



Human resource development for improving sanitation and wastewater management

APWS3 Parallel Session
'Improving Sanitation and Wastewater Management'
December 11, 2017
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Size and Scale of the Challenge (Global)

‘The SDGs demand we halve the amount of untreated wastewater. During the same period the global population is estimated to rise to 8.5 billion people. Our task is to provide wastewater treatment to another 3.5 billion people by 2030.

This means in the next 14 years we need to build new wastewater treatment facilities for 700,000 people every day. That requires roughly 14 million new wastewater professionals trained during the same period, or 1 million every year.,

< 1 wastewater professional for every 250 people >

(Source: ‘Five solutions to avoid a water sector human resources crisis’ by Mr. Ger Bergkamp, IWA Executive Director (September 4, 2016), which was based on the IWA study report (An Avoidable Crisis; WASH Human Resource Capacity Gaps in 15 Developing Economies’ (2014))

How many wastewater professionals work to ensure the treatment of domestic wastewater in Japan?

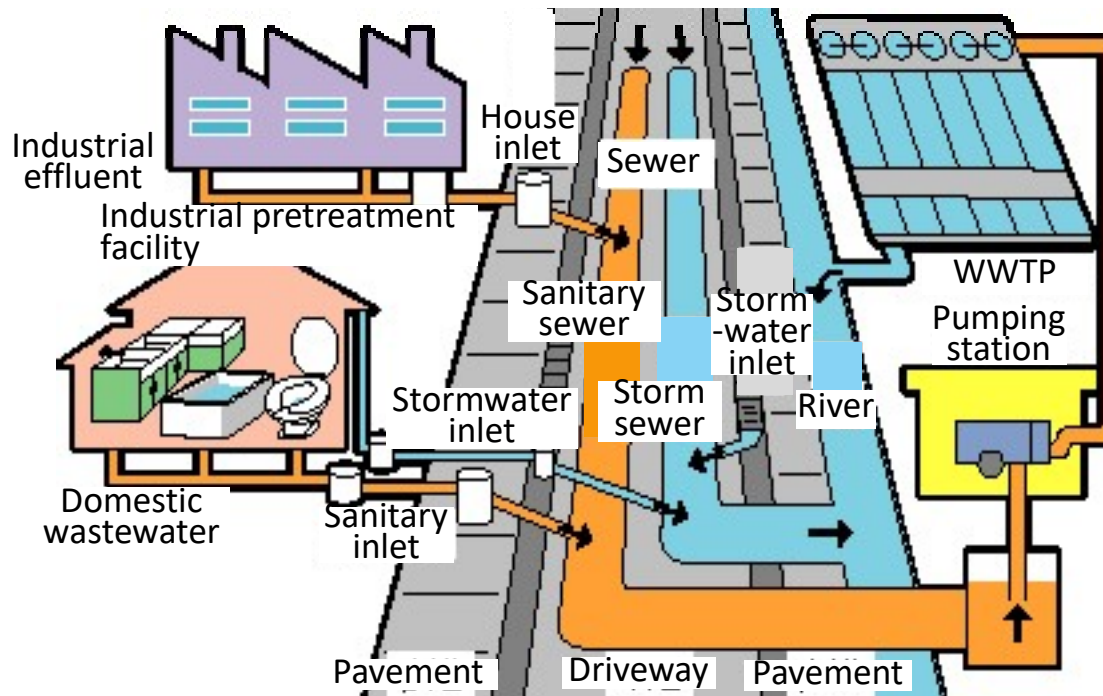
(Now, in Japan, 100% of Black Water and 90% of Gray Water are safely managed.)

Wastewater Management System (Population covered (2015))	Professionals	Total number (Nationwide)
Off-site (Sewerage) system (94.5 Million)	Staff engaged in sewerage services for all the prefectures and municipalities in Japan (1998-peak year)	47,000
On-site system (33.6 Million)	Qualified technicians for the installation works, O/M works and desludging works of Johkasou (Japan's standard on-site system) as of March 31, 2015 – <i>the majority belongs to the private sector</i>	210,620
Total		257,620

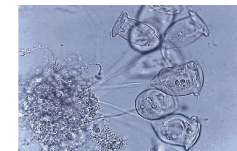
(Source: Ministry of Environment 'Emissions and processing status of municipal solid waste (2015)' (in Japanese), etc.)

Managing Sewerage System requires employing many professionals with a wide range of knowledge, which is a difficult task for medium and small-scale municipalities

- Collects wastewater from households, business entities and factories through sewers and pumping stations.
- Treats wastewater to purify it. Collects or stores stormwater.
- WWTPs require a wide range of knowledge including **civil, construction, mechanical, electrical and chemical engineering**.
- O&M requires **chemical and wastewater treatment technology**.



Microorganisms performing wastewater treatment



Storm sewer



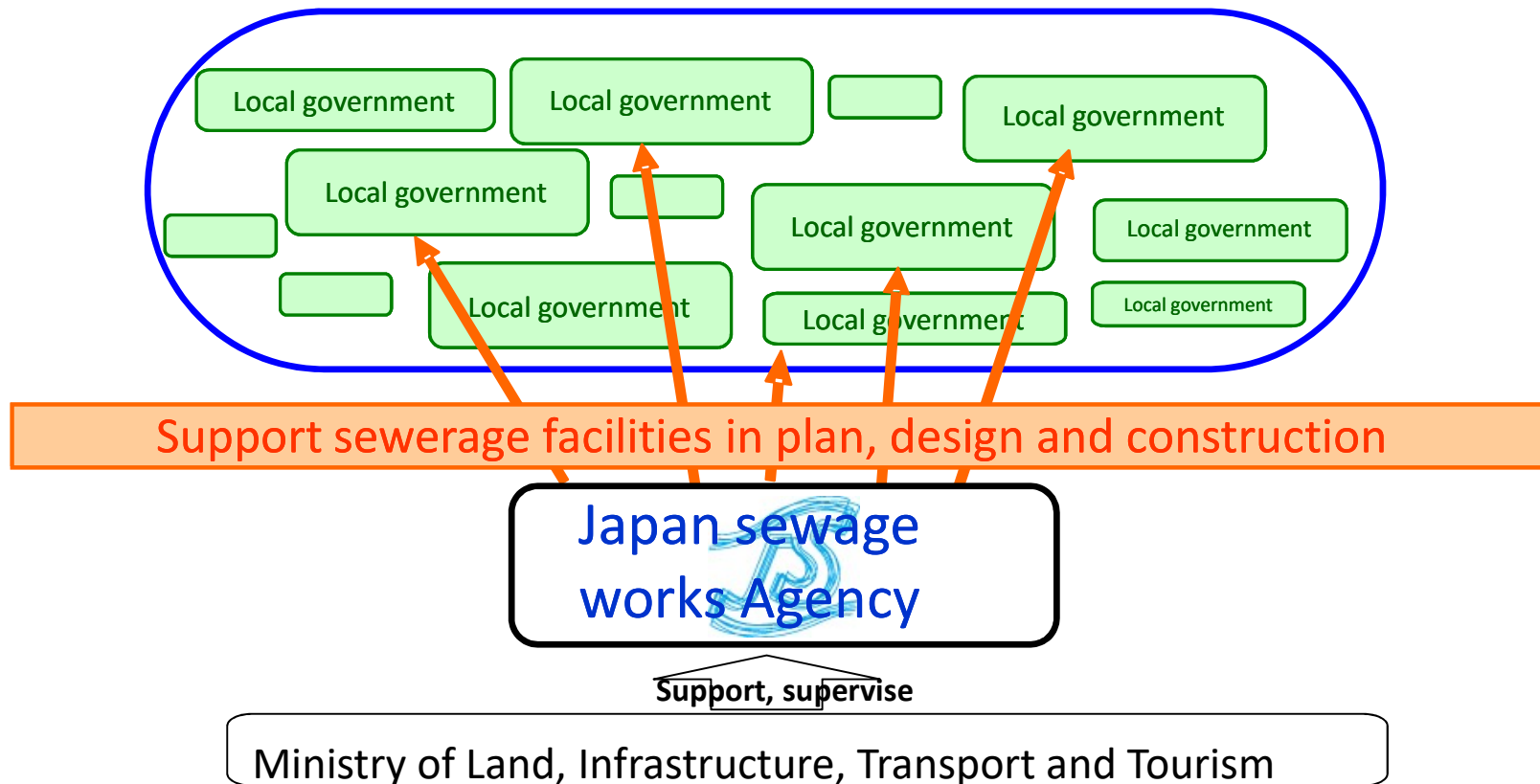
Incinerator



How Japan did manage the shortage of professionals in local governments?

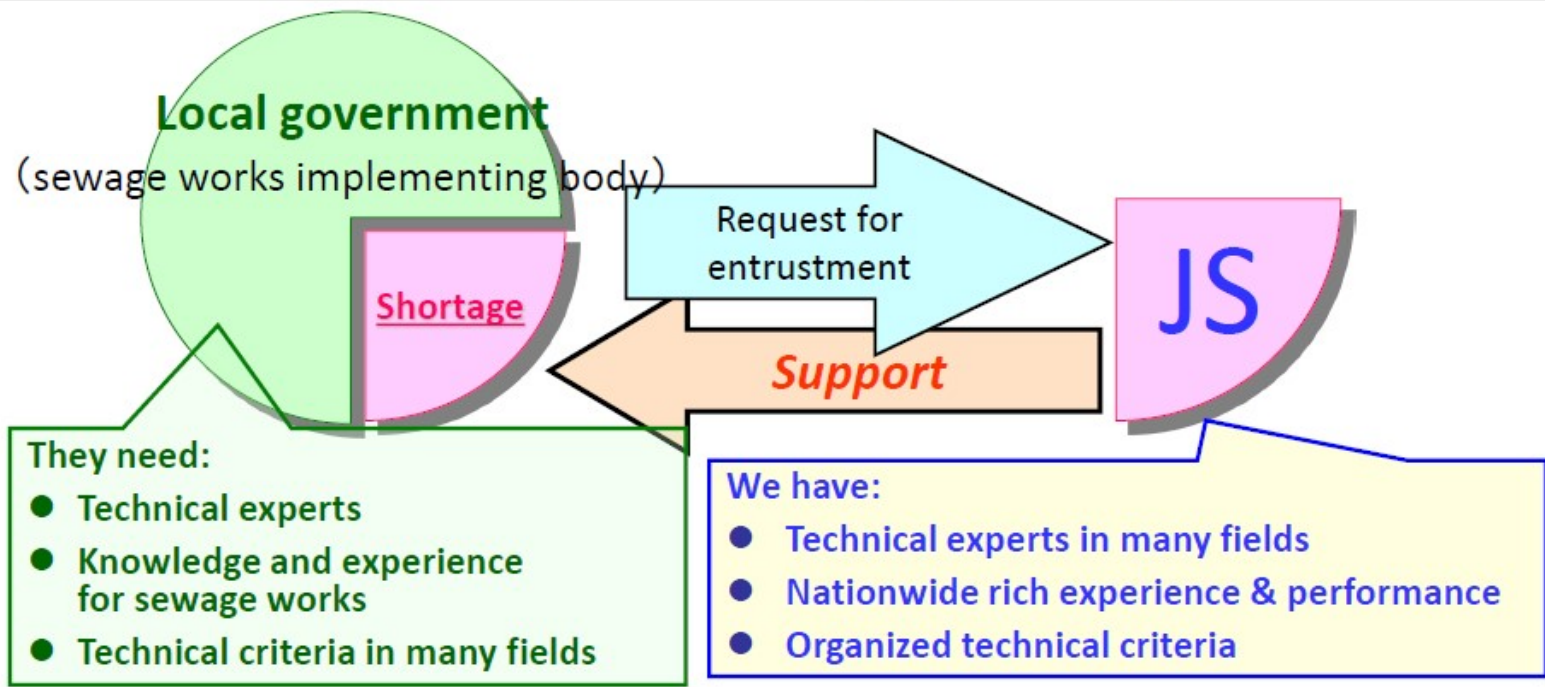
—Japan Sewage Works Agency (JS)—

Established in 1972 to create a pool sewerage technical experts (provided by the Japan Sewage Works Agency Law)
 → **Implementing body of sewage works based on local governments' request.**



How does Japan Sewage Works Agency support local governments in short of professionals?

- The organization of sewerage technical expert, supporting improvement of sewage works upon the request from local governments.
- Contributed to rapid development of sewerage systems in Japan.



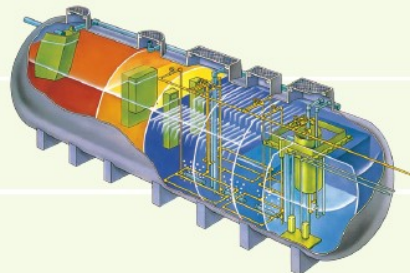
JS provides a comprehensive solution to local governments

Japan's Decentralized Wastewater Management (On-site) System

Packaged Aerated Wastewater Treatment Plant (PAWTP – Johkasou)



Small-scale johkasou (FRP-made)



Medium-scale johkasou (FRP-made)



Large-scale johkasou (RC-made)

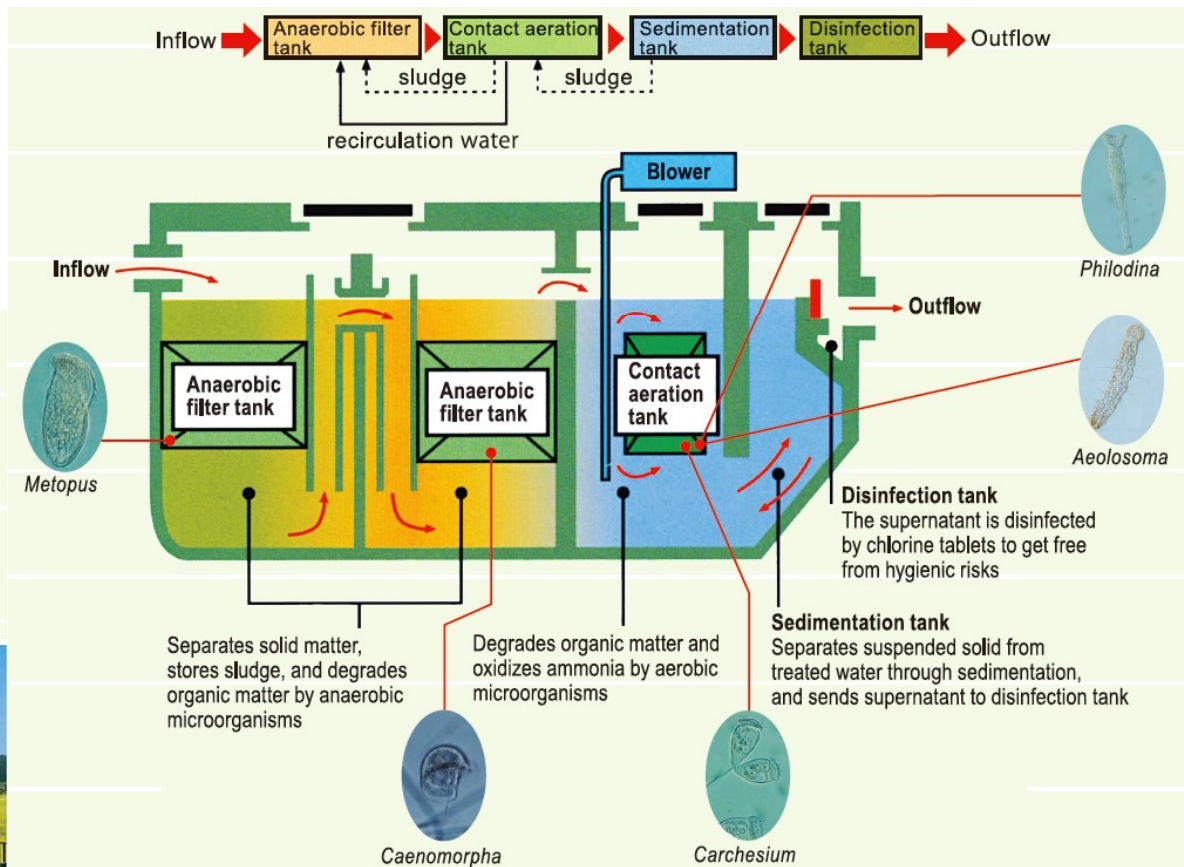
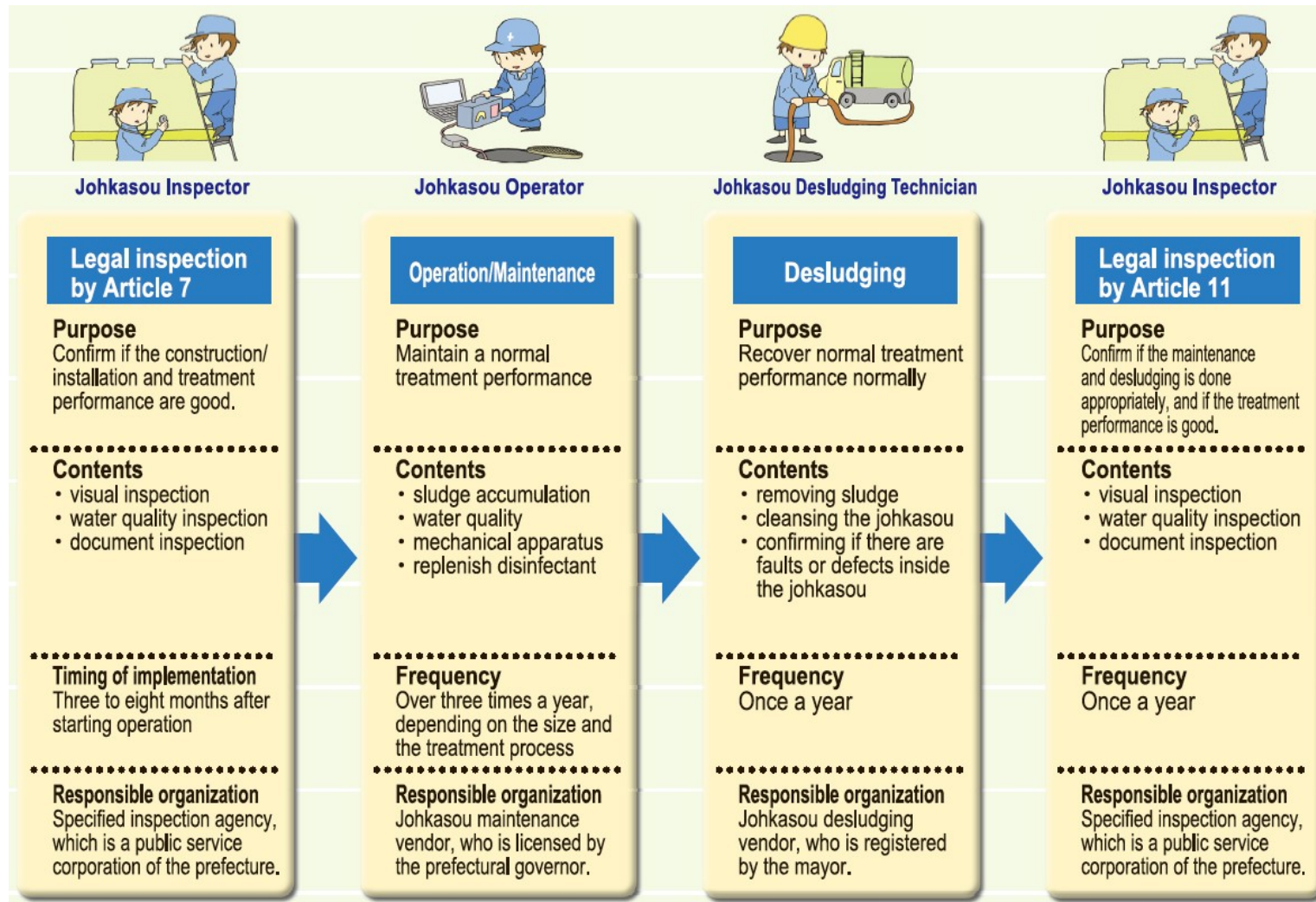


Figure 15 Structure and treatment principle of johkasou

What kind of professionals are required for managing the Decentralized Wastewater Management (On-site) System in Japan?



How professionals engaged in the installation works, O&M and desludging works of on-site systems are trained and qualified in Japan?

- In 1966, Japan Education Center for Environmental Sanitation (JECES) was established to provide training for professionals in the business related to PAWTP (Johkasou).
- In 1983, Johkasou (PAWTP) Act was established, which stipulates that only the qualified workers can engage in the installation works, O&M works and desludging works of PAWTPs.
- In 1984 and 1985, national examinations for PAWTP Operators and PAWTP Installation Workers started. These two certificates can be obtained by passing the examination or by receiving the training course.
- JECES was appointed as the agency for training courses and the agency for the examinations by the Johkasou Act. Through the examinations and the training courses, more than 3,000 PAWTP technicians newly join the PAWTP business every year.



Number of professionals engaged in the businesses related to the management of Decentralized Wastewater Management (On-site) System in Japan

Certified technicians	Number of registrants	Business content	Legal basis
PAWTP Operators	78,487	Operation & maintenance	PAWPT Act
PAWTP Installation Workers	85,862	Installation/ construction	
PAWTP Technical Supervisor	29,146	Management of johkasou with 501 PE or more	Ordinance of PAWTP Act
PAWTP Desludging Technicians	15,842	Desludging	
Registered PAWTP Inspectors	1,283	Johkasou inspection and water quality examination	
Total	210,620		

(as of March 31, 2015)

Different Approaches in Asia & Pacific

– Using the vitality of the private sector –

In Manila, Philippines, water services including piped water supply and wastewater management were privatized in 1997. **Maynilad Water Services** and **Manila Water Company** have developed, operated and managed the sewerage system of this city.

In Malaysia, in 1994, **Indah Water Konsortium (IWK)** – a private operator – was awarded the concession for nationwide sewerage services. Since then, IWK has taken over these services from local authorities. In June 2000, as a testimony of the Government's commitment to ensure that proper and efficient sewerage systems are successfully installed and maintained, the Government, through the Ministry of Finance, took over the entire equity in IWK from its previous private owners.

Two private operators in Manila and IWK of Malaysia provide professional septage management services, in addition to sewerage services.



Thank you for your attention !

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