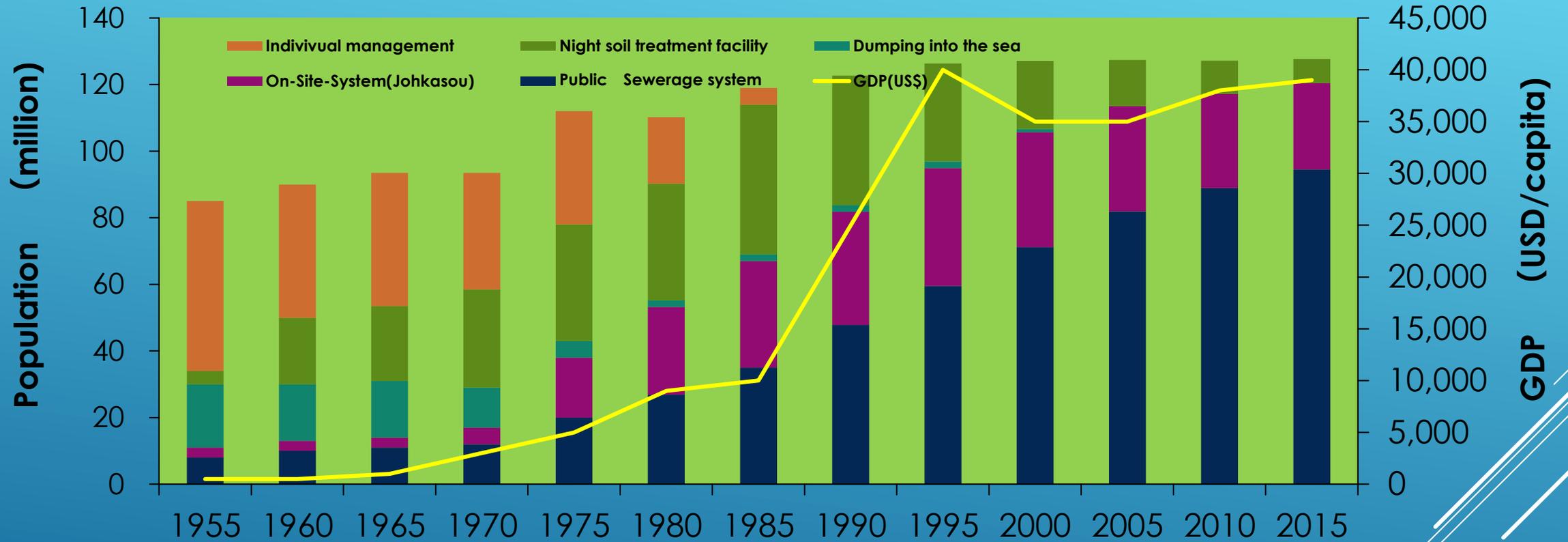


JOHKASOU SYSTEM AND ITS APPLICATION IN DEVELOPING COUNTRIES

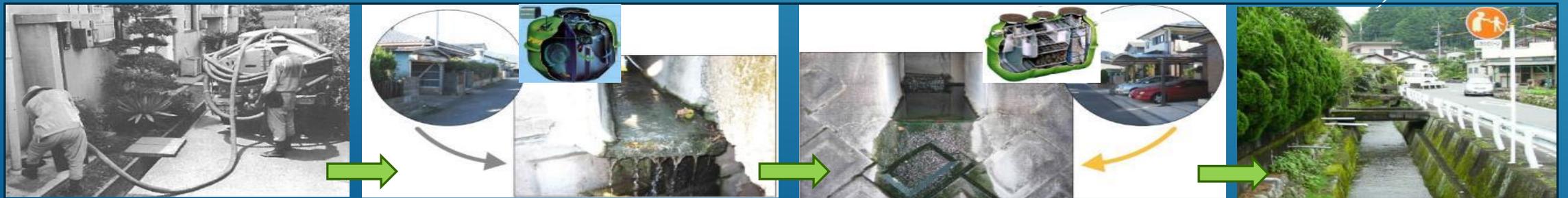
Shinhi Kumokawa Ph. D

Japan Education Center of Environmental Sanitation (JECES)

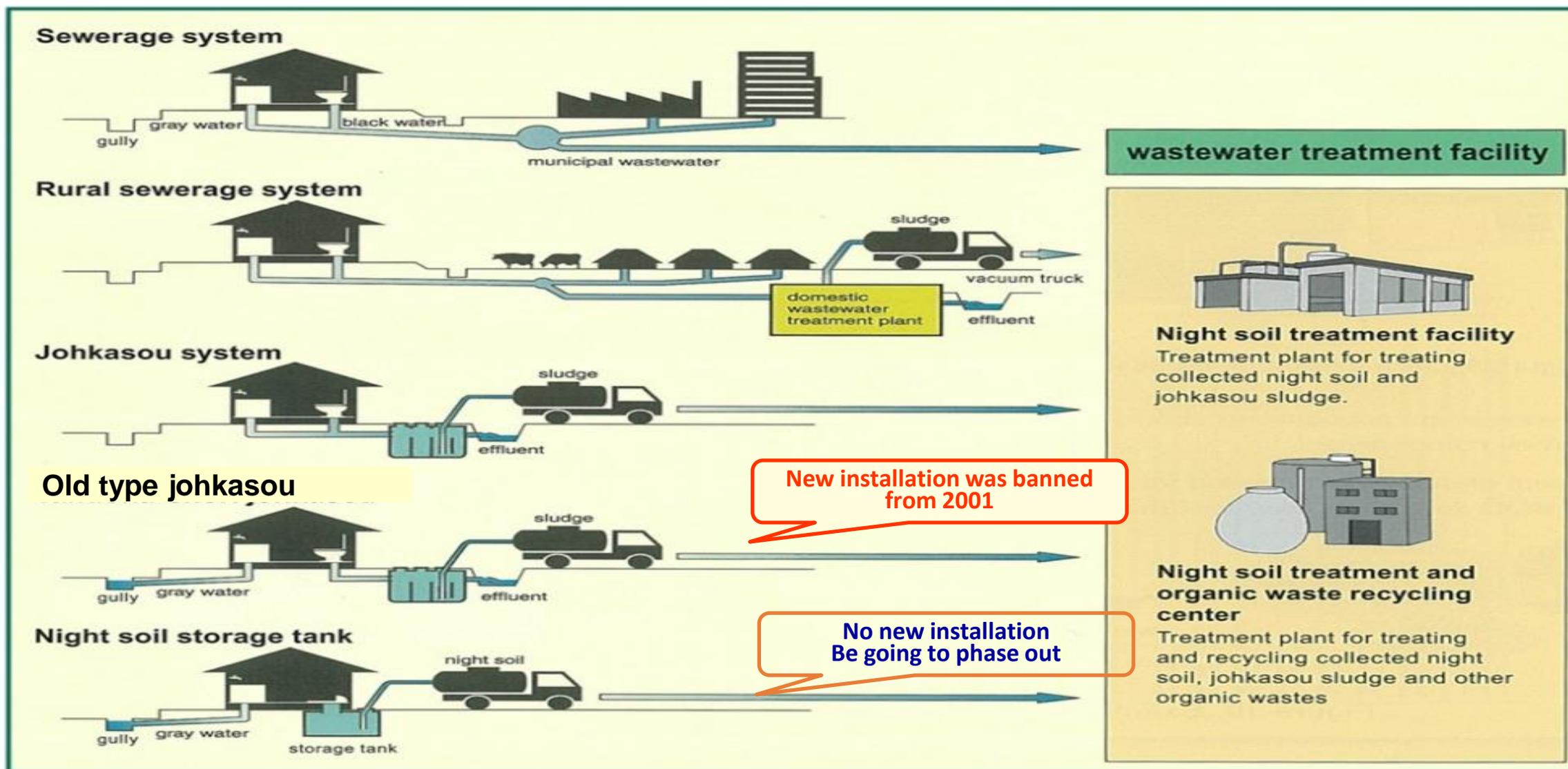
TRENDS FOR NIGHT SOIL TREATMENT AND DOMESTIC WASTEWATER TREATMENT IN JAPAN



Source: Ministry of the Environment

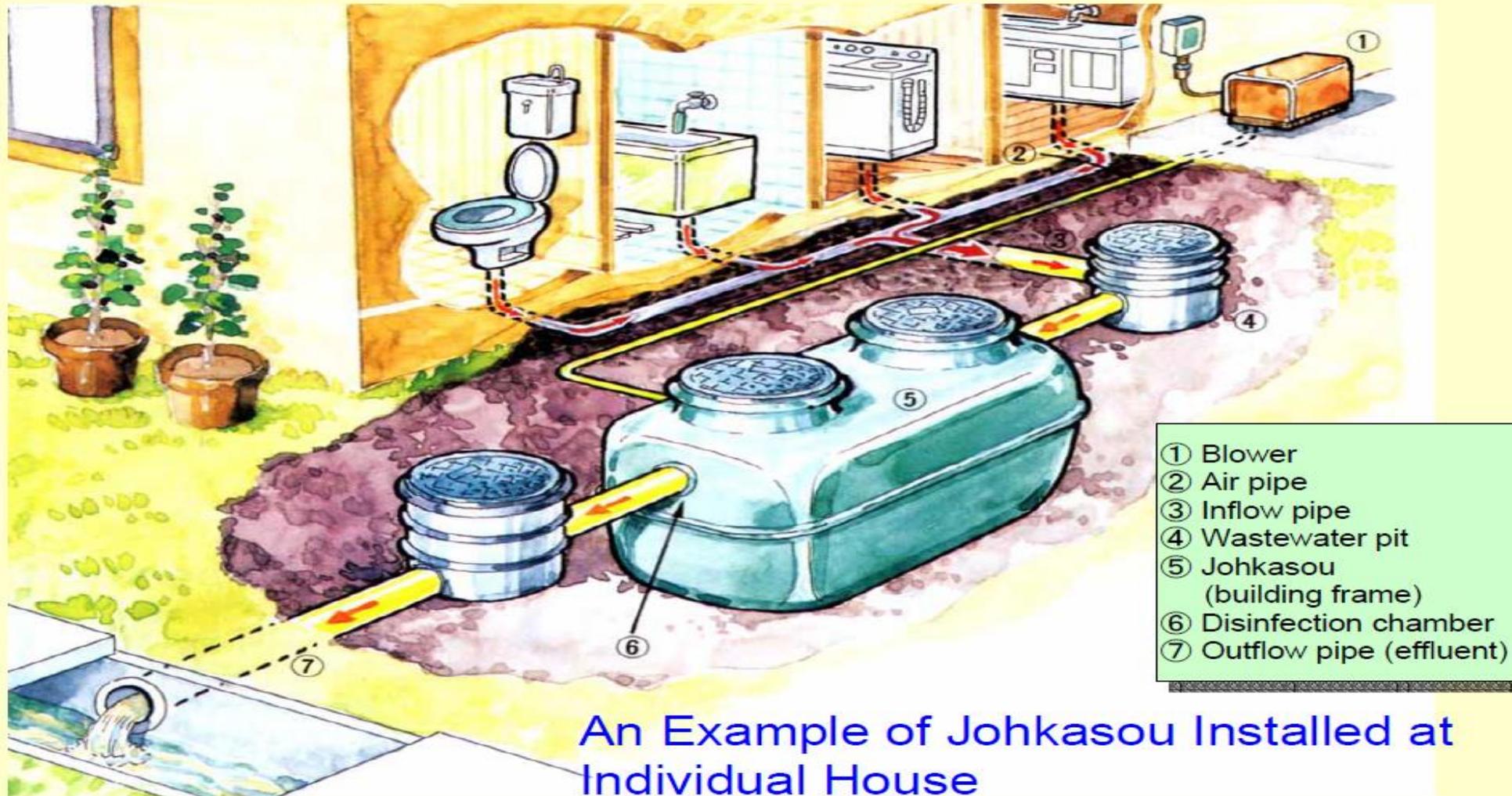


MAJOR DOMESTIC WASTEWATER TREATMENT SYSTEMS IN JAPAN



Source: Ministry of the Environment

WHAT IS JOHKASOU ?



An Example of Johkasou Installed at Individual House

STRUCTURAL STANDARDS FOR JOHKASOU

Class	Type of treatment	Treatment process	Number of users for design							BOD removal rate	Treatment performance			
			5	50	100	200	500	2000	5000		Effluent quality (mg/l)			
											BOD	COD	T-N	T-P
1	Combined domestic wastewater treatment	Separation-contact aeration process	[Bar chart: 5-5000]							90% or more	20 or less	—	—	—
		Anaerobic filter-contact aeration process	[Bar chart: 5-5000]											
		Denitrification type anaerobic filter-contact aeration process	[Bar chart: 5-5000]											
4	Flush toilet wastewater treatment	Septic tank process	[Bar chart: 5-5000]							55% or more	120 or less	—	—	—
5		Land infiltration process	[Bar chart: 5-5000]							SS: 55% or more	SS: 250 or less	—	—	—
6	Combined domestic wastewater treatment	Rotating biological contactor process	[Bar chart: 5-5000]							90% or more	20 or less	30 or less	—	—
		Contact aeration process	[Bar chart: 5-5000]											
		Trickling filter process	[Bar chart: 5-5000]											
		Extended aeration process	[Bar chart: 5-5000]											
		Conventional activated sludge process	[Bar chart: 5-5000]											
7	Combined domestic wastewater treatment	Contact aeration and trickling filter process	[Bar chart: 5-5000]							—	10 or less	15 or less	—	—
		Coagulation separation process	[Bar chart: 5-5000]							—	10 or less	10 or less	—	—
8	Combined domestic wastewater treatment	Contact aeration and activated carbon absorption process	[Bar chart: 5-5000]							—	10 or less	10 or less	—	—
		Coagulation separation and activated carbon absorption process	[Bar chart: 5-5000]							—	10 or less	10 or less	—	—
9	Combined domestic wastewater treatment	Nitrified water recirculation type activated sludge process	[Bar chart: 5-5000]							—	10 or less	15 or less	20 or less	1 or less
		Tertiary treatment type denitrification dephosphorization process	[Bar chart: 5-5000]							—	10 or less	15 or less	20 or less	1 or less
10	Combined domestic wastewater treatment	Nitrified water recirculation type activated sludge process	[Bar chart: 5-5000]							—	10 or less	15 or less	15 or less	1 or less
		Tertiary treatment type denitrification dephosphorization process	[Bar chart: 5-5000]							—	10 or less	15 or less	15 or less	1 or less
11	Combined domestic wastewater treatment	Nitrified water recirculation type activated sludge process	[Bar chart: 5-5000]							—	10 or less	15 or less	10 or less	—
		Tertiary treatment type denitrification dephosphorization process	[Bar chart: 5-5000]							—	10 or less	15 or less	10 or less	—
12	Emission standard under the Water Pollution Control Law	Class: 6-11 6-11 6-11 7-11 8	COD (mg/l): 60 45 30 15 10	SS (mg/l): 70 60 50 15 15	n-Hex (mg/l): 20 20 20 20 20	pH: 5.8-8.6 5.8-8.6 5.8-8.6 5.8-8.6 5.8-8.6	Total coliforms (N/ml): 3,000 or less 3,000 or less 3,000 or less 3,000 or less 3,000 or less							

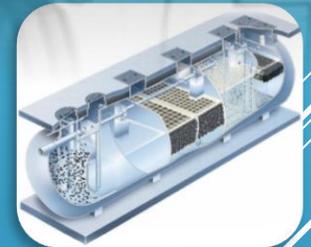
note: Class 2 and Class 3 were deleted in 2006.



the performance evaluation test conducted by a designated third-party



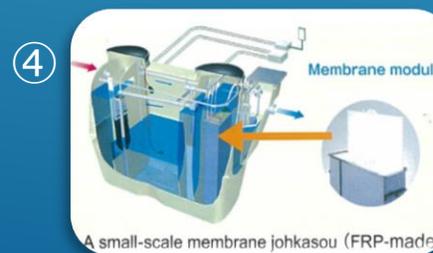
Small-scale johkasou (~10 m3/day)



Middle-scale johkasou (10~100 m3/day)



Large-scale johkasou (RC-made)

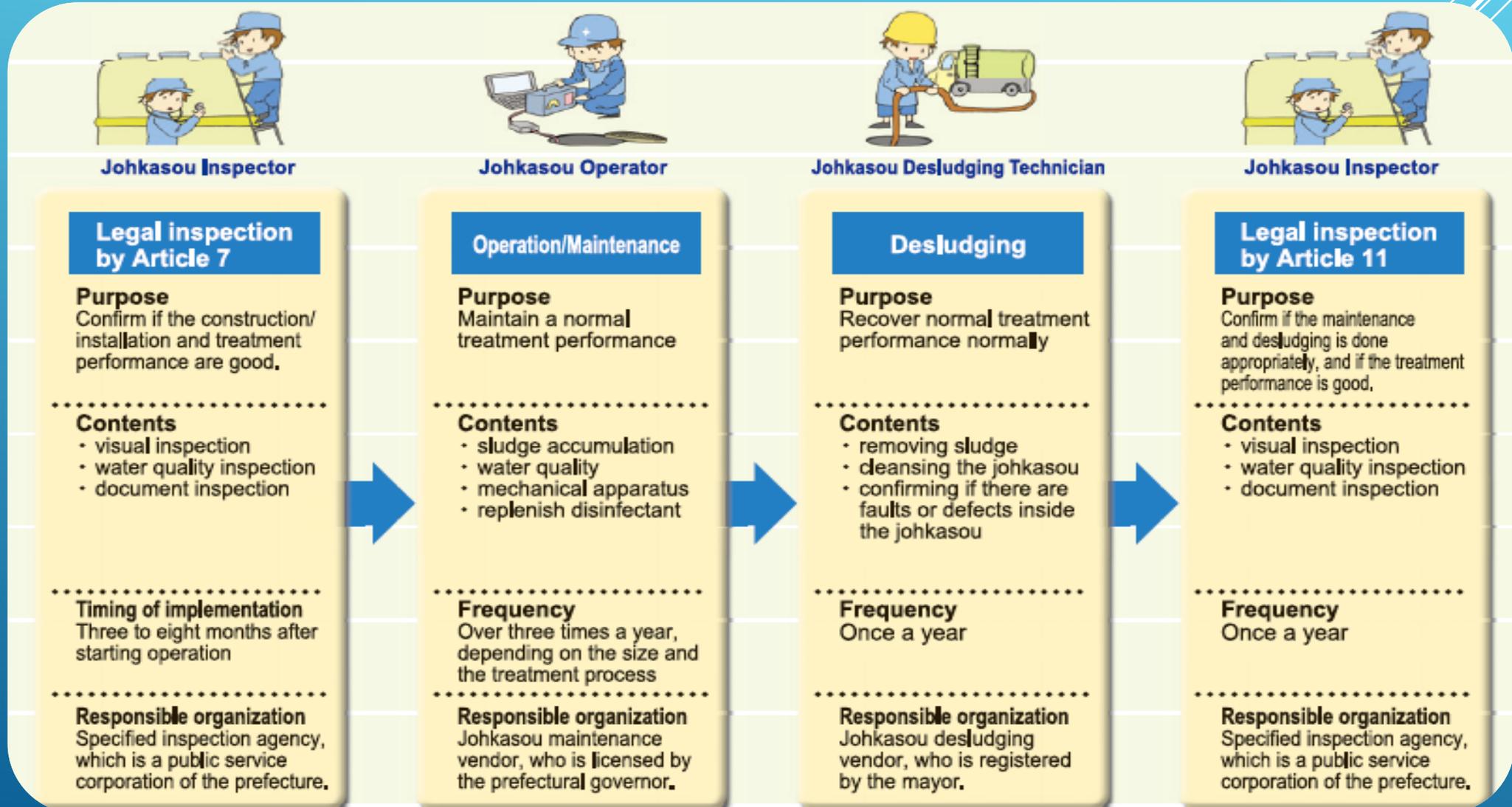


- ① BOD remove-type
- ② BOD/N remove-type
- ③ BOD/N/P remove-type
- ④ Membrane johkasou

Large-scale johkasou (100 m3/day ~)

LEGAL SYSTEM AND POLICY FOR JOHKASOU PROMOTION

- Operation and Maintenance, desludging and legal inspection

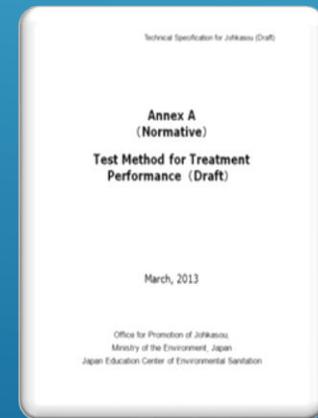
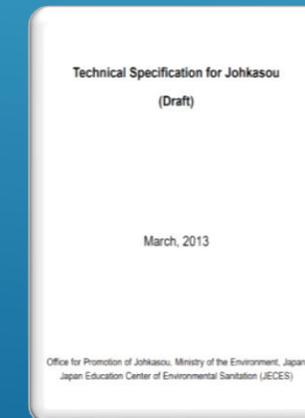
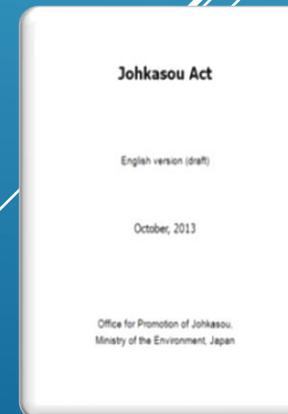
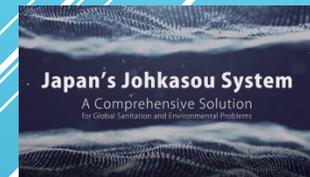
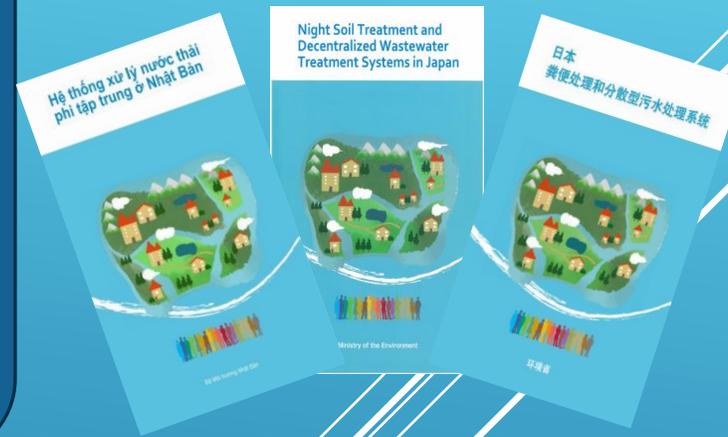


OVERSEAS JOHKASOU BUSINESS PROMOTION

Projects of the Ministry of the Environment on overseas johkasou system promotion

Activities and achievement

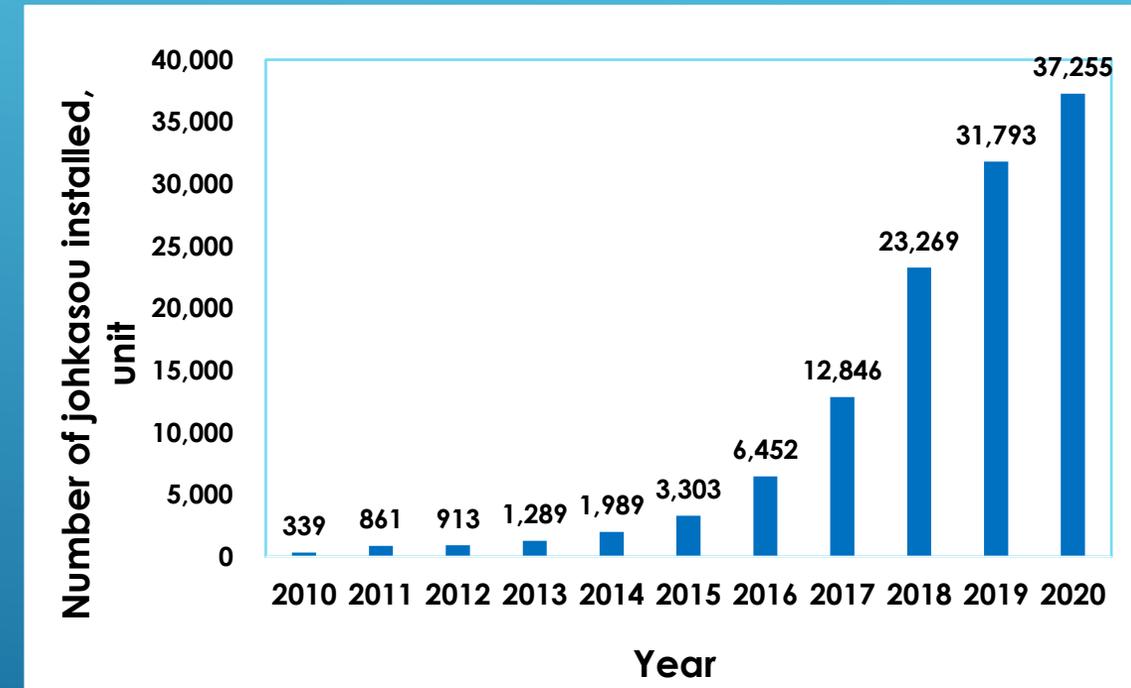
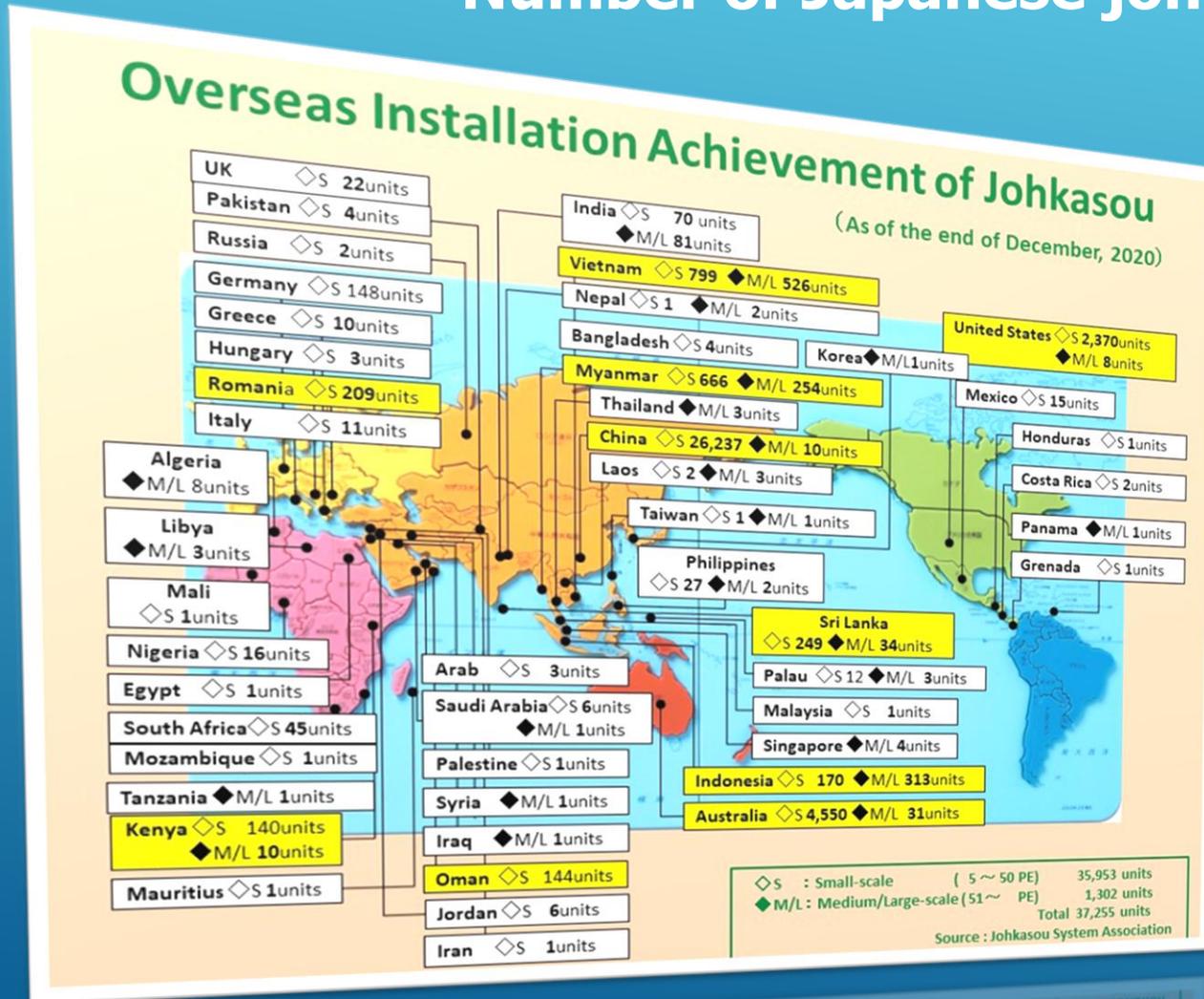
- overseas survey on decentralized domestic wastewater treatment
- creation/translation of documents on johkasou law and standards
- creation of public awareness materials for johkasou introduction
- Hosting Int. Workshop on decentralized domestic wastewater treatment in Asia, and technical seminar on johkasou system



7th Workshop on decentralized domestic wastewater treatment in Asia, Hanoi, 2019

OVERSEAS JOHKASOU BUSINESS PROMOTION

Number of Japanese johkasou installed overseas



Trend of Japanese johkasou newly installed overseas

OVERSEAS JOHKASOU BUSINESS PROMOTION

Japanese johkasou project/business in Asia



China



Johkasou project



Johkasou business



Johkasou factory

OVERSEAS JOHKASOU BUSINESS OF PRIVATE SECTOR



Sebu, the Phillipins



Bali, Indonesia



Nha Trang, Vietnam

OVERSEAS JOHKASOU BUSINESS OF PRIVATE SECTOR



India: 15 m³/day



Indonesia: 200 m³/day



Algeria: 500 m³/day



Malaysia: 500 m³/day



Philippine: 500 m³/day



Kenya: 70 m³/day

OVERSEAS JOHKASOU BUSINESS OF PRIVATE SECTOR



Johkasou for restaurant in China
Capacity: 10 m³/day



Johkasou for hospital in Vietnam
Capacity: 250 m³/day



Johkasou for staff quarters of an oil plant facility in Saudi Arabia
Capacity: 530 m³/day



Johkasou for a factory in Myanmar
Capacity: 30 m³/day

KEY ISSUES FOR PROMOTING JOHKASOU SYSTEM IN DEVELOPING COUNTRIES

