



Introduction of Japanese Johkasou

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Government of JAPAN

<https://www.env.go.jp/recycle/jokaso/>

Water pollution in Japan during rapid economic growth

Sumida
River
(Tokyo)
in the
1970s



Dohkai Bay
(Kitakyushu)
in the 1960s

Chofu Weir,
Tama River
(Tokyo)
in the 1970s



History of wastewater treatment and infectious diseases

- Up to the 1950s, night soil had been used as agricultural fertilizer and regarded as resource.
- From the late 1950s, night soil had become “waste” due to the spread of chemical fertilizers and urbanization. Lack of night soil treatment facilities and hygienic treatment had become serious social problems.
- Spread of infectious diseases had continued until the rapid economic growth period of the 1970s.

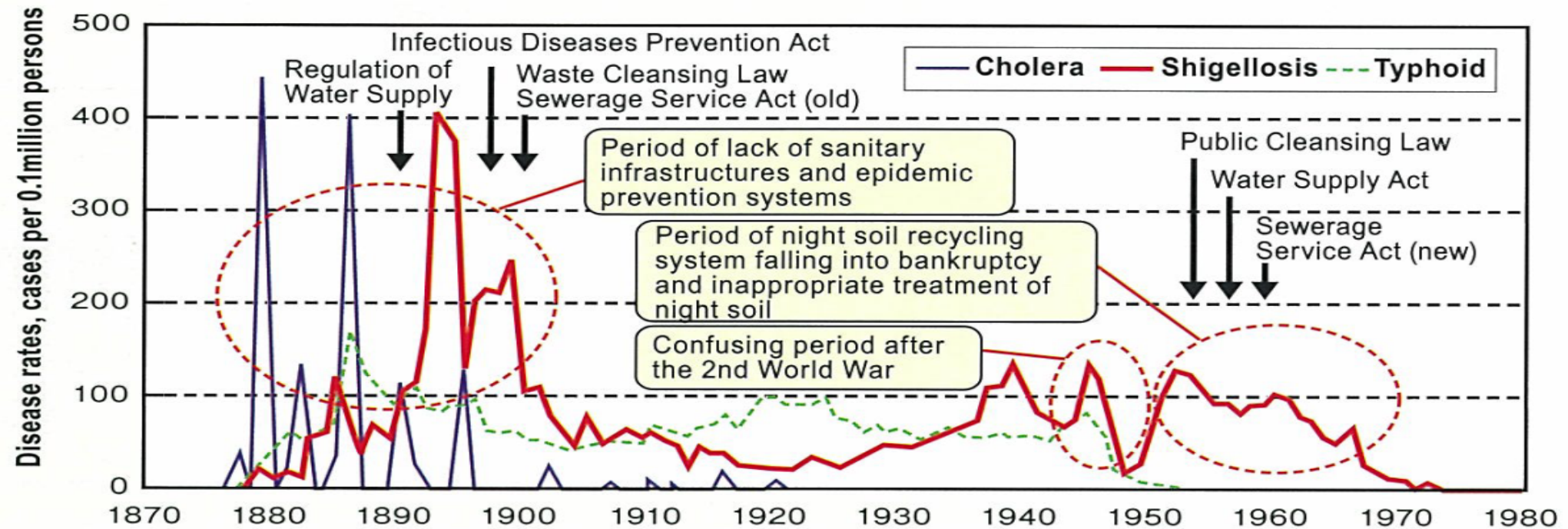
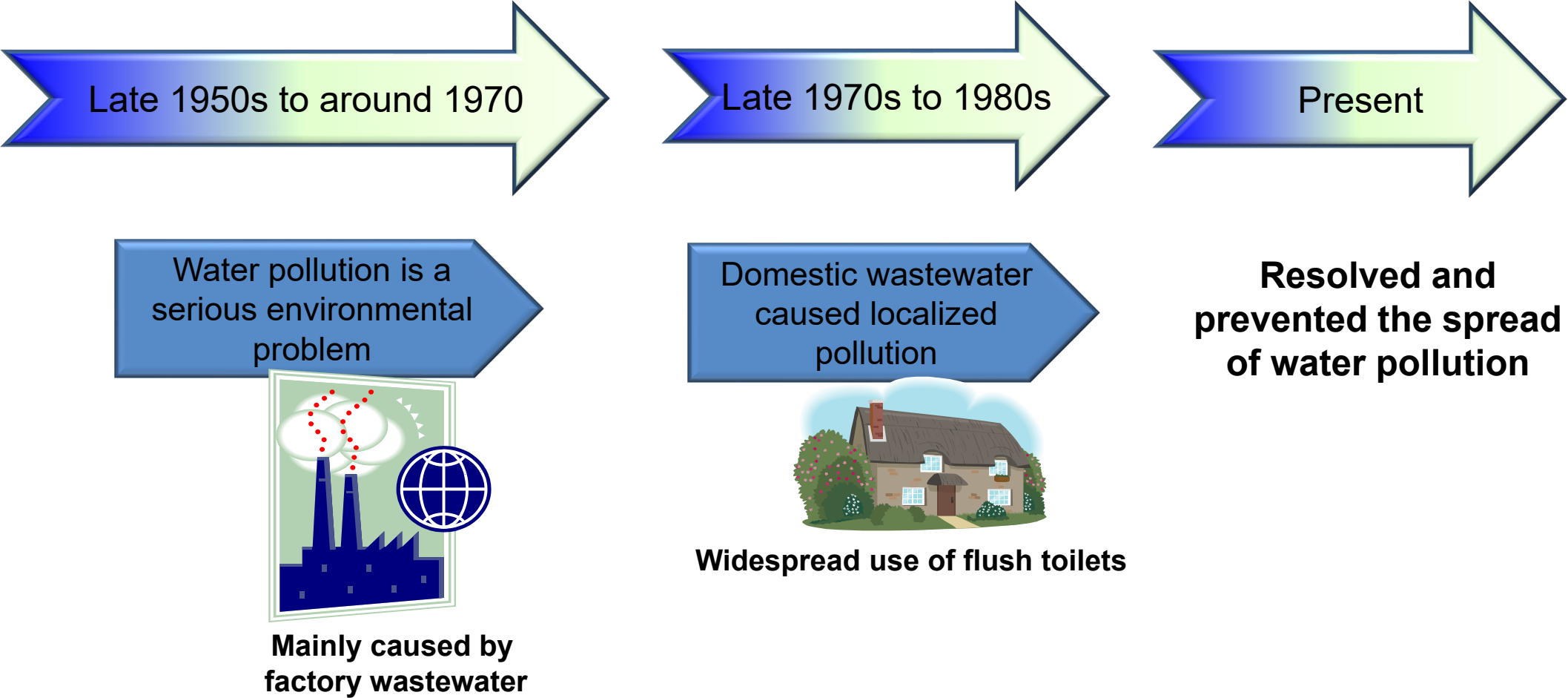


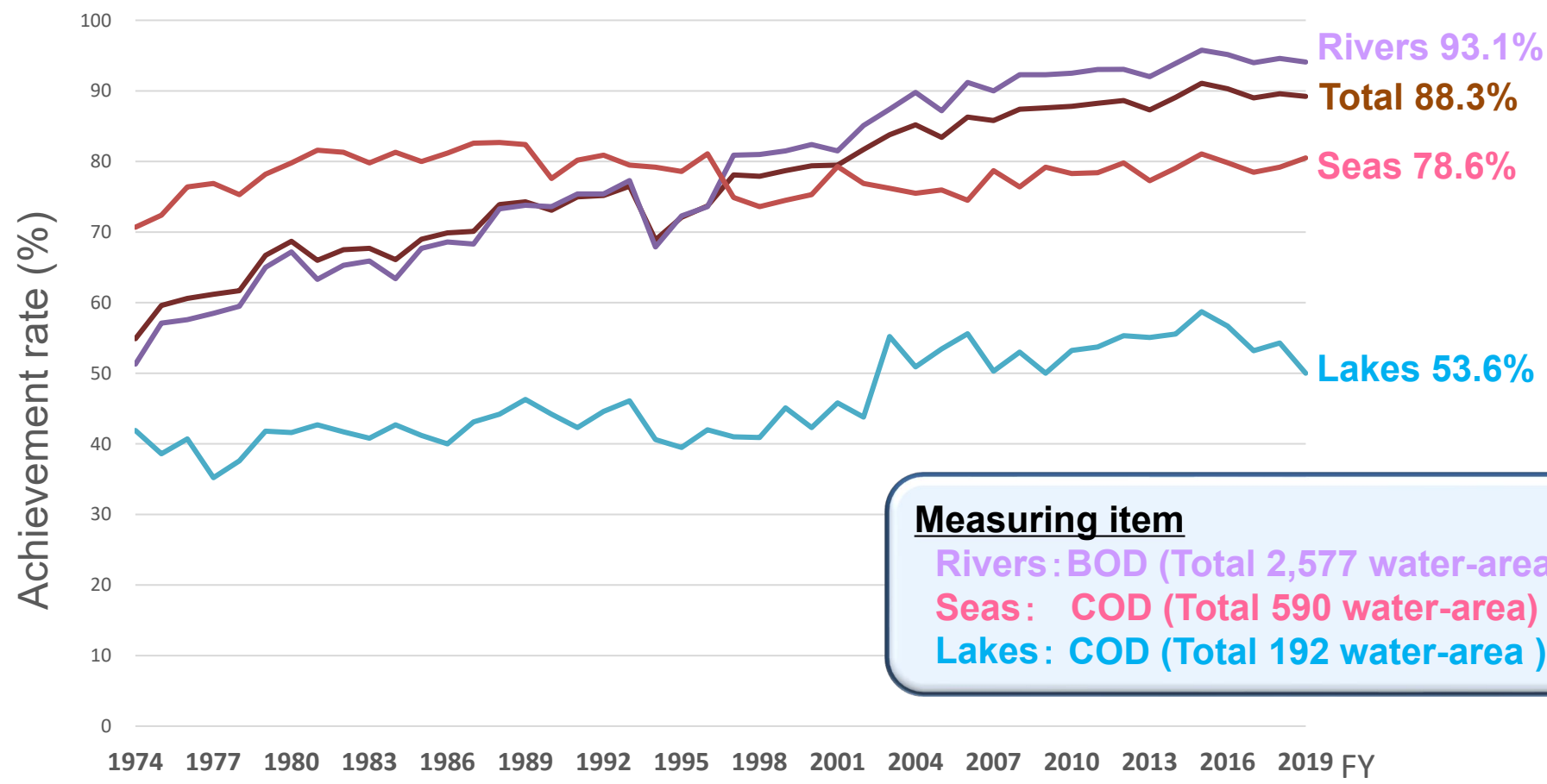
Figure 3 Trends of waterborne disease rates in Japan⁽³⁾

(3) Yuzo Inoue, History and technology of night soil treatment in Japan, J. of Monthly Johkasou

Domestic wastewater treatment issues in Japan



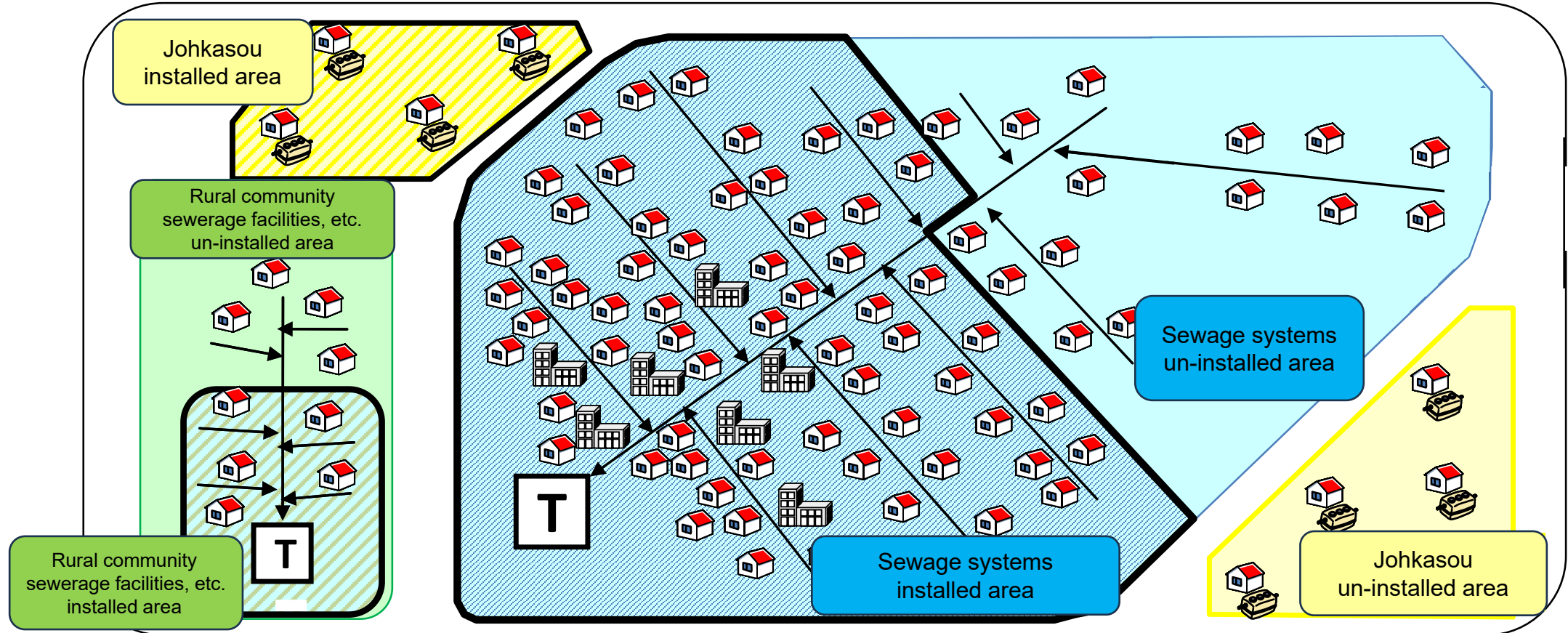
Achievement of water quality related to Effluent Standards



Public waters water quality measurement results (2021)

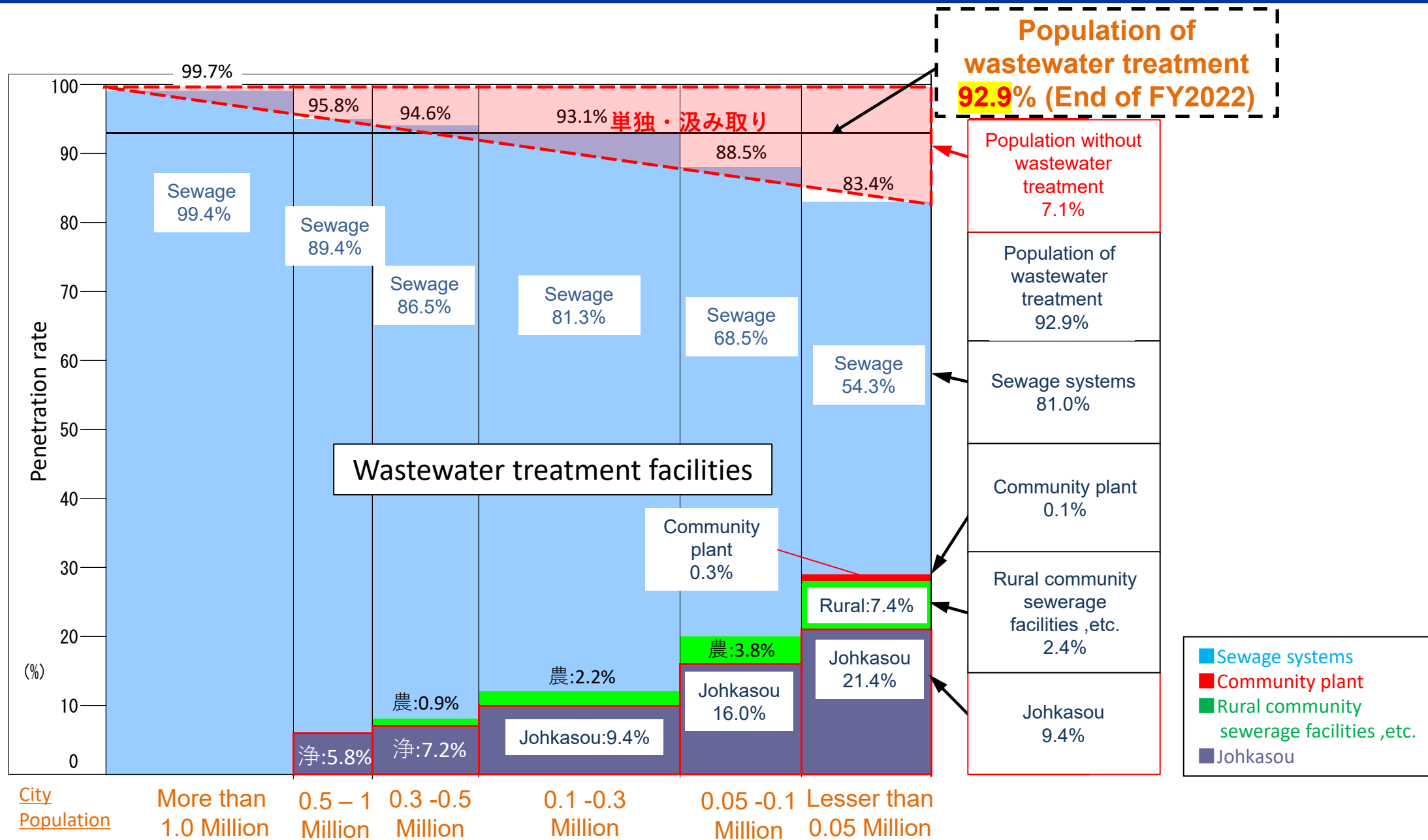
Ministry of the Environment, Government of Japan

Domestic wastewater treatment systems in Japan



- **Sewage Systems** : managed by the Ministry of Land, Infrastructure, Transport and Tourism
- **Rural community sewerage facilities, etc.:** managed by the Ministry of Agriculture, Forestry and Fisheries
- **Johkasou**: managed by the Ministry of the Environment

Trend of Johkasou's spread status by city size

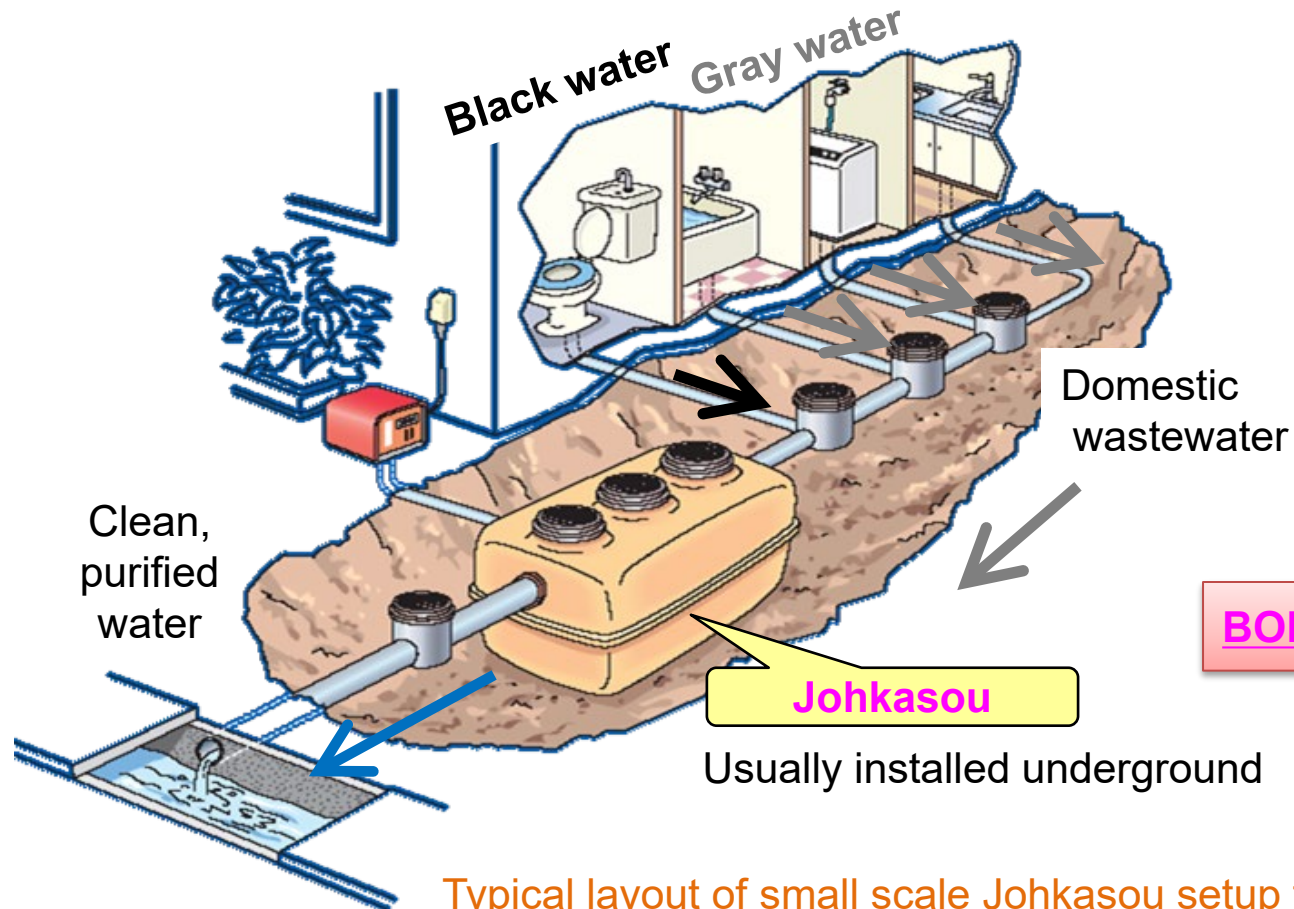


Current situation of population served for treating domestic wastewater by different wastewater treatment facilities

Type of treatment facility		Population served (x1,000 people)	
		End of FY2022	End of FY2021
<u>Sewage systems</u>		<u>101,280 (81.0%)</u>	<u>101,181 (80.6%)</u>
<u>Rural community sewerage facilities</u> including Facilities for fishing villages, Facilities for forestry villages, Simple wastewater facilities		<u>3,018 (2.4%)</u>	<u>3,103 (2.4%)</u>
<u>Johkasou</u>		<u>11,784 (9.4%)</u>	<u>11,758 (9.4%)</u>
	Municipal Johkasou Installation Program	825	831
	Johkasou Installation and Maintenance Program	6,229	6,203
	Other Johkasou	4,730	4,725
<u>Community plants, etc.</u>		<u>160 (0.1%)</u>	<u>171 (0.1%)</u>
Total population served		116,242	116,213
<u>Percentage of population served</u>		<u>92.9%</u>	<u>92.6%</u>
Total population		125,065	125,540
Total population not served		8,823	9,327
<u>Un-installed rate</u>		<u>7.1%</u>	<u>7.4%</u>

General Information of Johkasou

- “Johkasou” is categorized as decentralized wastewater treatment system for domestic wastewater discharged by household, building and so-on.“
- Johkasou have a combined purification structure capable of treating both night soil (black water) and miscellaneous wastewater (gray water)
- Johkasou attains high and stable performance as same as that of sewage treatment plant and it has been installed totally more than 3.9 million units in Japan.



Industrial wastewater, Domestic wastewater

Sewage treatment, Decentralized treatment

Septic tank, wetland, DEWATS, etc., Johkasou

BOD removal, Nitrogen and/or Phosphorous removal

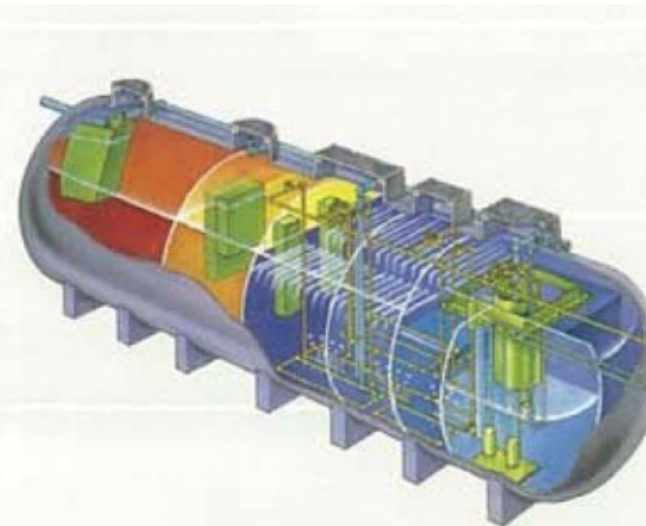
Typical layout of small scale Johkasou setup for household

**Small and middle size
(5 ~ 51 P.E.)**



Box shape

**Large size
(51 P.E.~)**



Cylindrical shape

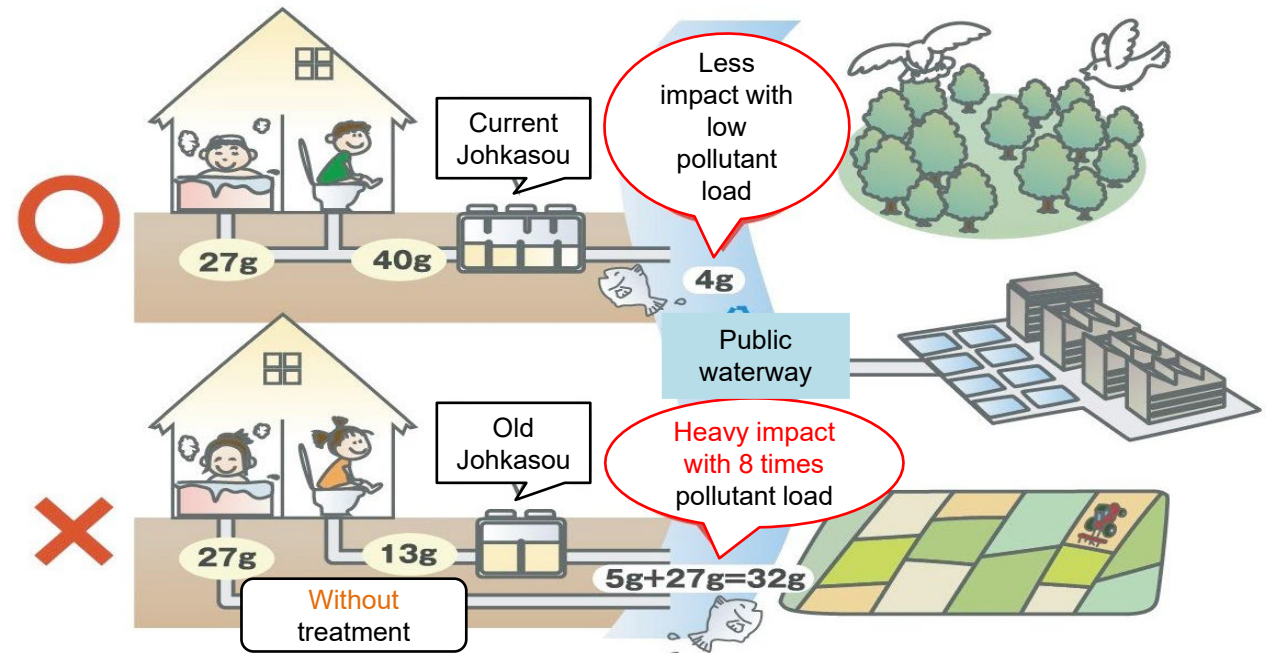
- The performance criteria of Johkasou's performance evaluation system
 - BOD \leq Standard type 20mg/L, Option 15, 10, 5mg/L
 - T-N (Total Nitrogen) \leq Standard type (NIL), Option 20, 15, 10, 5mg/L
 - T-P (Total Phosphorous) \leq Standard type (NIL), Option 2, 1, 0.5, 0.1mg/L

Old and current type of Johkasou

■ Domestic wastewater = Black water (Night soil) + Gray water(kitchen drainage, bath drainage etc.)

○ Current Johkasou in Japan

Both Black water & Gray water are treated.



✗ Old type Johkasou in Japan

Only Black water is treated and have low treating ability

⇒ Heavy impact with 8 times pollutant load



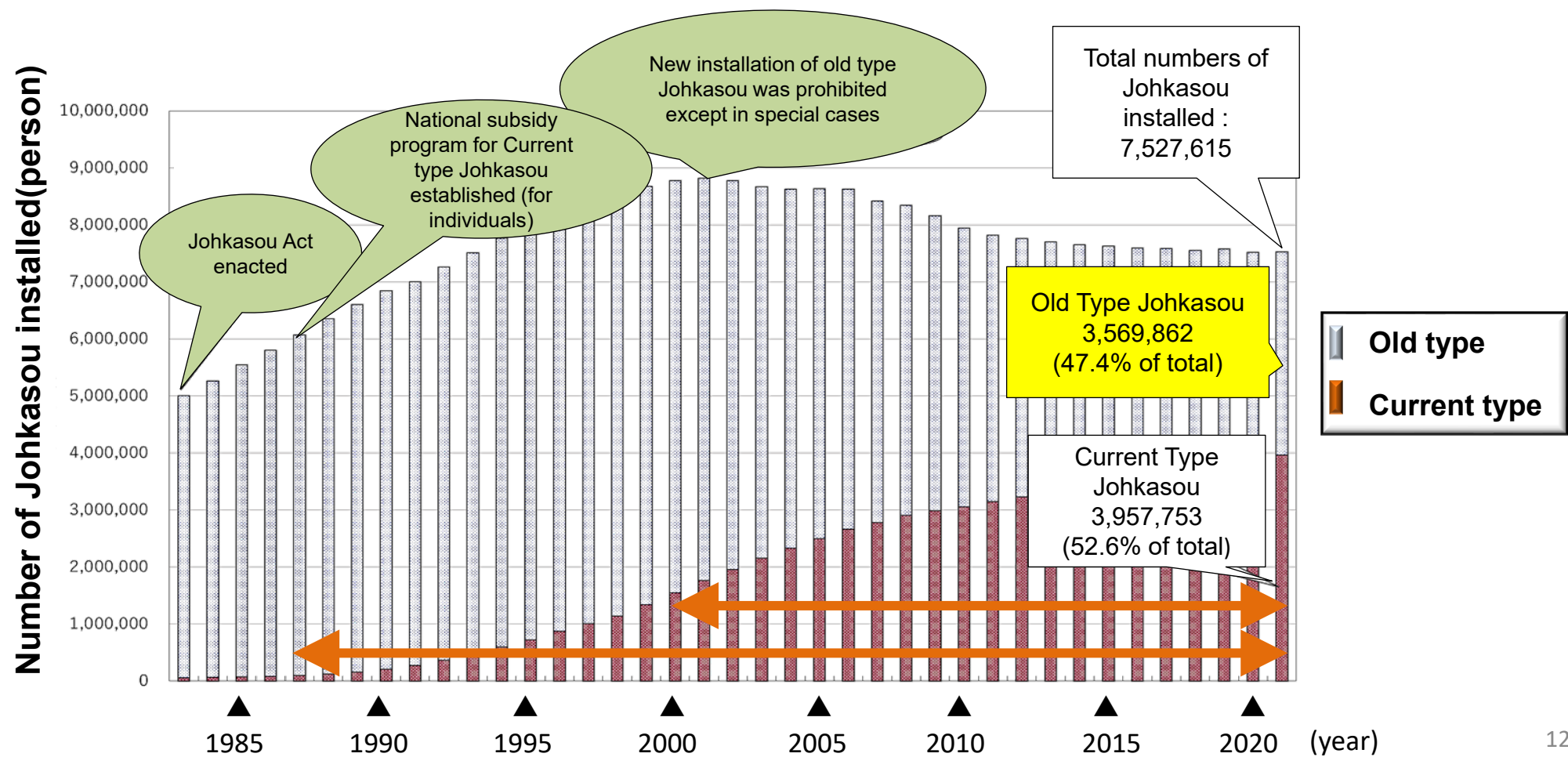
In Japan, old type Johkasou is not considered as wastewater treatment facility, and this is counted as untreated wastewater.



Discharge of untreated wastewater

Configuration of old and current type Johkasou

- Though new installation of old type Johkasou was prohibited in 2001, still approx. 3.6 million sets of old type Johkasou are used in Japan.
- The conversion to the current type of Johkasou is still a big issue in Japan.



Comparison of Sewage, Johkasou and Septic tank

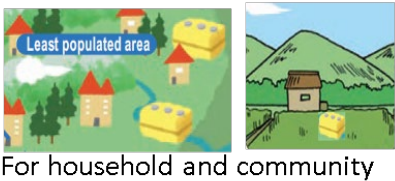
	Sewage (STP) *	Johkasou	Septic tank
Category	Centralized	Decentralized	
Capacity(m3/day)	Large	Small to middle	Small
Application	City covering with pipeline network	For household, building, housing complex, community, hospital, school, public toilet, etc.	
Target	Black water & Gray water		Black water
Method	Aerobic (plus Anaerobic)		Anaerobic only
Treated water quality	- Good - BOD <20mg/L - Nitrogen & Phosphorous can be removed		- Poor - BOD \cong 100mg/L - Nitrogen and Phosphorous can't be removed
Discharge	Clean discharge is discarded directly to the river, lake, sea and so-on.		- Dirty discharge is penetrated into ground - Gray water is discharged without treatment
Main body	Civil structure constructed at site	FRP manufactured in factory	Civil structure constructed at site
Maintenance works	Checking and adjustment, desludging, inspection, changing spare parts		Desludging only (every 3 to 5 years)
Total period for operation start	Long for planning, financing, construction	Short	

*STP:
Sewage treatment plant

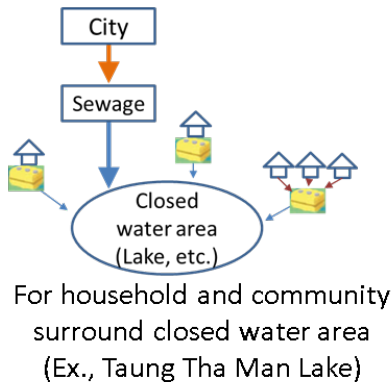
Johkasou can be recognized as a “prefabricated small scale sewage treatment plant” in wastewater management

■ Application of Johkasou for domestic wastewater management

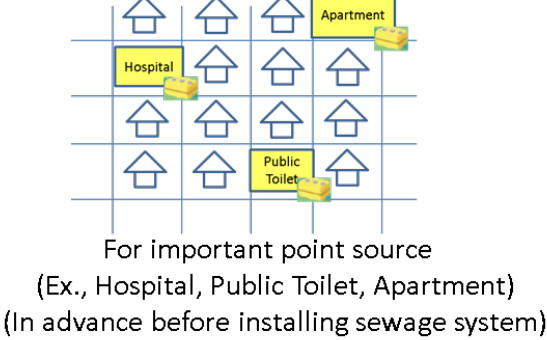
a) Rural, agricultural area, Geographical isolated area



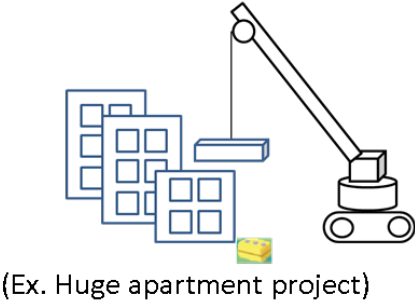
b) Closed water area



c) City



d) Rapid development area



e) Emergency hygiene improvement area (if any)

(Ex. Poverty houses where frequent water-born diseases are infected)

f) Monumental Area

(Ex. For natural reserve, world heritage, etc.)

■ Example of Johkasou installation overseas



Restaurant
(China: 10m³/d)



Toilet in factory
(Vietnam: 5m³/d)



Canteen & toilet
(Myanmar: 30m³/d)

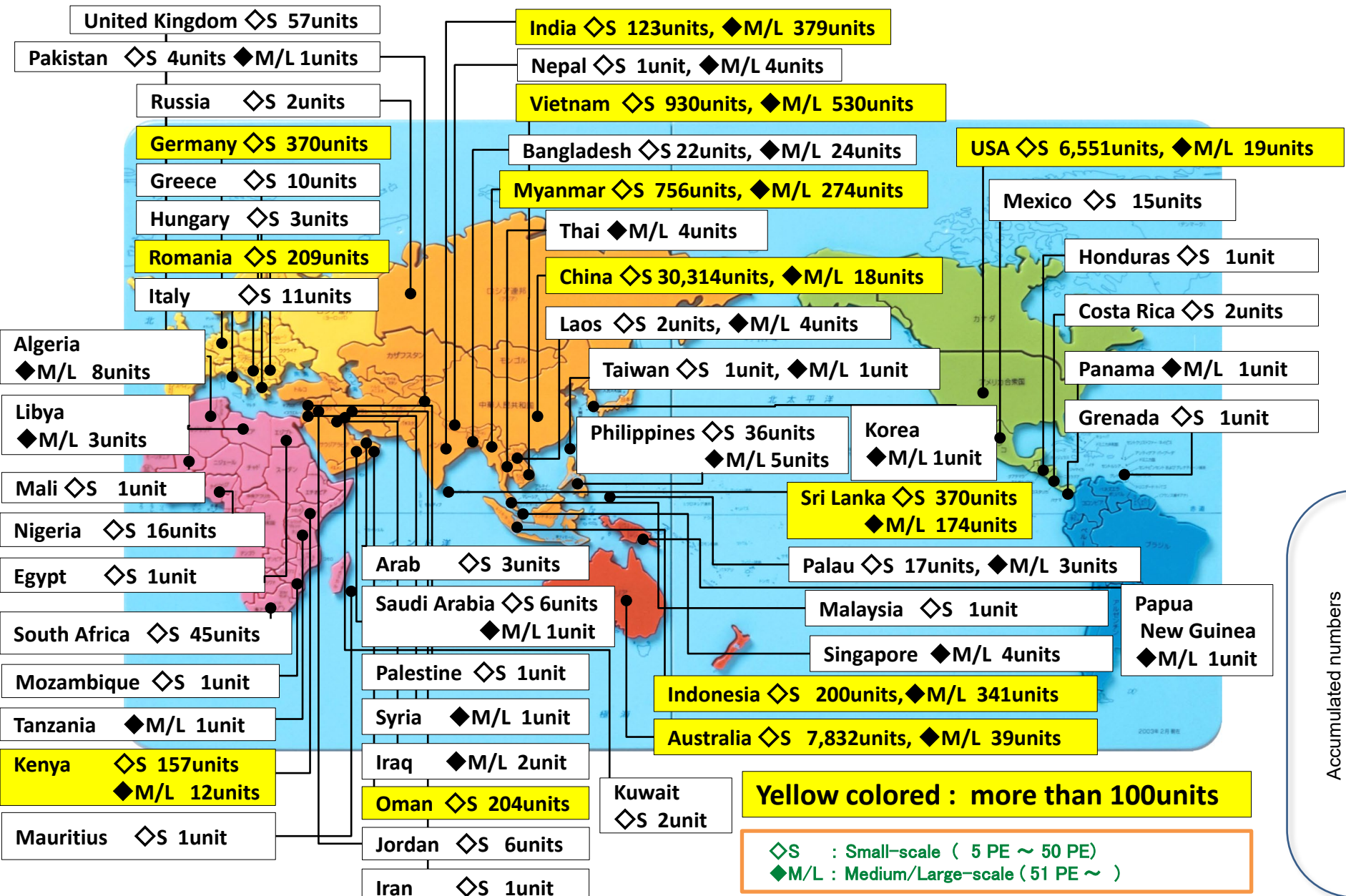


Employee dormitory
(Saudi Arabia: 530m³/d)

At the end of 2022, totally over 50,000 units of Johkasou are installed overseas

Installation records of Japanese Johkasou Overseas

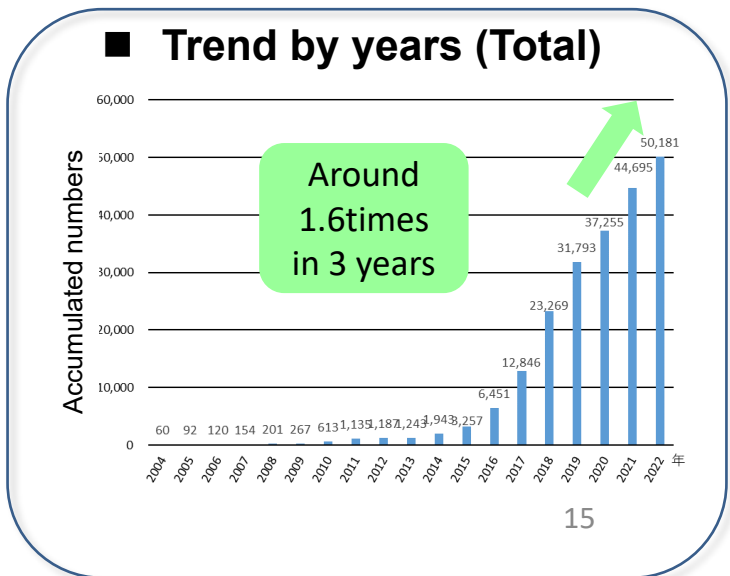
As of the end of December 2022 (Total) by Johkasou System Association



● 2022 recent (Total)

Small size 48,325units
M/L size 1,856units
Total 50,181units

Total 51 countries



Thank you for your kind attention



Check Japan's Johkasou System on Youtube 

<https://www.youtube.com/watch?v=r4xOKGbYWes>

