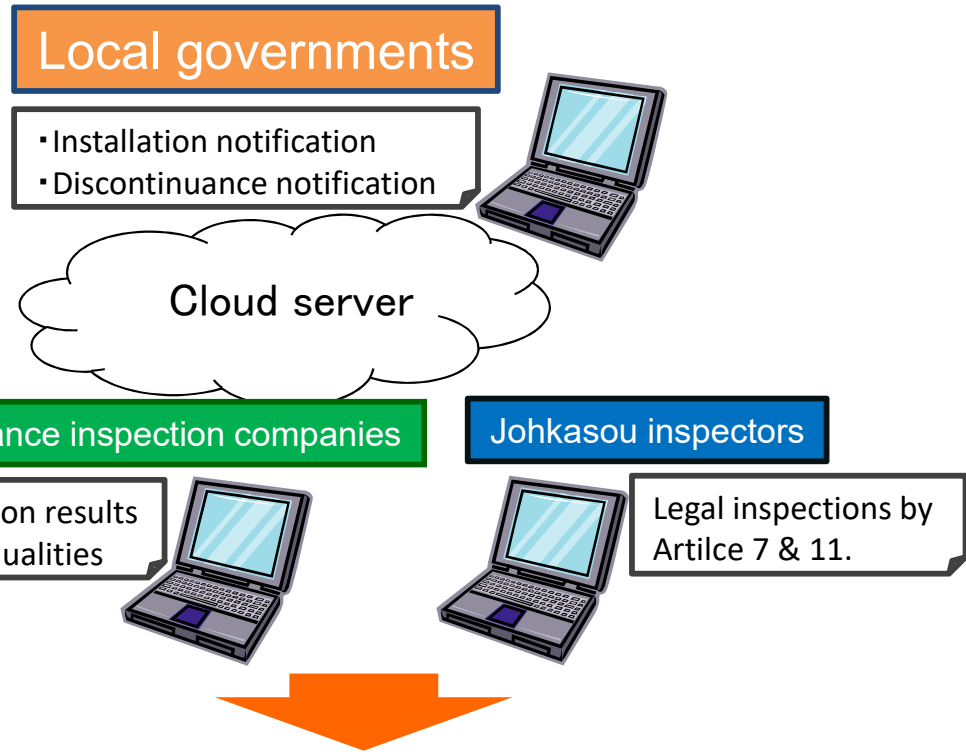
Damages or wastewater leakages of old type (6,000 cases in 2016), harming water environment by discharging untreated wastewater.

Conversion works



Old type removal Current type installation Piping works

Johkasou data base system



Conversion of old type, deteriorated and harmful to the environment, is a MUST!

Streamlining of Johkasou managements by grasping operation & maintenance status more thoroughly!

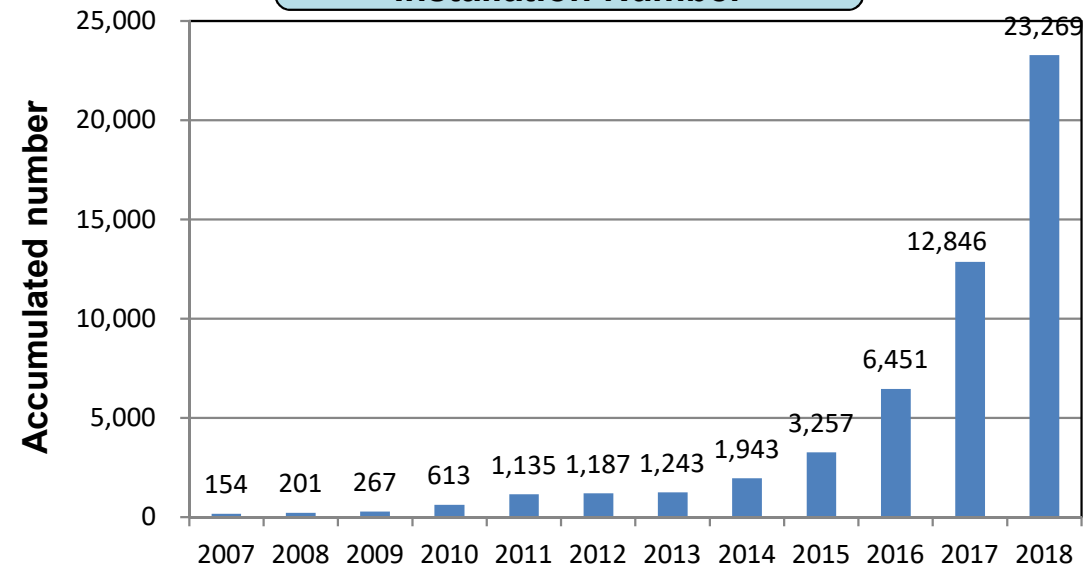
4. Overseas Promotion for Johkasou

- The number of Johkasou overseas installation has explosively increased for the past few years. Johkasou makers request systematic promotion support from the Government for performance evaluation system and O & M management to popularize it overseas.
- Ministry of the Environment (MOEJ) works in harmony with stakeholders to strategically promote circular industries overseas through standardization of Johkasou suitable to ASEAN countries, etc.

Main activities of MOEJ

- National Institute for Environmental Studies is doing a research project for fair treatment evaluation system establishment suitable to ASEAN countries to standardize Johkasou.
- MOEJ hosts International Workshop on Decentralized Wastewater Treatment in Asia to share Japanese legal systems, regulations and experiences and to promote Johkasou.
- MOEJ also hosts Johkasou Seminars and site surveys to further promote Johkasou to stakeholders of the counterparts and to support overseas business of domestic Johkasou related companies.

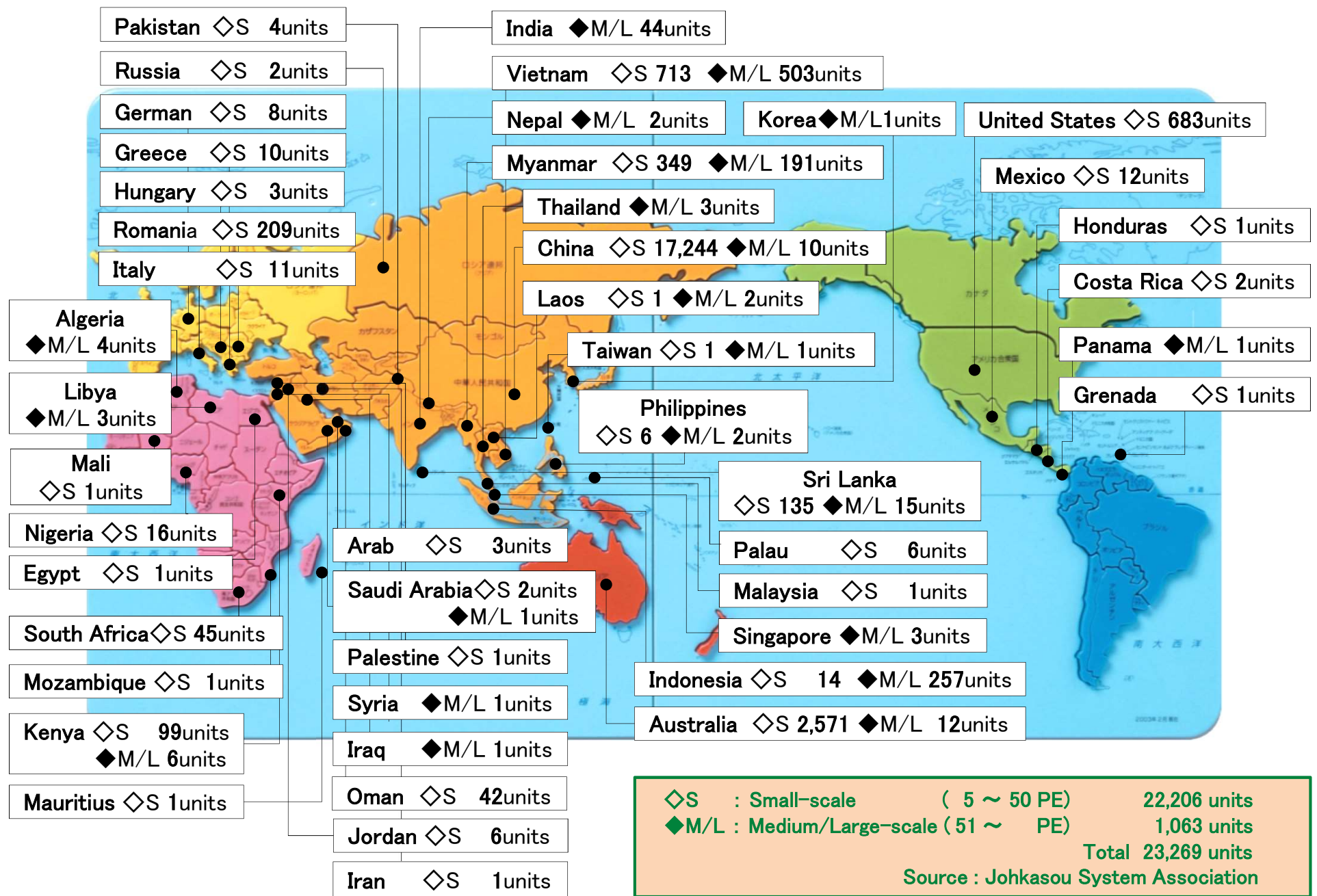
Johkasou Overseas Yearly Installation Number



- Workshop in Tokyo
- Seminar in Hanoi
- Site survey in Vietnam (from left to right)

Johkasou Overseas Installation

As of the end of December 2018





THANK YOU FOR YOUR KIND ATTENTION.

At kikuchi gorge, Kikuchi City, Kumamoto Prefecture