

2nd Workshop on On-site Domestic  
Waste water Treatment in Asia



# Japanese Standards for On-site Domestic Wastewater Treatment

Dr Yoshitaka EBIE

National Institute for Environmental Studies, JAPAN  
(E-mail: [ebie.yoshitaka@nies.go.jp](mailto:ebie.yoshitaka@nies.go.jp))

## Centralized system



WWTP

87,800 thousand  
people  
(68.9%)

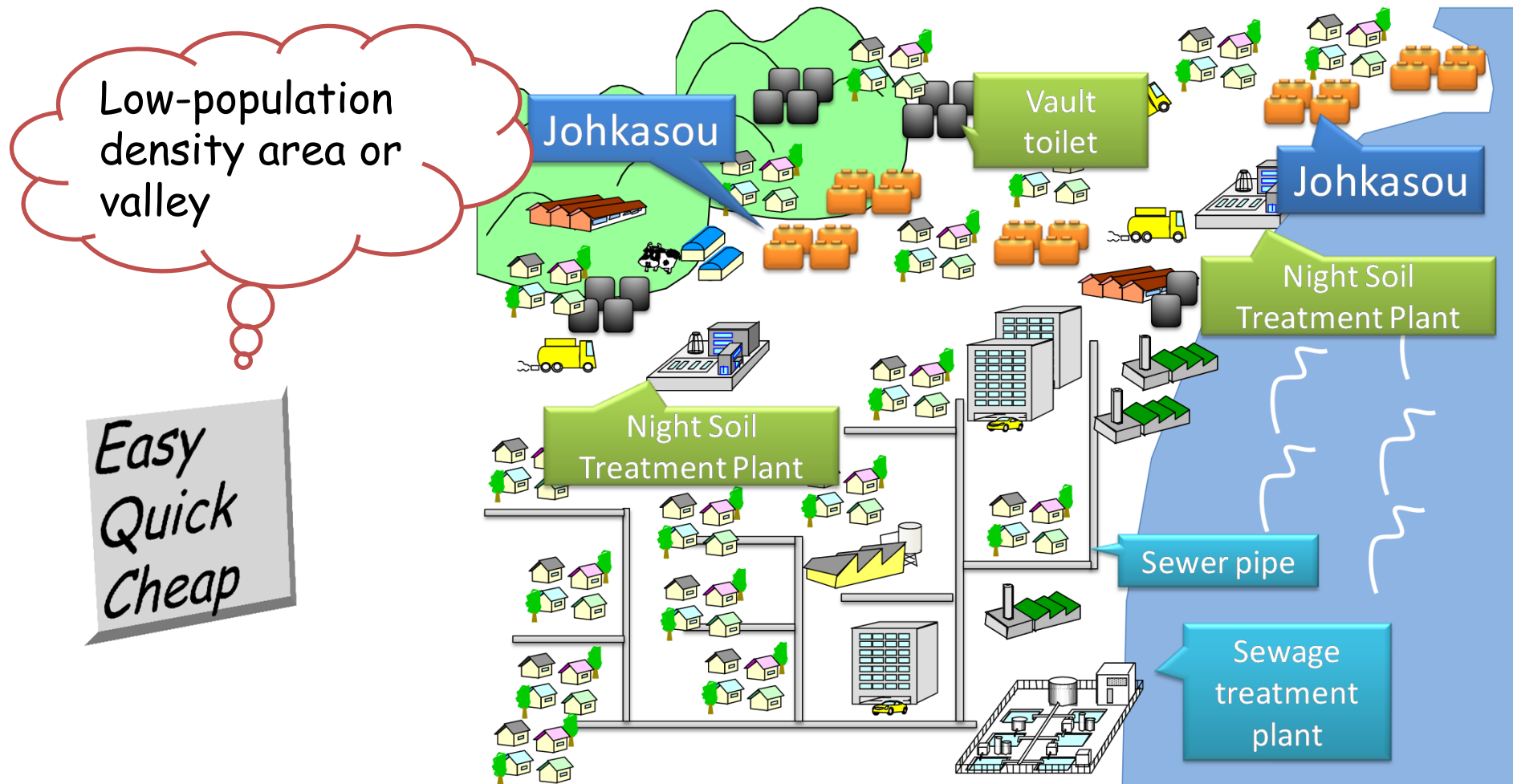
## Decentralized system



Johkasou

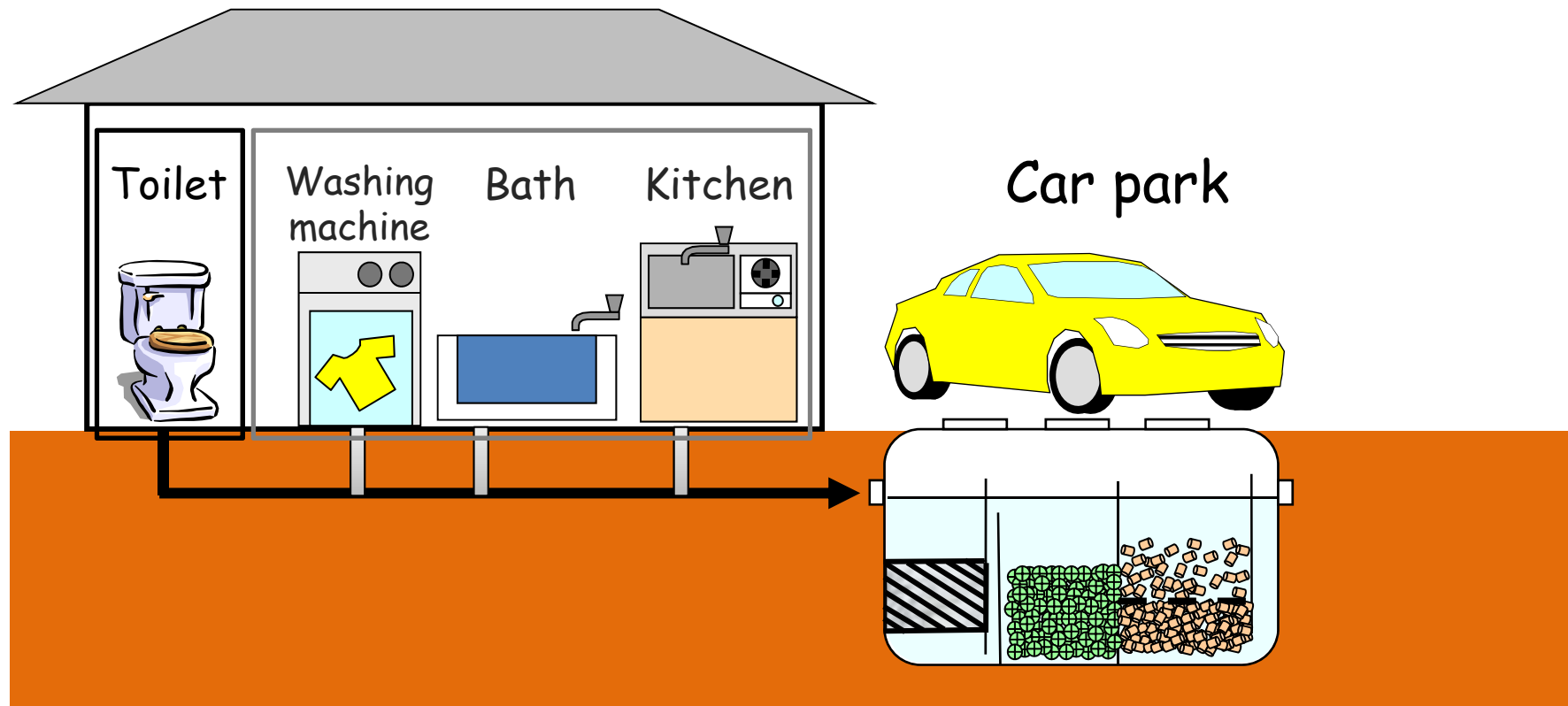
14,100 thousand  
people  
(11.1%)

**Johkasou** has been developed in Japan as a decentralized wastewater treatment facility.



# Johkasou

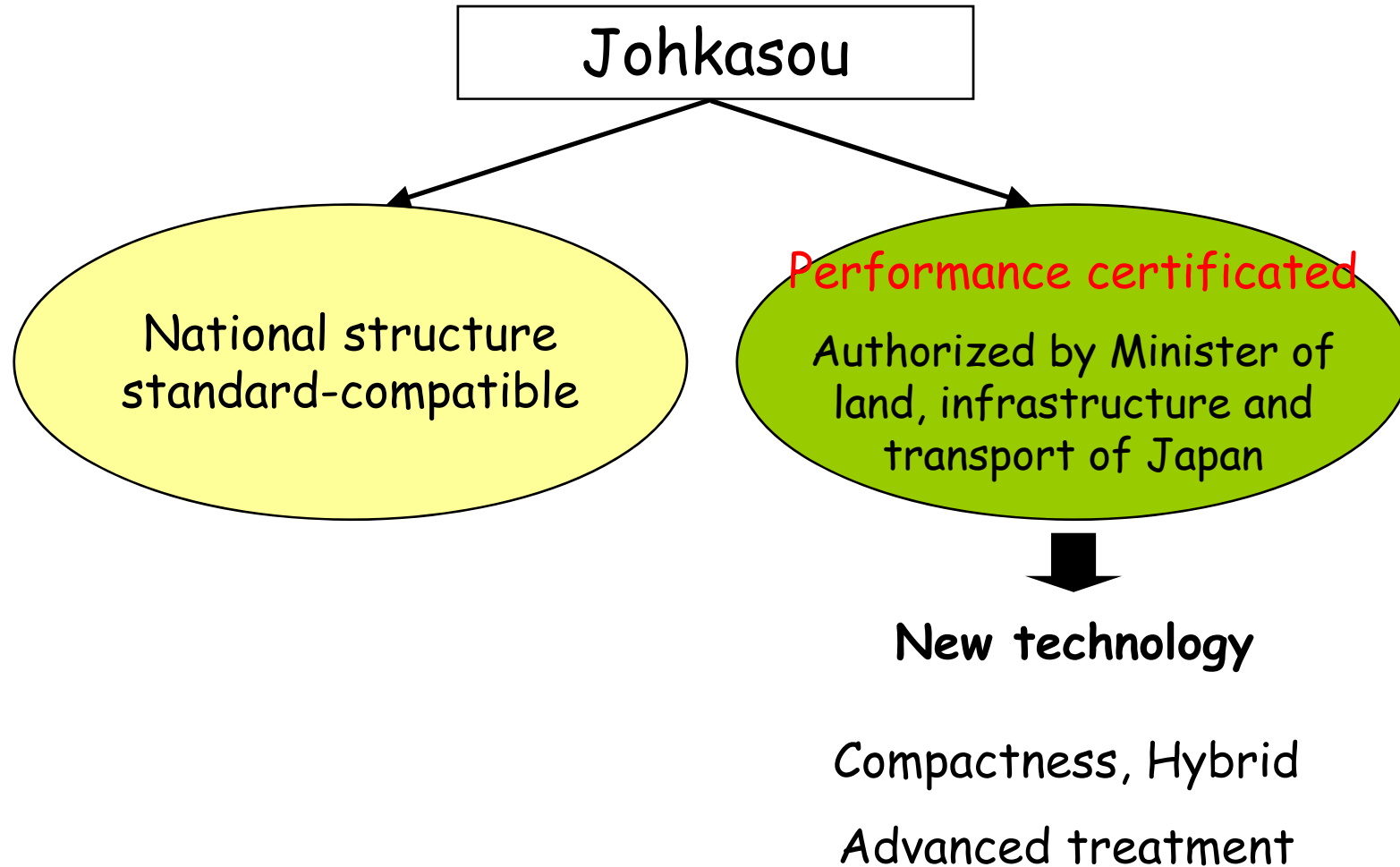
Not only black water  
but also gray water



# National structure standards-compatible Johkasou

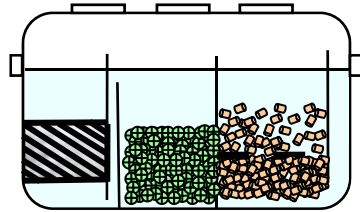
Class	Type of treatment	Treatment process	Number of users for design						
			5	50	100	200	500	2000	5000
1	Combined domestic wastewater treatment	Separation-contact aeration process	5 - 50 PE						
		Anaerobic filter-contact aeration process	5 - 50 PE						
		Denitrification type anaerobic filter-contact aeration process	5 - 50 PE						
4	Flush toilet wastewater treatment	Septic tank process	5 - 50 PE						
5		Land infiltration process	5 - 50 PE						
6	Combined domestic wastewater treatment	Rotating biological contactor process	>5,000 PE						
		Contact aeration process	>5,000 PE						
		Trickling filter process	>5,000 PE						
		Extended aeration process	>5,000 PE						
		Conventional activated sludge process	>5,000 PE						
7	Combined domestic wastewater treatment	Contact aeration and trickling filter process	>5,000 PE						
		Coagulation separation process	>5,000 PE						
8	Combined domestic wastewater treatment	Contact aeration and activated carbon absorption process	>5,000 PE						
		Coagulation separation and activated carbon absorption process	>5,000 PE						
9	Combined domestic wastewater treatment	Nitrified water recirculation type activated sludge process	>5,000 PE						
		Tertiary treatment type denitrification dephosphorization process	>5,000 PE						
10	Combined domestic wastewater treatment	Nitrified water recirculation type activated sludge process	>5,000 PE						
		Tertiary treatment type denitrification dephosphorization process	>5,000 PE						
11	Combined domestic wastewater treatment	Nitrified water recirculation type activated sludge process	>5,000 PE						
		Tertiary treatment type denitrification dephosphorization process	>5,000 PE						
12	Emission standard under the Water Pollution Control Law	Class: 6 - 11	COD (mg/l): 60	SS (mg/l): 70	n-Hex (mg/l): 20	pH: 5.8~8.6	Total coliforms (N/ml):		
		6 - 11	45	60	20	5.8~8.6			
		6 - 11	30	50	20	5.8~8.6			
		7 - 11	15	15	20	5.8~8.6			
		8	10	15	20	5.8~8.6			

## Japan's Building Standards Act



# Authorization of a new product

Develop a new product



1. Take a performance test

2. Get a certification  
issued by Minister\*

3. Type conformity  
certification (optional)

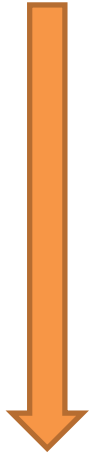
4. Type approval (required  
for factories manufacturing  
the product)

Supply the new product

\*MILT: Ministry of Land, Infrastructure, Transport and Tourism

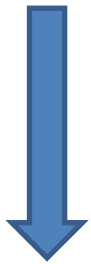
# Authorization of a new product

the Building  
Standards Act



1. Take a performance test
2. Get a certification issued by the Minister\*
3. Type conformity certification (optional)

Johkasou law



4. Type approval (required for factories manufacturing the product)
5. Registration for national subsidy application





Temperature controlled examination lab.

## 1. Short-term test with temperature control

- 16 weeks (or 8 weeks in parallel)
- 13 and 20°C
- with influent control

Summer and winter

## 2. Outside long-term test

- 48 weeks
- with influent control

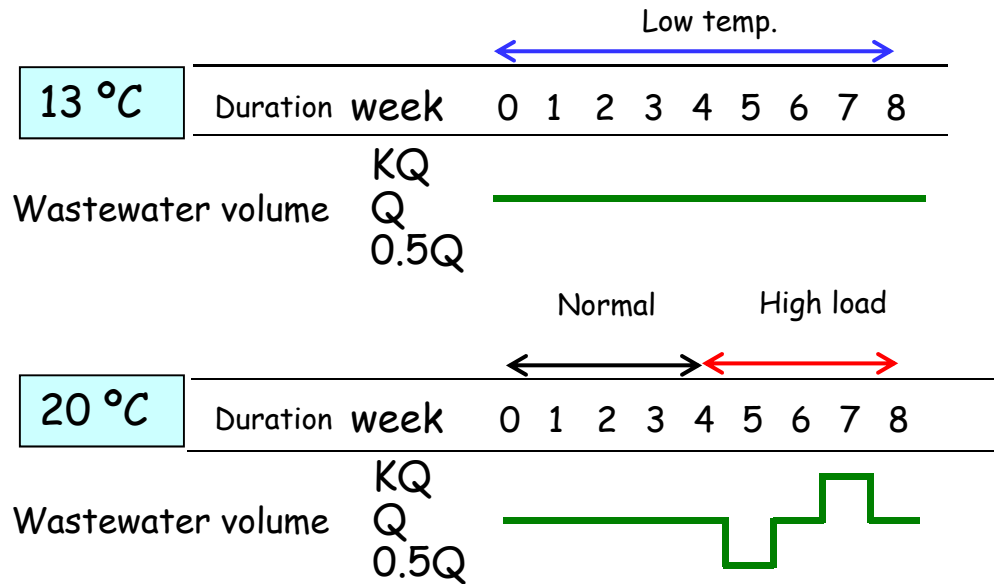
## 3. On-site household test

- 48 weeks
- without influent control
- at least 3 sites

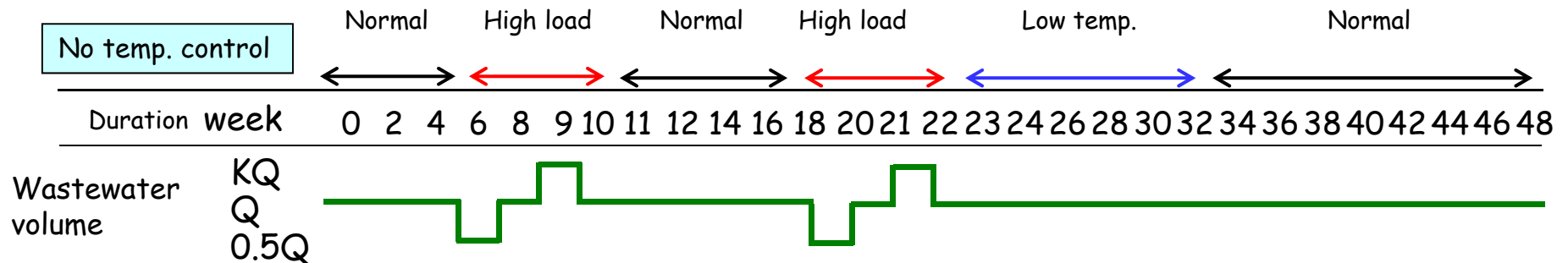
The performance test is done by the third party

# Schedule of the performance test

## 1. Short-term test with temperature control

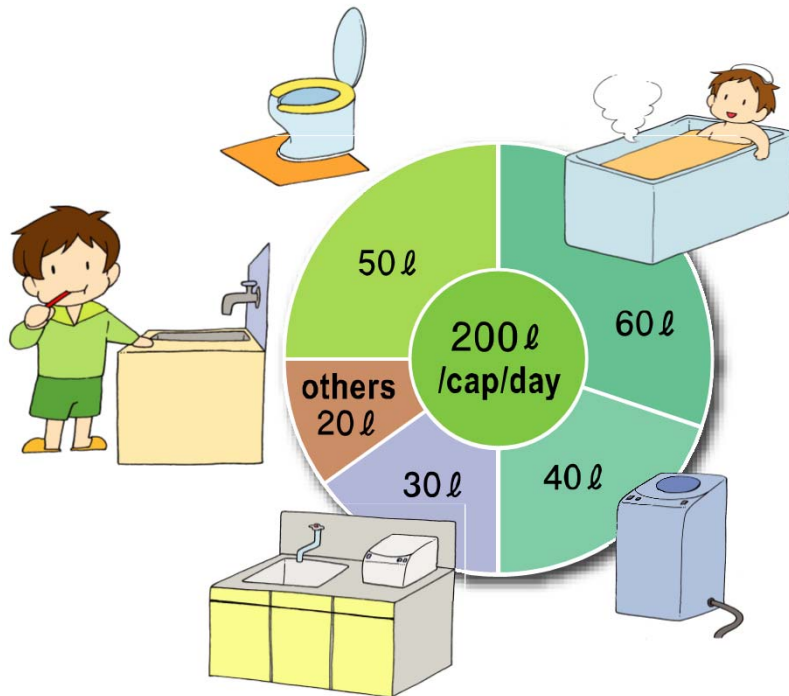


## 2. Outside long-term test



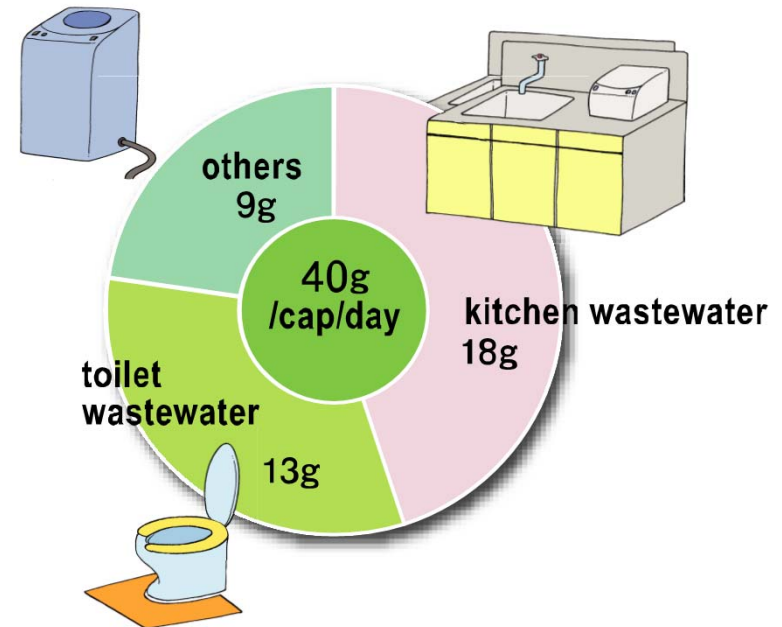
# Influent control

- Concentration and water volume -



Water consumption

200 L/person/day



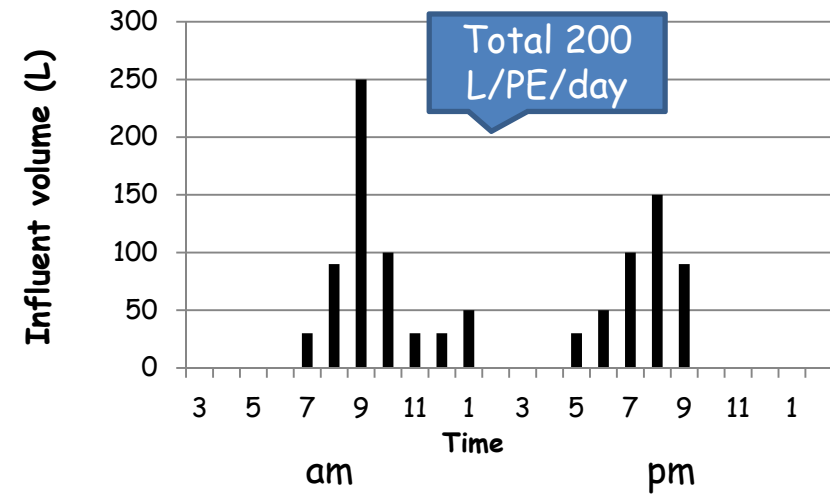
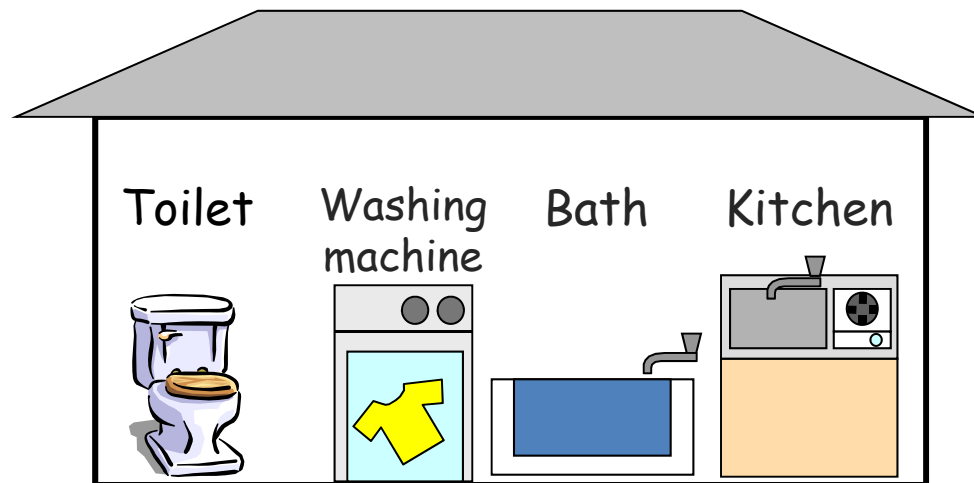
BOD loads per capita per day

40 gBOD/person/day

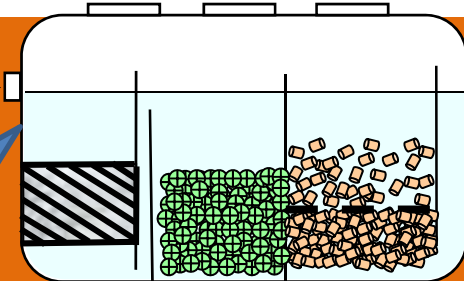
BOD: 200 mg/L, TN: 45 mg/L, TP: 5 mg/L

# Influent control

## - Inflow pattern -

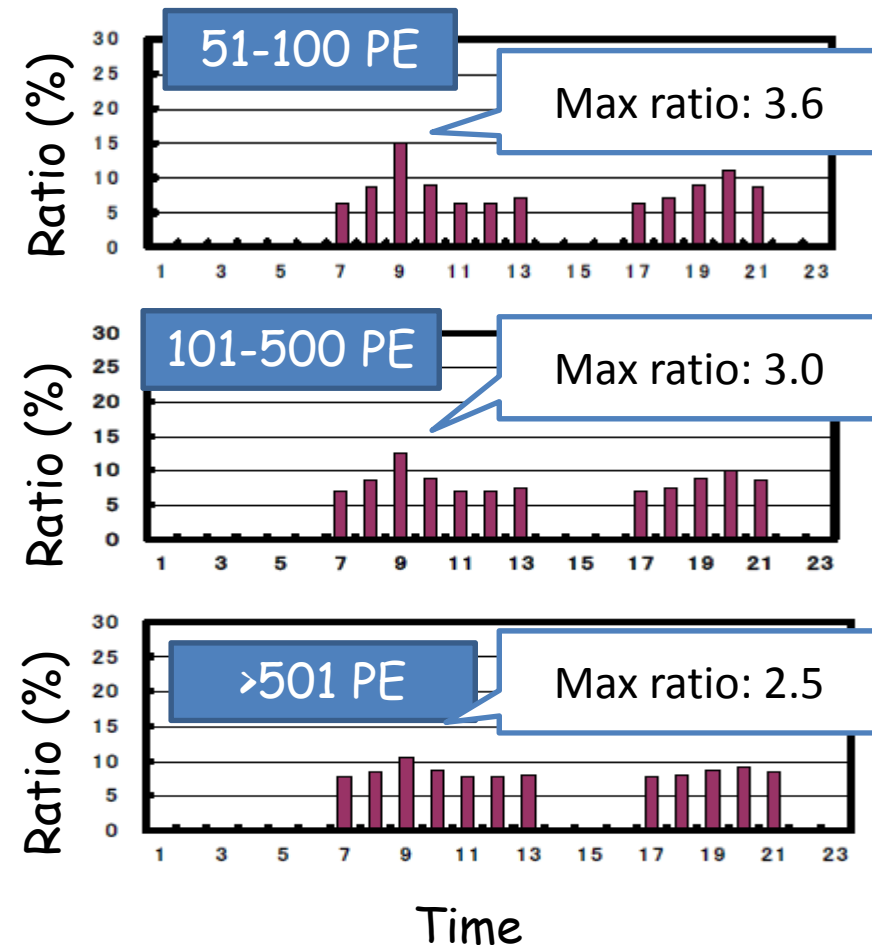
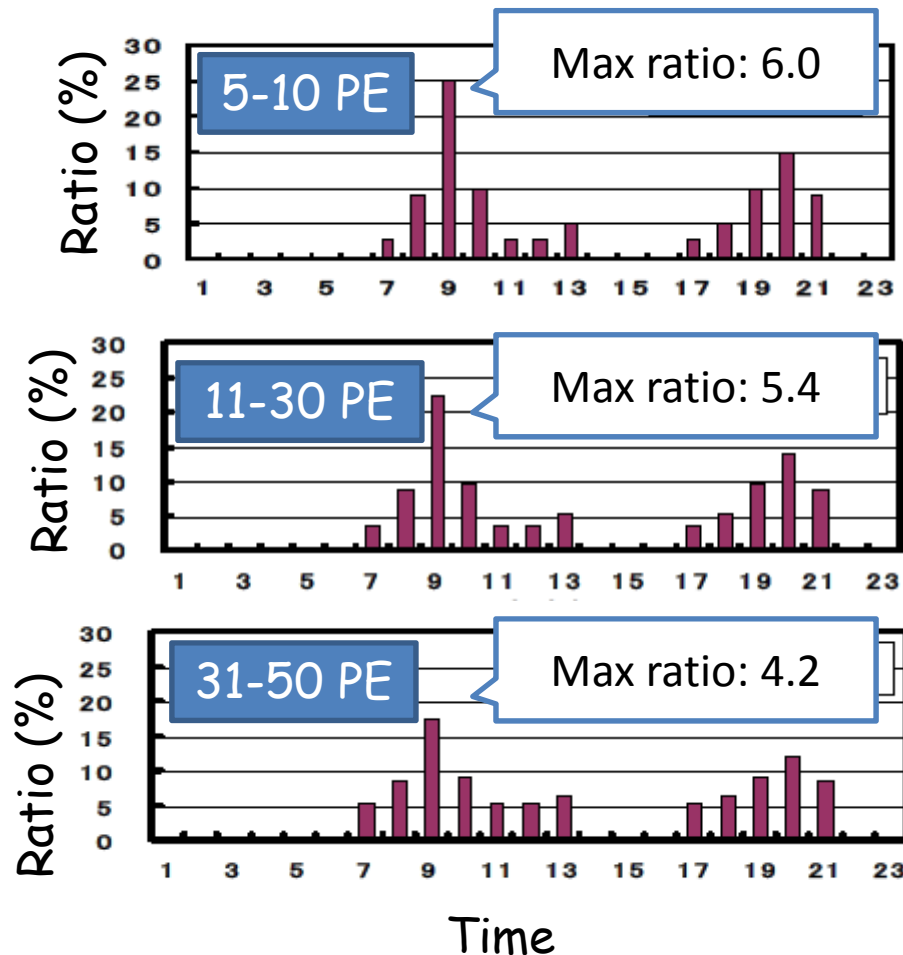


When you use water, influent comes to Johkasou.



Johkasou

# Different inflow pattern for different size of the test body



# Estimation of population for wastewater treatment (JIS A 3302-2000)

	Purpose of building use	number of users for designing		waste water		
		calculation formula	remarks	volume a unit	BOD (mg/L)	volume a person (L/day·person)
1	public hall meeting place theatre movie house entertainment hall religious hall	$n = 0.08 \cdot A$	n: number of users for design A: total floor area ( m <sup>2</sup> )	16 (L/m <sup>2</sup> ·day)	150	200
	bicycle race truck race course motor boat race place	$n = 16 \cdot C$	n: number of users for design C: total stool number(No.)	2,400 (L/No.·day)	260	150
	viewing stand gymnasium	$n = 0.065 \cdot A$	n: number of users for design A: total floor area ( m <sup>2</sup> )	10 (L/m <sup>2</sup> ·day)	260	155
2	residence( A ≤ 130 )	$n = 5$	n: number of users for design A: total floor area ( m <sup>2</sup> )	1,000 (L/residence·day)	200	200
	residence( A > 130 )	$n = 7$	n: number of users for design A: total floor area ( m <sup>2</sup> )	1,400 (L/residence·day)		
	multiple dwelling house	$n = 0.05 \cdot A$	n: number of users for design A: total floor area ( m <sup>2</sup> ) Note that when "n" is up to 3.5 persons per house, the "n" per house is reckoned as 3.5 persons ( or 2 persons when the house consists of one room ) when "n" per house exceeds 6 persons, the "n" per house is reckoned as 6 persons.	10 (L/m <sup>2</sup> ·day)	200	200
	lodging house dormitory	$n = 0.07 \cdot A$	n: number of users for design A: total floor area ( m <sup>2</sup> )	14 (L/m <sup>2</sup> ·day)	140	200

# Other standards/legislation in Japan

- Standard for Johkasou accessories (Johkasou System Association: JSA)
- Standard of PVC pipes and couplers (JIS K 6741, K 6739, and so on.)
- Maintenance of Johkasou (Johkasou Law)
- Initial and annual inspection of Johkasou (Johkasou Law)
- Qualification systems (license) for Johkasou operator, inspector, and desludging technician.



1. Scope
2. Normative references
3. Terms and Definitions
4. Symbols and Abbreviations
5. Requirements
  - 5.1 Design
  - 5.2 Load bearing capacity
  - 5.3 Treatment performance
  - 5.4 Watertightness
  - 5.5 Durability
  - 5.6 Components
6. Calculation and Test Method
  - 6.1 Water-tightness
  - 6.2 Treatment performance
  - 6.3 Structural strength
  - 6.4 Chemical resistance test
7. Technical Information
8. Evaluation of conformity
  - 8.1 General
  - 8.2 Initial type tests
  - 8.3 Factory production control
9. Construction instructions
10. Maintenance instructions

# Technical Specification for Johkasou (Draft)

Technical Specification for Johkasou (Draft)

March, 2013



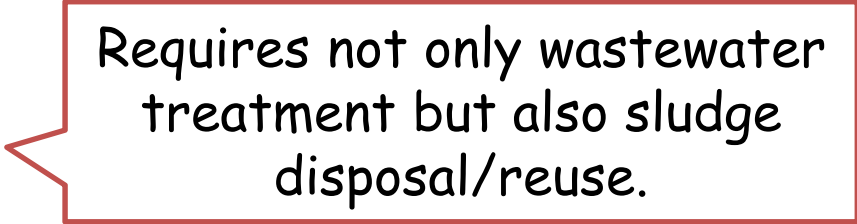
# Technical Specification for Johkasou (Draft)

## **Annex**

- Annex A**    **Testing Method for Johkasou Treatment Performance**
- Annex B**    **Standard for access cover**
- Annex C**    **Standard for blower**
- Annex D**    **Standard for filter media**
- Annex E**    **Strength Test Method**
- Annex F**    **Production and production equipment overview**
- Annex G**    **Instructions to construction and maintenance**
- Annex H**    **Procedures of installation**
- Annex I**    **Examples of contents and procedures of maintenance**
- Annex J**    **Examples of contents and procedures of desludging**

## Guidelines for the management of basic onsite domestic wastewater services -draft-

- 1 Scope
  - 2 Normative references
  - 3 Terms and definitions
  - 4 **Components of basic on-site domestic wastewater systems**
    - 4.1 General
    - 4.2 Types of basic on-site domestic wastewater systems
    - 4.3 Basic on-site domestic wastewater systems
      - 4.3.1 **User interface**
      - 4.3.2 **Collection**
      - 4.3.3 **Transportation**
      - 4.3.4 **Treatment**
      - 4.3.5 **Disposal/reuse**
    - 4.4 Selection of appropriate technological solution
      - 4.4.1 Segments of basic on-site domestic wastewater technologies
      - 4.4.2 **Criteria for selecting appropriate basic on-site domestic wastewater technologies**
  - 5 Objectives of the basic on-site domestic wastewater services
  - 6 Management of basic on-site domestic wastewater systems
  - 7 Guideline for the management of basic on-site domestic wastewater systems
- ANNEX



Requires not only wastewater treatment but also sludge disposal/reuse.

# Insufficient legislation and standards? NIES, Japan

## Let's share and standardize in Asia

- 
- **Appropriate product evaluation** leads new and good technology development.
  - **Product authorization** leads appropriate technology selection.

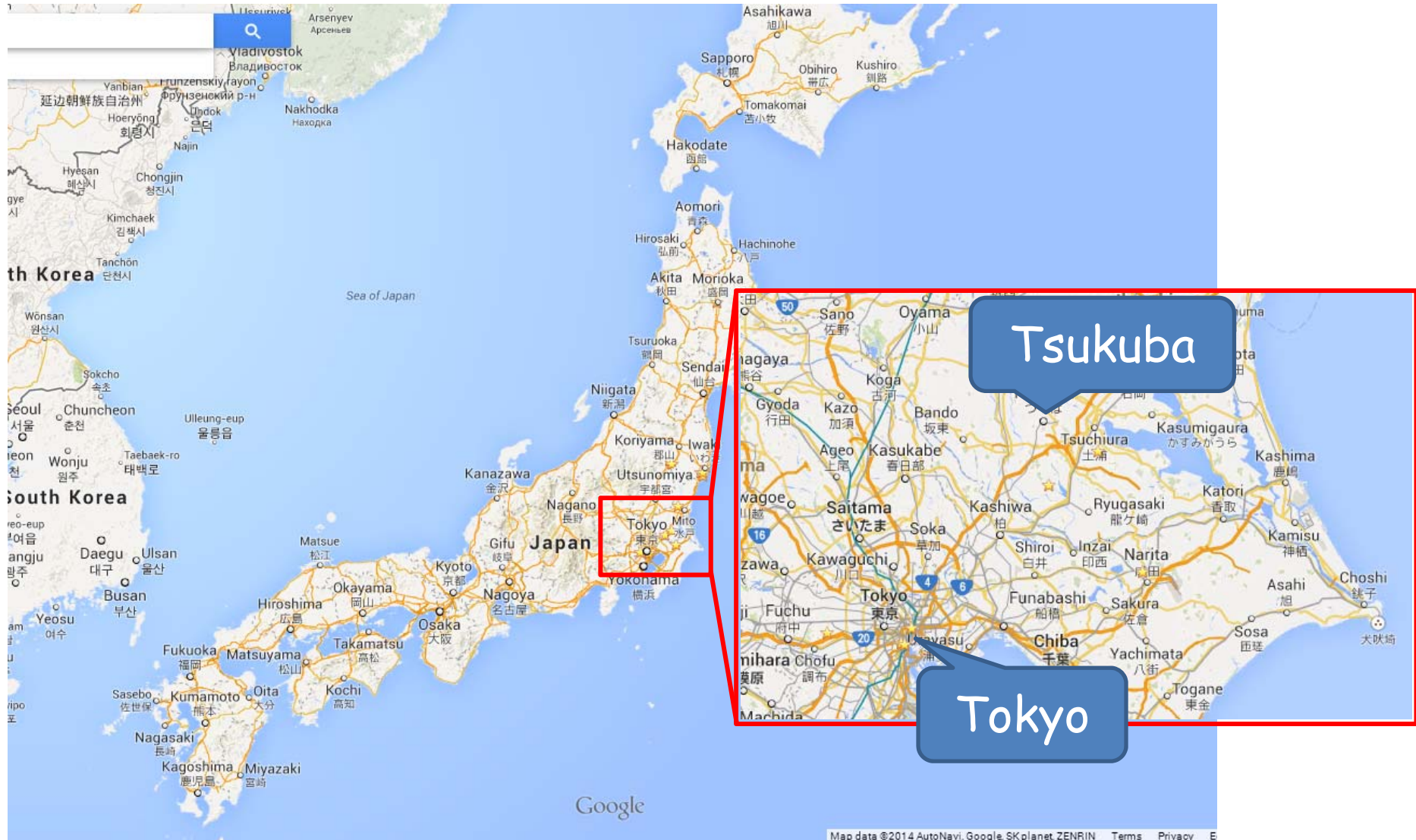
- 
- **Installation and maintenance by government** might be a good way.
  - **Co-benefit** opens new financial scheme opportunities.

- 
- **Certification of technicians** leads appropriate maintenance.
  - **Register** helps good management by government.

A high-speed photograph of a water splash. The water is captured in mid-air, forming a crown-like shape above a horizontal surface. Below the surface, several bubbles are visible, rising from the point of impact. The background is a light blue gradient. The text "Thank you for your kind attention" is overlaid in the center of the image in a bold, black, sans-serif font.

**Thank you for your kind attention**

# From Tsukuba, Japan



# Location of our research laboratory

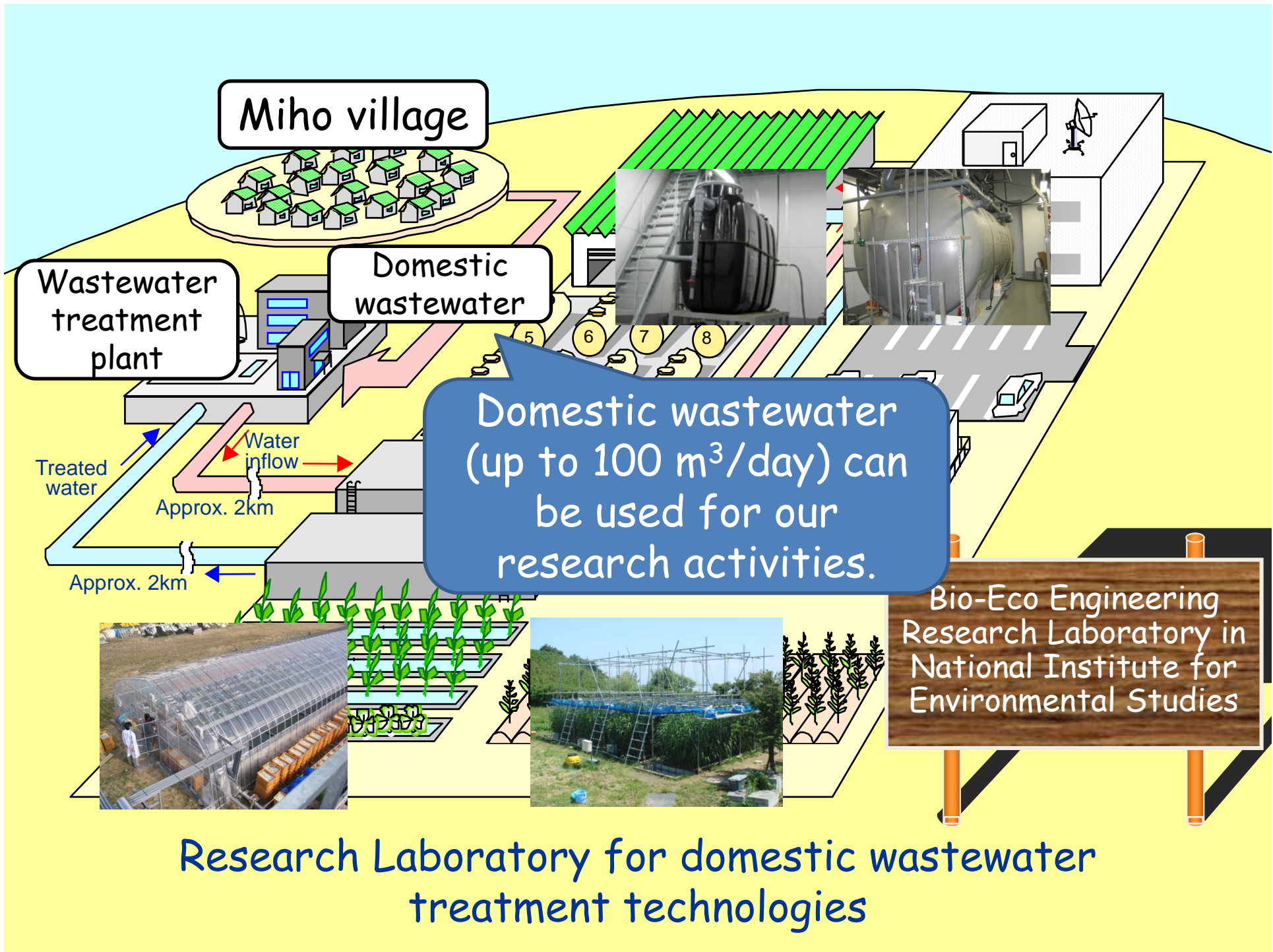


Tsukuba  
city

**Bio-Eco Engineering Research Laboratory**  
(30 km far from main office)

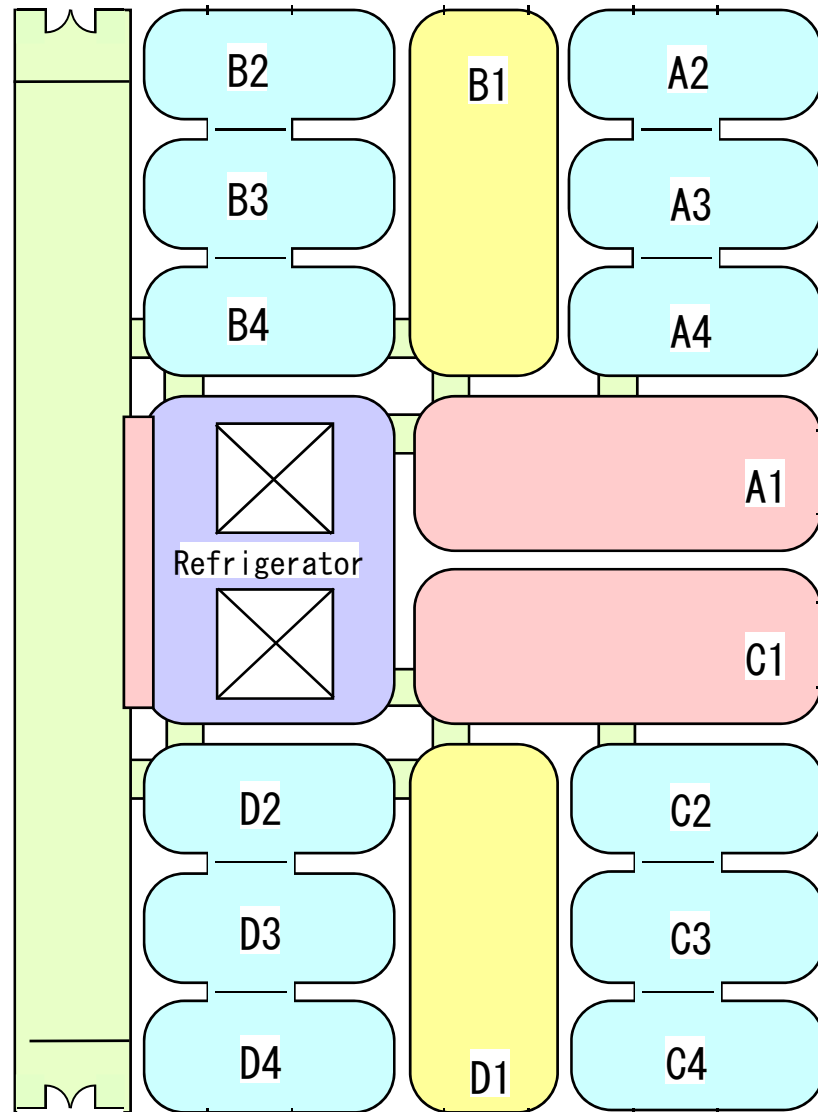
# Research Station for Preservation and Enhancement of the Water Environment







# Diagram of the laboratory



- We have 16 temperature-controlled labs.
- **Volume and concentration** of domestic wastewater **are controlled**.
  - regional characteristics
- **Air- and water-temperature** are controlled from 10 to 30°C.
  - seasonal changes
  - boreal, temperature, subtropical

# Temperature-controlled lab for developing and evaluating Decentralized Wastewater Treatment Processes

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- We develop and evaluate wastewater treatment technologies **with different BOD load and temperature.**
- Performance test is done with **fluctuation of wastewater inflow and temperature change.**

**We look forward to your visit!!**