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River Cities Alliance (RCA) Global Seminar at India Habitat Centre

River Cleaning and Improvement of Decentralized Wastewater Management System

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Causes of River Pollution

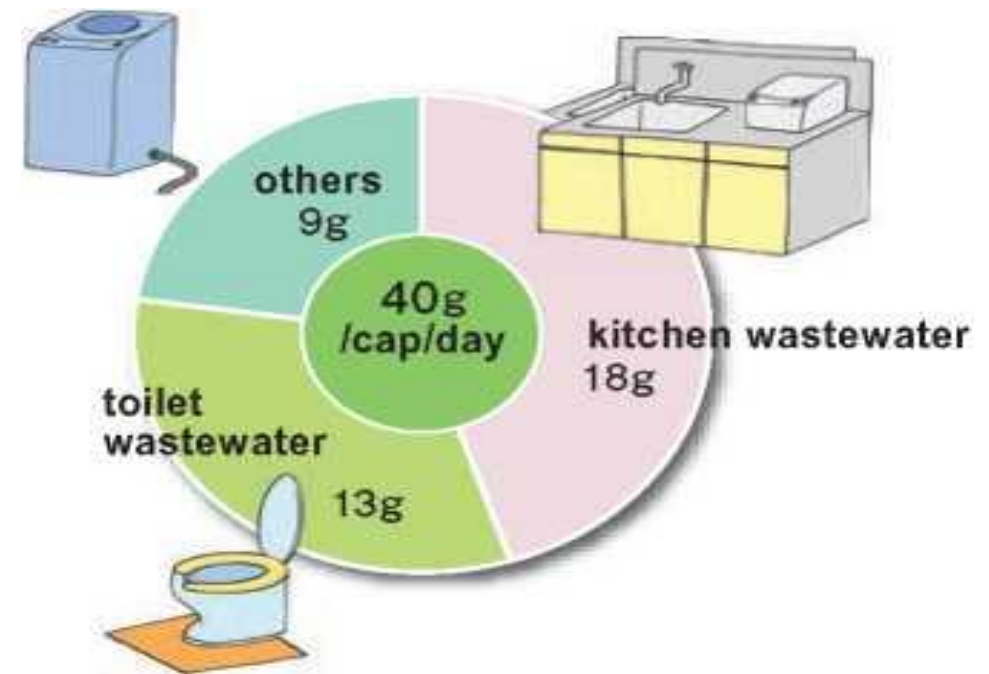
Japan (in 1970s)	India (now)
Urban (domestic) wastewater	Urban (domestic) wastewater
Industrial wastewater	Industrial wastewater
Solid waste dumped to the rivers	Solid waste dumped to the rivers
Agricultural wastewater	Agricultural wastewater
Livestock wastewater	Livestock wastewater
(Since, in Japan, the on-site sludge management system had been duly established in 1960s, on-site sludge was no longer a cause of river pollution.)	Sludge from septic tanks and pits dumped to the rivers

What is domestic wastewater?

Domestic wastewater = Night soil (black water) + Gray water

In Japan, the sample surveys of the characteristics of the domestic wastewater were conducted periodically. It was established that grey water (kitchen wastewater, etc.) contains more than double of the pollution loads (BOD) contained in black water (toilet wastewater). These figures are used for determining the design standard for the WWTP and the Johkasou, standard decentralized wastewater treatment system in Japan.

Pollutant loads (BOD) of domestic wastewater (per capita per day) in Japan



Importance of Grey Water Management

- Pollution load of grey water may vary country by country, depending on the user type and on their dietary patterns, etc. It is recommended for the Government of India to conduct its own sample survey of the characteristics of the domestic wastewater.
- In any case, in order to reduce the total pollution load to the river, some form of grey water management is required.
- Specific measure needs to be selected according to the concentration of the pollution load, availability of the land space (nature based solutions such as constructed wetland may require substantial land space), economic situation, etc.

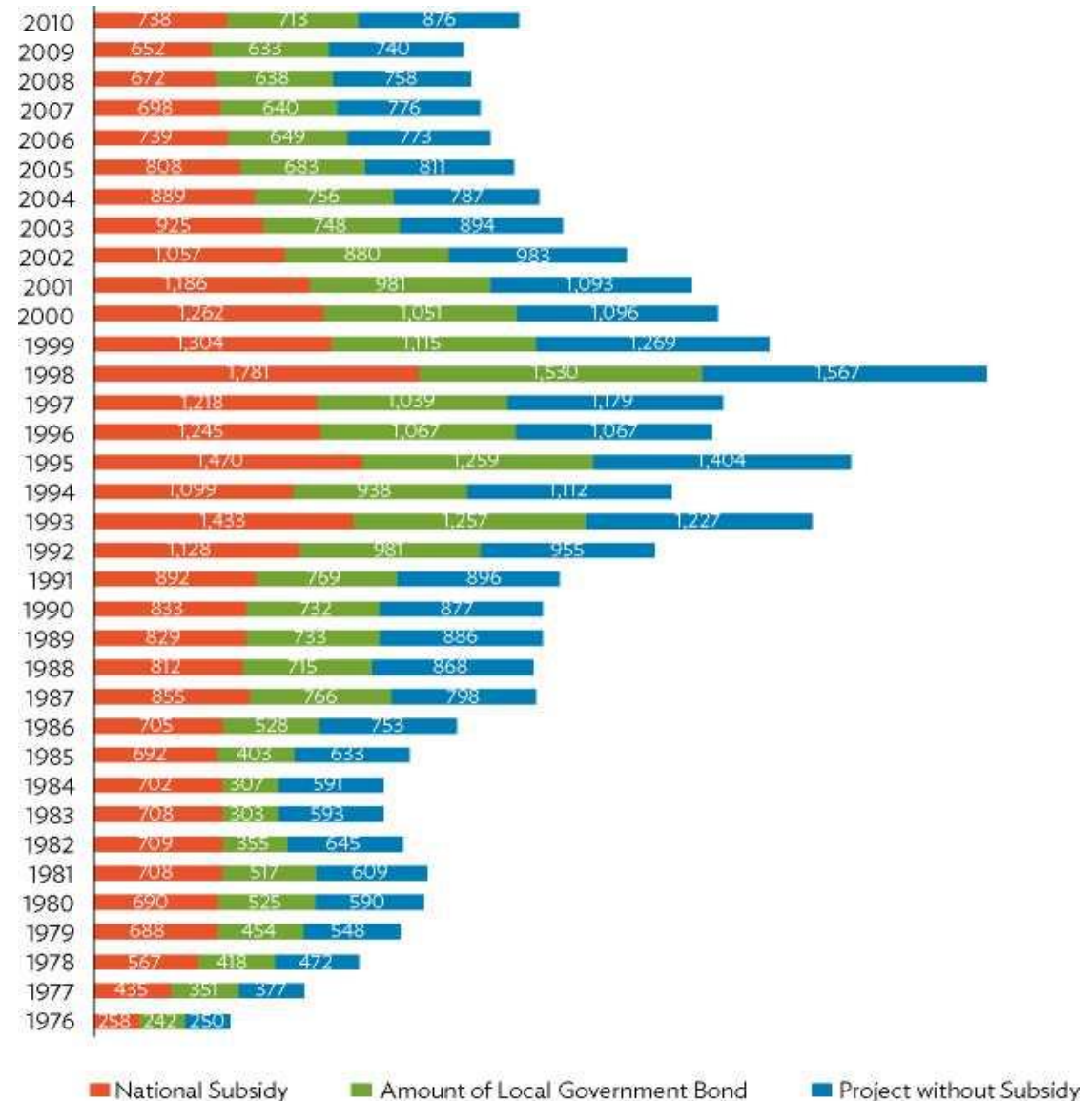
Countermeasures against River Pollution in Japan

Cause of River Pollution	Countermeasures
Domestic wastewater	Comprehensive Basin-wide Planning of Sewerage Systems (CBPSS) based on Sewerage Law; Development of the Decentralized Wastewater Management System based on the Johkasou, Japan's standard decentralized wastewater treatment plant, which treats both black water and grey water.
Industrial wastewater	Regulation and enforcement of the effluent standards based on Water Pollution Control Law.
Solid waste dumped to the rivers	Regulation and enforcement based on Waste Management and Public Cleansing Act.
Agricultural wastewater	Various countermeasures.
Livestock wastewater	Various countermeasures.

How much did Japan spend for Cleaning-up Rivers? (Sewerage System alone)

In FY 1998 alone, Japan spent ¥4,878 Billion (US\$ 40 Billion) for Sewerage Works Investment.

Trend of Sewage Works Investment in Japan



Note: Figures in billion yen (¥).

Source: Sanitation and Sustainable Development in Japan Page.11

Matters to be considered for cleaning up rivers (1)

1.	Comprehensive planning is necessary for cleaning up rivers.
2.	Grey water management is essential for cleaning up rivers. While the sewerage system development is the most effective way for grey water management, the on-site system also needs to incorporate grey water management.
3.	The high performance decentralized wastewater management system, such as Johkasou in Japan, which can manage grey water, requires the comprehensive management system (regulation, enforcement, sludge management, human resource development and monitoring) as such established in Japan.

Matters to be considered for cleaning up rivers (2)

4.	<p>The high-performance decentralized wastewater treatment plants, such as Johkasou in Japan, requires expenses on their management. Users' 'Willingness to Pay' and 'Affordability to Pay' needs to be duly considered.</p> <p>It may be realistic for developing countries to start applying such systems for commercial users (office buildings, hotels, apartments, malls, etc.) and institutional users (government offices, schools, hospitals, stations, etc.) not connected to the sewerage system.</p>
5.	<p>Fecal Sludge Management (FSM) will not only improve the people's sanitation but also improve the river water quality to some extent (not full extent), together with the sewerage system development, by reducing the volume of on-site sludge dumped to the rivers .</p>

Matters to be considered for cleaning up rivers (3)

6. In many Southeast Asian developing countries, even in the areas covered by the sewerage system, the interceptor system, in which, each household is not connected to the sewer, the wastewater from households are discharged to the existing rainwater drainage and is intercepted before discharged to the river and treated by WWTP, is used. India may not be an exception. Under this system, households continue to use their septic tanks or pits, the sludge from which is usually not properly managed. If such is the case, even in the areas covered by the sewerage system, the improvement of on-site sludge management is essential.

Improvement of Decentralized Wastewater Management System Case of Japan (1)

Challenges	Japan's response
Improper design of the on-site systems	Structural standards, Government approval, Performance testing system of the on-site systems
Lack of monitoring of compliance with the building standards of the on-site system	Building confirmation by the building officials of a local government
Poor installation of the on-site systems	Registration system for the On-site System Construction Vendors Certification and Examination system for the Installation Workers
Improper disposal of the on-site sludge	Development of the sludge treatment facilities nationwide.

Improvement of Decentralized Wastewater Management System Case of Japan (2)

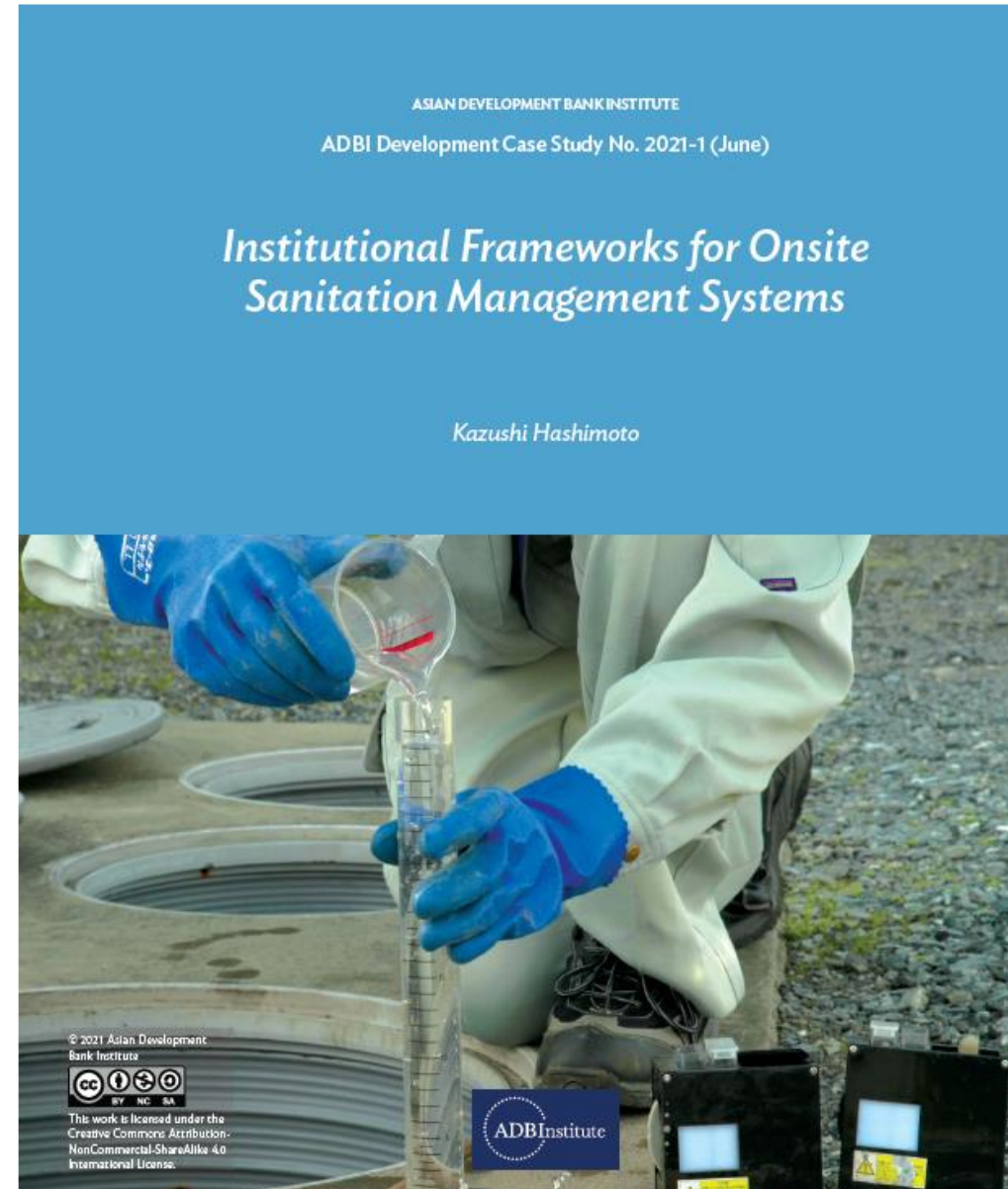
Challenges	Japan's response
Improper management of the sludge generated by the on-site systems	Enactment of the On-site System Act (Johkasou Act). Regular de-sludging obligation.
Unregulated De-sludging Operators working in the difficult conditions	Approval system of the On-site System Desludging Vendors
Improper operation and maintenance of the on-site systems	Enactment of the On-site System Act (Johkasou Act). Owner's Legal obligation of O/M. Owner's obligation of deploying a Technical Supervisor for a large on-site system (≥ 501 PE). Registration system for the On-site System Maintenance Vendors

Improvement of Decentralized Wastewater Management System Case of Japan (3)

Challenges	Japan's response
Lack of human resources for the maintenance work	Training system, Certification and Examination system for the On-site System Operators
Lack of awareness on the on-site systems among the system owners and local governments	Establishment of the training institution for the professionals in the business related to the on-site systems
Lack of accountability	Legal inspection
Poor operation and maintenance of the large size on-site systems of the commercial users	Monitoring under Water Pollution Control Law (compliance to the effluent standard, measurement and record obligation, report and inspection)

For more details;

<https://www.adb.org/sites/default/files/publication/711441/adbi-cs2021-01.pdf>



Asia Development Bank Institute (ADBI) Spotlight on Japan’s “Johkasou” Sanitation System: A Model for Asia



<https://www.adb.org/news/videos/spotlight-japan-johkasou-sanitation-system>

Achievement 1. Complete faecal sludge management

In Japan, more than 1,000 sludge treatment facilities were built nationwide by the local governments pursuant to the Public Cleansing Law (1954) in 1950s-60s before the start of the nationwide development of sewerage treatment plants.

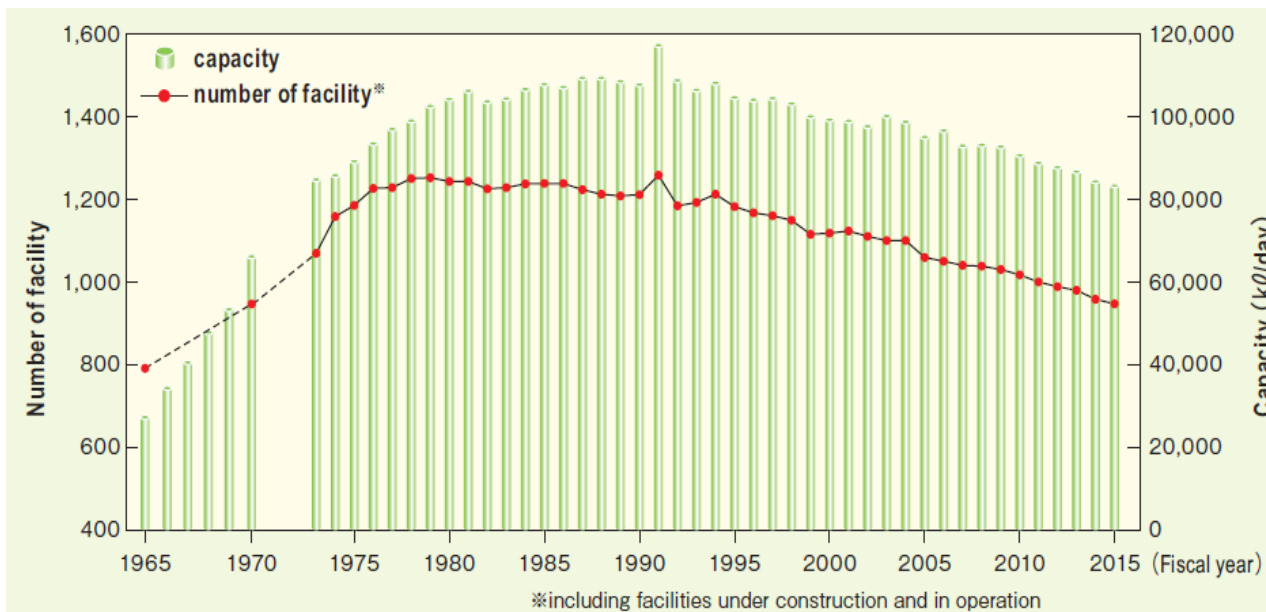


Figure 4 Trends of the number and capacity of night soil treatment facilities(4)

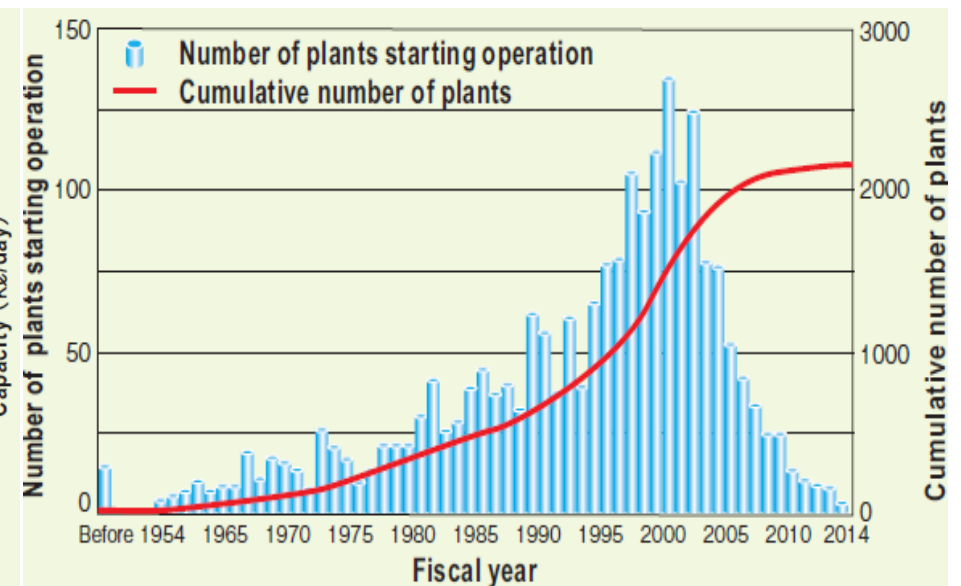
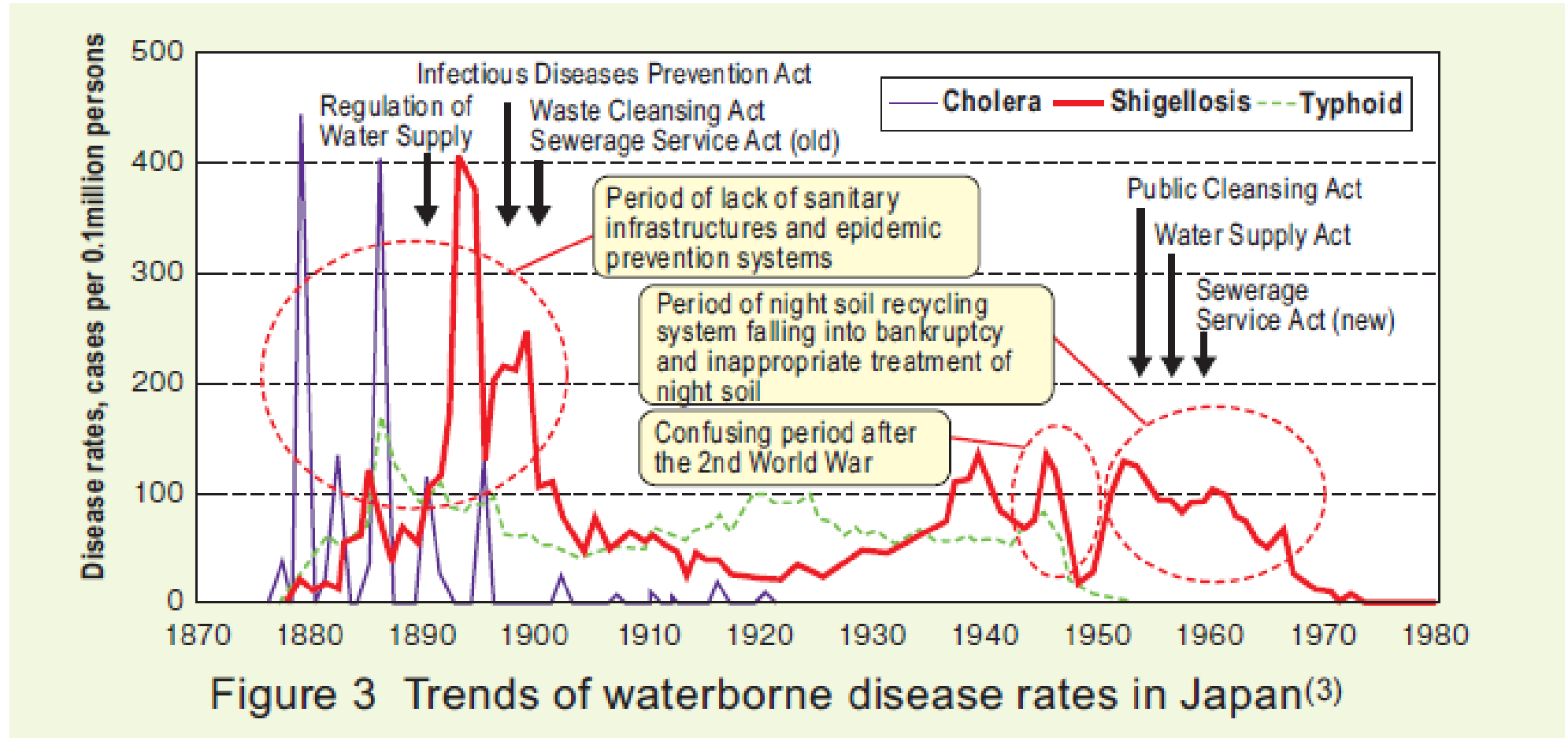


Figure 7 Number and trends of sewerage treatment plants(5)

(Source) Ministry of Environment on Japan 'Night soil Treatment and Decentralized Wastewater Treatment in Japan' https://www.env.go.jp/recycle/jokaso/basic/pamph/pdf/wts_full.pdf

Achievement 2: Complete elimination of water borne diseases



(Source) Ministry of Environment on Japan 'Night soil Treatment and Decentralized Wastewater Treatment in Japan'

https://www.env.go.jp/recycle/jokaso/basic/pamph/pdf/wts_full.pdf

Achievement 3: Development of human resources

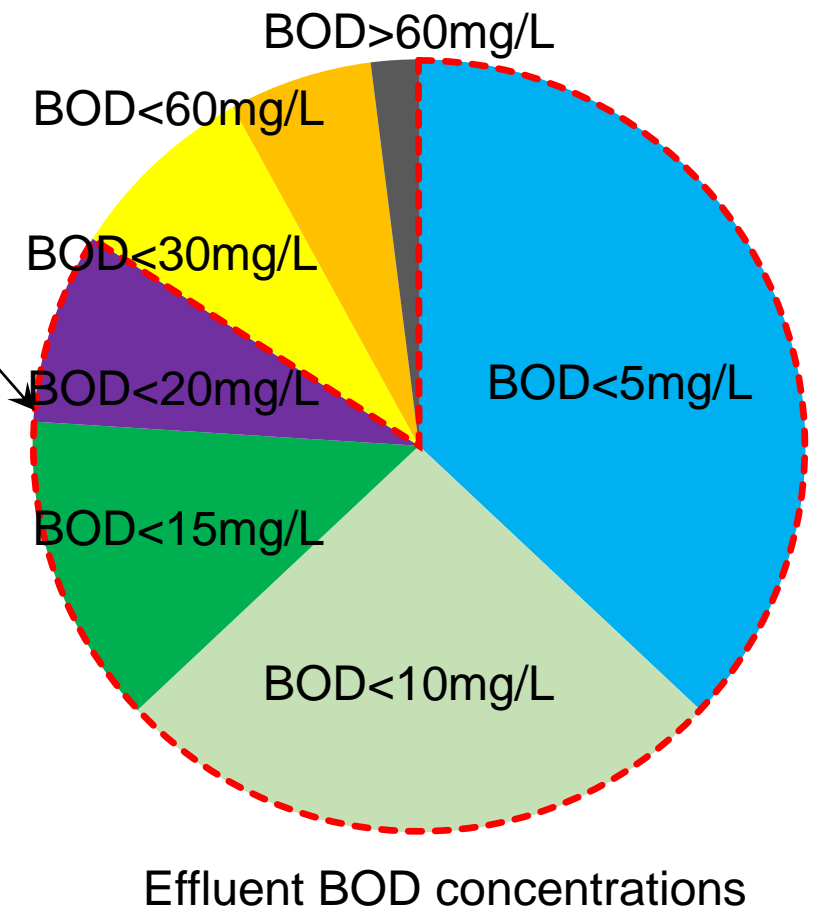
In Japan, through the examinations and the training courses administered by JECES, more than 3,000 On-site system technicians newly join the on-site system business every year.

(Table) Number of professionals engaged in the businesses related to the management of On-site systems in Japan

Certified technicians	Number of registrants	Business content	Legal basis
On-site Systems Operators	80,042	Operation & maintenance	On-site Systems Act (Johkasou Act)
On-site Systems Installation Workers	86,595	Installation/ construction	
On-site System Technical Supervisor	29,794	Management of on-site systems with 501 PE or more	Ordinance of On-site Systems Act (Johkasou Act)
Desludging Technicians	16,021	Desludging	
Registered On-site Systems Inspectors	1,280	On-site systems inspection and water quality examination	
Total	213,732		

Achievement 4: Environmental effects of Japan's on-site sanitation management system

85.0% of Johkasou (Black/grey water type) of which the effluent water quality were inspected during FY 2013, produced the effluent BOD<20mg/L which meets the effluent water quality standard.



Related ADBI materials

[Decentralized wastewater management system in Japan]

- ADBI Working Paper Series ‘Institutional Mechanisms for Sustainable Sanitation: Lessons from Japan for Other Asian Countries’
<https://www.adb.org/sites/default/files/publication/524116/adbi-wp1001.pdf>
- ADBI Case Study: Johkasou – Wastewater Management in a Local Municipality in Japan
<https://www.adb.org/sites/default/files/publication/743241/adbi-cs2021-04.pdf>

[Johkasou in PRC]

- ADBI Case Study: Challenges and Solutions for On Site Wastewater Treatment: Chongming Case <https://www.adb.org/sites/default/files/publication/798686/adbi-case-study-2022-2.pdf>
- ADBI Case Study: Public-Private Partnership for Wastewater Treatment: Changsu Case <https://www.adb.org/sites/default/files/publication/798661/adbi-case-study-2022-1.pdf>

ADBI-Toyo University Training Program on City-Wide Inclusive Sanitation Policy and Innovation in Asia: Focus on Japanese Experiences [ADBI-Toyo University Training Program on City-Wide Inclusive Sanitation Policy and Innovation in Asia: Focus on Japanese Experiences | Asian Development Bank](#)

ACCESS ADBI PUBLICATIONS

1. Case study
of Johkasou



3. Changsu Case



5. Institutional Mechanism



2. Chongming Case



4. ADBI-Toyo Course on CWIS





Thank you for your attention!

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