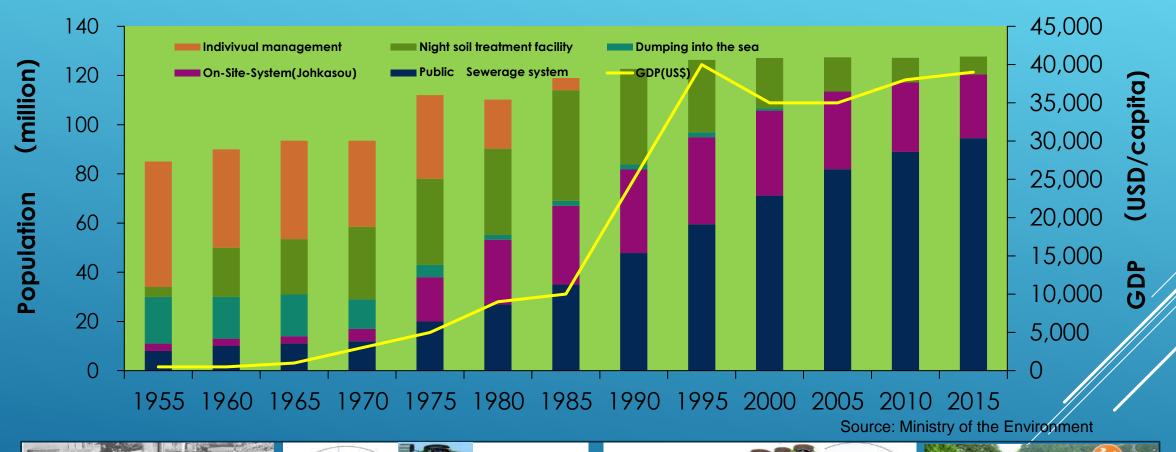
# JOHKASOU SYSTEM AND ITS APPLICATION IN DEVELOPING COUNTRIES

Shinhi Kumokawa Ph. D

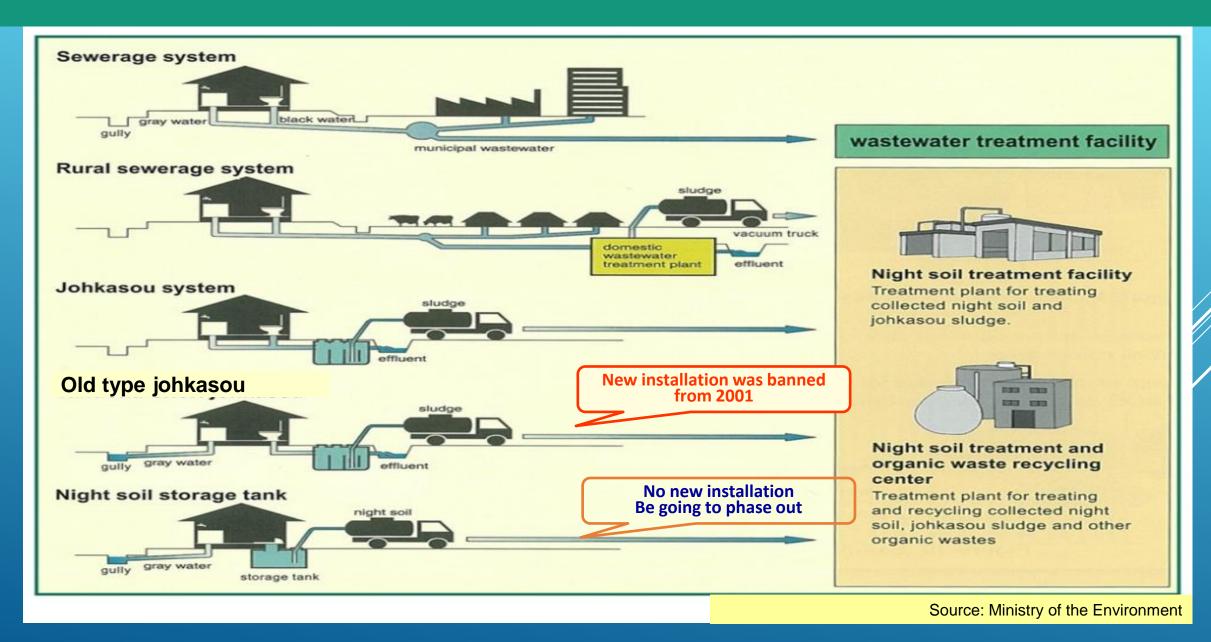
Japan Education Center of Environmental Sanitation (JECES)

## TRENDS FOR NIGHT SOIL TREATMENT AND DOMESTIC WASTEWATER TREATMENT IN JAPAN

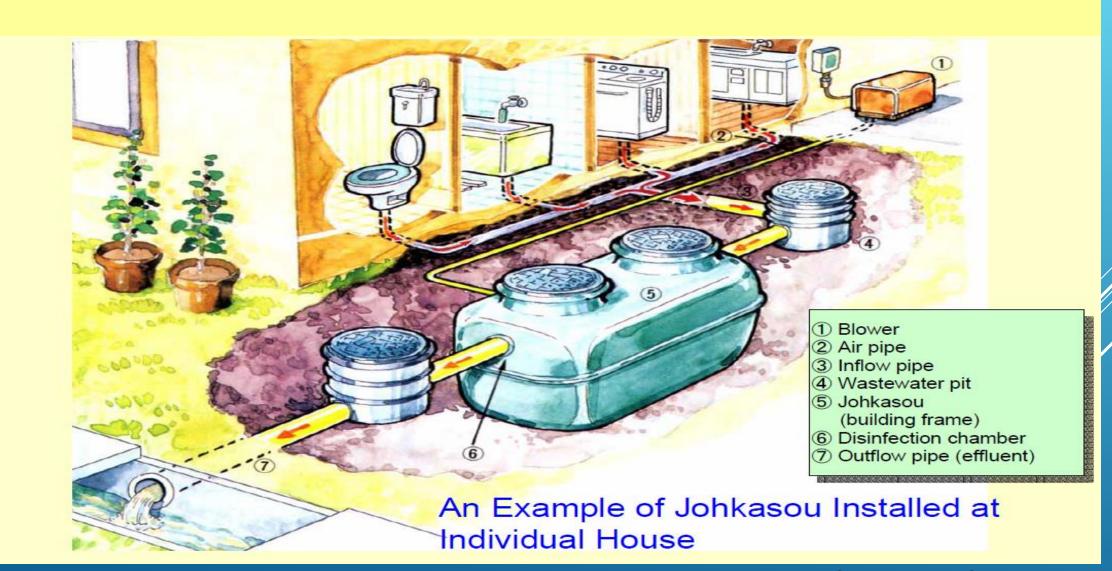




## MAJOR DOMESTIC WASTEWATER TREATMENT SYSTEMS IN JAPAN



## WHAT IS JOHKASOU?



## STRUCTURAL STANDARDS FOR JOHKASOU

			Number of users for design								Treatment performance			
Cla	Type of treatment	Treatment process								BOD removal rate	Effluent quality (mg/£)			
			5	50	100	200	500	2000	5000	removal rate	BOD	COD	T-N	T-P
1	Combined	Separation-contact aeration process		_			į						_	-
	domestic wastewater	Anaerobic filter-contact aeration process		-			-			90% or more	20 or less	-	_	_
	treatment	Denitrification type anaerobic filter-contact aeration process		-									20 or less	_
4	Flush toilet wastewater	Septic tank process		-				i	i	55% or more	120 or <b>l</b> ess	_	_	_
5	treatment	Land infiltration process								SS: 55% or more	SS: 250 or less	_	_	_
6	Combined domestic	Rotating biological contactor process									20 or less	30 or less	_	_
		Contact aeration process												
		Trickling filter process					-			90% or more				
		Extended aeration process			_		-	-						
		Conventional activated sludge process												
7		Contact aeration and trickling filter process			-				-		10 or less	15 or less	_	_
		Coagulation separation process					-			_				
8	wastewater	Contact aeration and activated carbon absorption process					_			_	10 or less	10 or less	_	_
	treatment	Coagulation separation and activated carbon absorption process								_				
9		Nitrified water recirculation type activated sludge process			-		-			-	10 or less	15 or less	20 or less	1 or less
		Tertiary treatment type denitrification dephosphorization process			i					_				
10		Nitrified water recirculation type activated sludge process				-	-			-	10 or less	15 or less	15 or less	1 or less
		Tertiary treatment type denitrification dephosphorization process												
11		Nitrified water recirculation type activated sludge process					-				10 or less	15 or less	10 or less	
		Tertiary treatment type denitrification dephosphorization process												
12 Emission standard under the Water Pollution Control Law		Class: 6 - 11	ex (mg/k	20 20 20 20 20 20	pŀ	1: 5.8~8.6 5.8~8.6 5.8~8.6 5.8~8.6	5	Total col	iforms (N/m	2): 3,000 or less 3,000 or less 3,000 or less 3,000 or less 3,000 or less				



Small-scale johkasou  $(\sim 10 \text{ m}^3/\text{day})$ 



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



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





3





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



Johkasou Inspector



Johkasou Operator



Johkasou Desludging Technician



Johkasou Inspector

## Legal inspection by Article 7

#### Purpose

Confirm if the construction/ installation and treatment performance are good.

#### Contents

- · visual inspection
- · water quality inspection
- document inspection

#### Operation/Maintenance

#### Purpose

Maintain a normal treatment performance

#### Contents

- sludge accumulation
- water quality
- mechanical apparatus
- replenish disinfectant

#### Desludging

#### Purpose

Recover normal treatment performance normally

#### Contents

- · removing sludge
- · cleansing the johkasou
- confirming if there are faults or defects inside the johkasou

## Legal inspection by Article 11

#### Purpose

Confirm if the maintenance and desludging is done appropriately, and if the treatment performance is good.

#### Contents

- · visual inspection
- water quality inspection
- document inspection



#### Timing of implementation

Three to eight months after starting operation

#### Responsible organization

Specified inspection agency, which is a public service corporation of the prefecture.



Over three times a year, depending on the size and the treatment process

#### Responsible organization

Johkasou maintenance vendor, who is licensed by the prefectural governor.

#### Frequency

Once a year

#### Responsible organization

Johkasou desludging vendor, who is registered by the mayor.

#### Frequency

Once a year

#### Responsible organization

Specified inspection agency, which is a public service corporation of the prefecture.

Source: Ministry of the Environment

## **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





Japan's Johkasou System





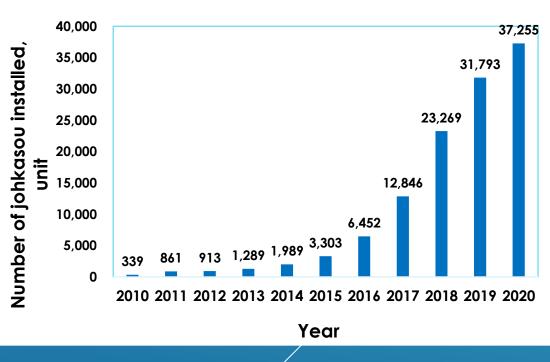


## **OVERSEAS JOHKASOU BUSINESS PROMOTION**

## Number of Japanese johkasou installed oversees



Iran S Junits



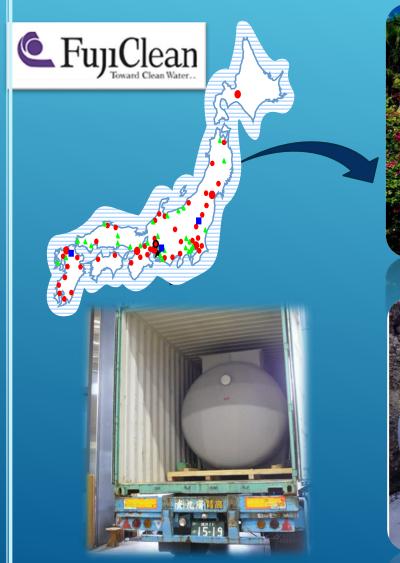
Trend of Japanese johkasou newly installed overseas

## **OVERSEAS JOHKASOU BUSINESS PROMOTION**

## Japanese johkasou project/business in Asia



## **OVERSEAS JOHKASOU BUSINESS OF PRIVATE SECTOR**









## **OVERSEAS JOHKASOU BUSINESS OF PRIVATE SECTOR**



India: 15 m3/day



Malaysia: 500 m3/day

Daiki 🥏



Indonesia: 200 m3/day



Philippine: 500 m3/day



Algeria: 500 m3/day



Kenya: 70 m3/day

Source: Daiki Axis

## OVERSEAS JOHKASOU BUSINESS OF PRIVATE SECTOR



Johkasou for restaurant in China Capacity: 10 m3/day



For Earth, For Life

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

