

Workshop 5, Session 1
Frontiers of Urban sanitation Options

TECHNOLOGY OPTIONS TO ACHIEVE SUSTAINABLE SANITATION IN URBAN AREAS

Wednesday 23 November 2011

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JSC
Japan Sanitation Consortium
APWF KNOWLEDGEHUB
Solving sanitation issues
in the Asia-Pacific

OVERVIEW OF TECHNOLOGY OPTIONS

centralized systems

OVERVIEW OF TECHNOLOGY OPTIONS: CONVENTIONAL SYSTEMS

centralized systems



Trickling Filter



Activated Sludge Process



Rotating Biological Contactor



Oxidation Ditch



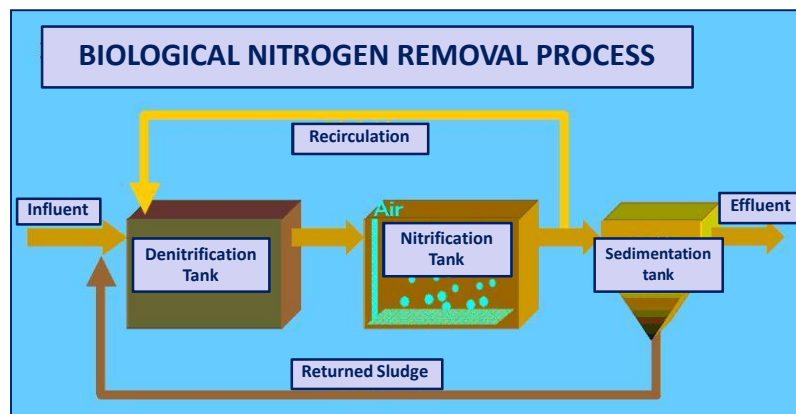
Wastewater Stabilization Pond (with Aerated Pond)



OVERVIEW OF TECHNOLOGY OPTIONS: ADVANCED TECHNOLOGIES

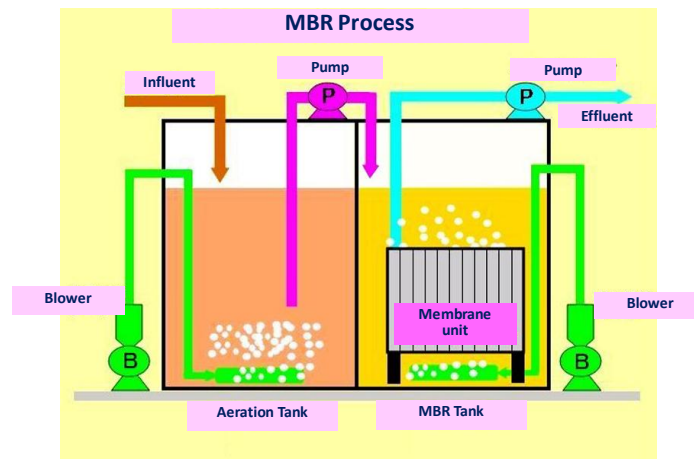
centralized systems

MODIFIED ACTIVATED SLUDGE PROCESS:



OVERVIEW OF TECHNOLOGY OPTIONS: ADVANCED TECHNOLOGIES: Membrane Bioreactor


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OVERVIEW OF TECHNOLOGY OPTIONS: CONVENTIONAL SYSTEMS

centralized systems


Technology	Pros	Cons
WWT Stabilization Pond (with or without aeration)	<ul style="list-style-type: none"> - Easy O&M - Low energy cost - Low sludge production 	<ul style="list-style-type: none"> - Requires large land area - Limited WWT treatment performance - Influence of cold weather in treatment
Trickling Filter	<ul style="list-style-type: none"> - Small land required - Easy O&M 	<ul style="list-style-type: none"> - Requires constant electricity source - Possible concern with odours and flies
Rotating Biological Contactor	<ul style="list-style-type: none"> - Low skill required for operation - Low sludge production - Hardly affected by WWT pick flows 	<ul style="list-style-type: none"> - Influence of cold weather in treatment - Mechanical parts require frequent maintenance
Activated Sludge Process	<ul style="list-style-type: none"> - Most widely used treatment process - Good treatment performance - Flexible scale 	<ul style="list-style-type: none"> - Requires constant electricity source - High skill required for O&M
Oxidation Ditch	<ul style="list-style-type: none"> - Low power requirement - Suitable for small scale equipment 	<ul style="list-style-type: none"> - Requires constant electricity source - High skill required for O&M

	OVERVIEW OF TECHNOLOGY OPTIONS: ADVANCED TECHNOLOGIES		<i>centralized systems</i>
	Technology	Pros	Cons
	Membrane Bioreactor	- High quality treatment suitable for water reclamation	- Requires constant electricity source - High skill required for O&M
	Modified Activated Sludge Process	- Removal of BOD and Nutrient substance (N, P)	- Requires constant electricity source - High skill required for O&M



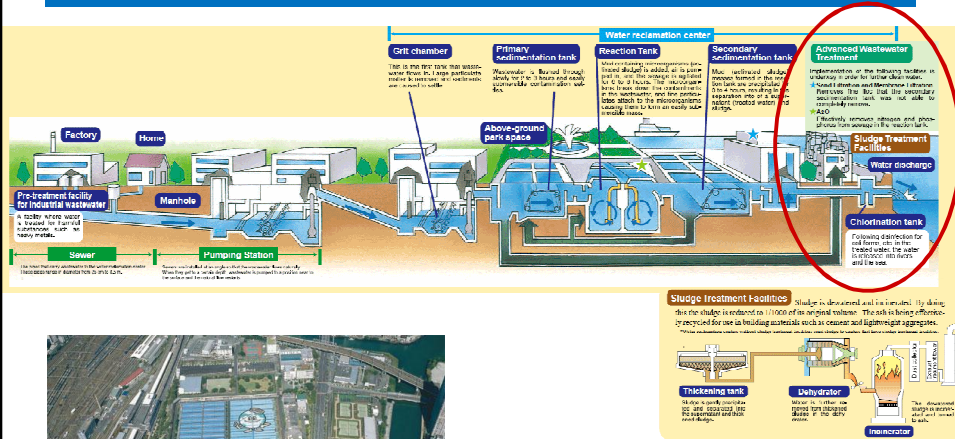
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WATER RECLAMATION
&
SLUDGE RECYCLING



OVERVIEW OF TECHNOLOGY OPTIONS:
WATER RECLAMATION

centralized systems
recycling



Shibaura Sewage Treatment Plant
Tokyo, Japan

OVERVIEW OF TECHNOLOGY OPTIONS:
DISPOSAL – RECYCLING OF SEWAGE SLUDGE

recycling



Landfill



Compost



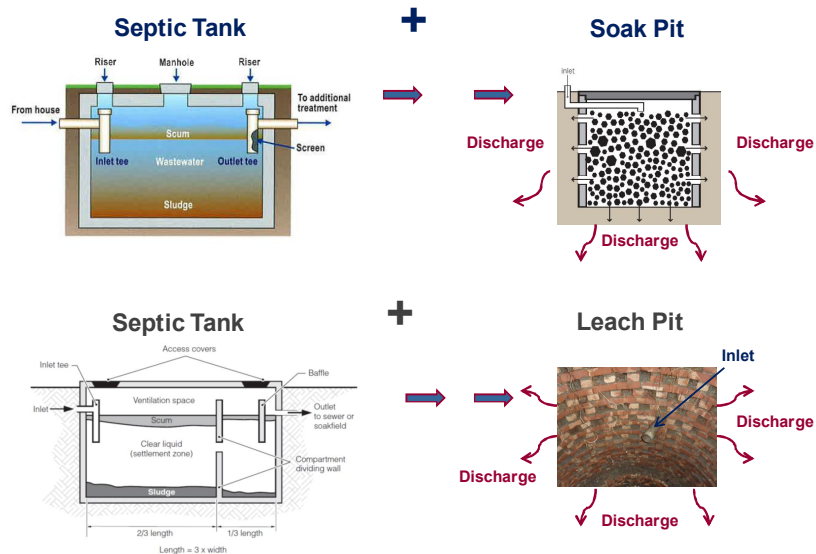
OVERVIEW OF TECHNOLOGY OPTIONS

decentralized systems

OVERVIEW OF TECHNOLOGY OPTIONS: CONVENTIONAL SYSTEMS

decentralized systems

Septic Tank + Ground Filtration Systems



OVERVIEW OF TECHNOLOGY OPTIONS: CONVENTIONAL SYSTEMS

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Septic Tank + Ground Filtration Systems

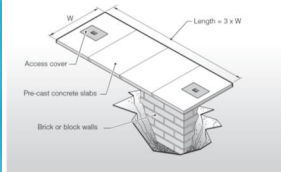


Figure 1: Ground Treatment Tank



Figure 2: Ground Treatment Tank 2

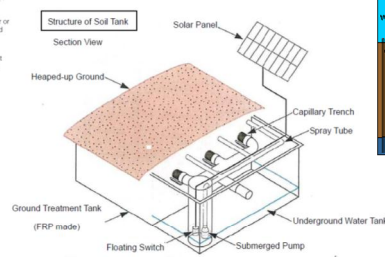
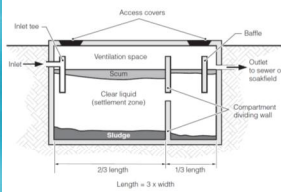
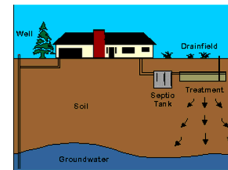


Figure 3: Ground Tank Structure



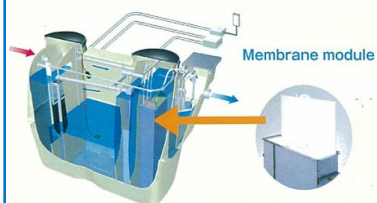
OVERVIEW OF TECHNOLOGY OPTIONS: ADVANCED SYSTEM: JOHKASOU

decentralized systems

SMALL-SCALE JOHKASOU (FRP)

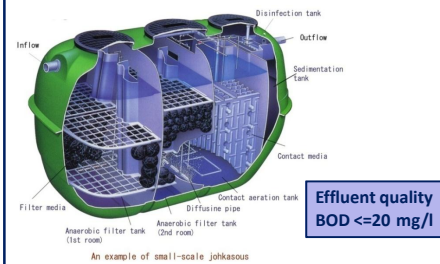
Capacity = 5 to 50 users

Membrane johkasou



Effluent quality
BOD <= 5 mg/l
T-N <= 10 mg/l

Conventional johkasou (FRP-made)



Johkasou for BOD, N&P Removal



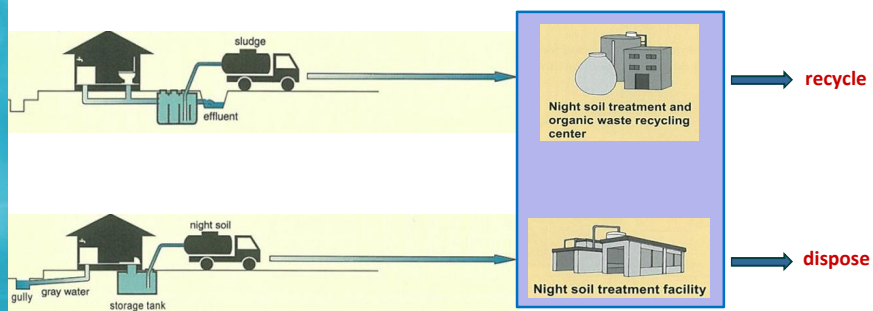
Effluent quality
BOD <= 10 mg/l
T-N <= 10 mg/l
T-P <= 1 mg/l

OVERVIEW OF TECHNOLOGY OPTIONS: DECENTRALIZED SYSTEMS

Technology	Pros	Cons
Septic tank	<ul style="list-style-type: none"> - No electricity required - Low sludge production 	<ul style="list-style-type: none"> - Additional treatment is highly recommended (necessary when water table is high) - Limited treatment performance - Rich in pathogen
Johkasou	<ul style="list-style-type: none"> - Environmentally-friendly effluent (can be discharged directly to water bodies) - High treatment performance - Pathogen free 	<ul style="list-style-type: none"> - Requires electricity source - High sludge production

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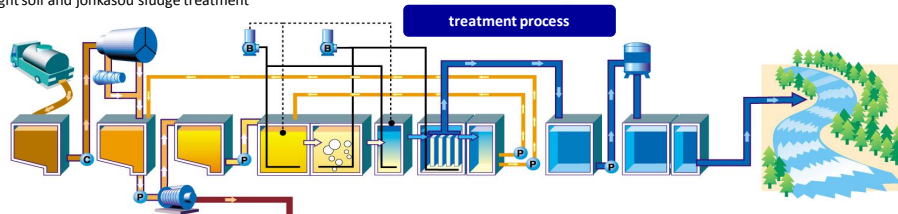
SLUDGE AND NIGHT SOIL COLLECTION & TREATMENT + RECYCLING



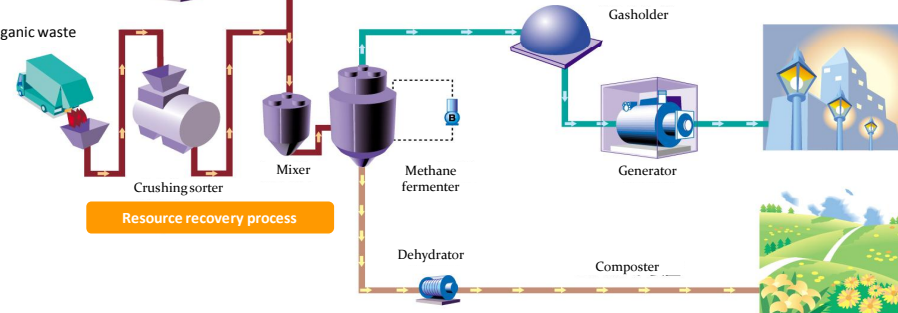
NIGHT SOIL TREATMENT AND ORGANIC WASTE RECYCLING CENTER

decentralized systems

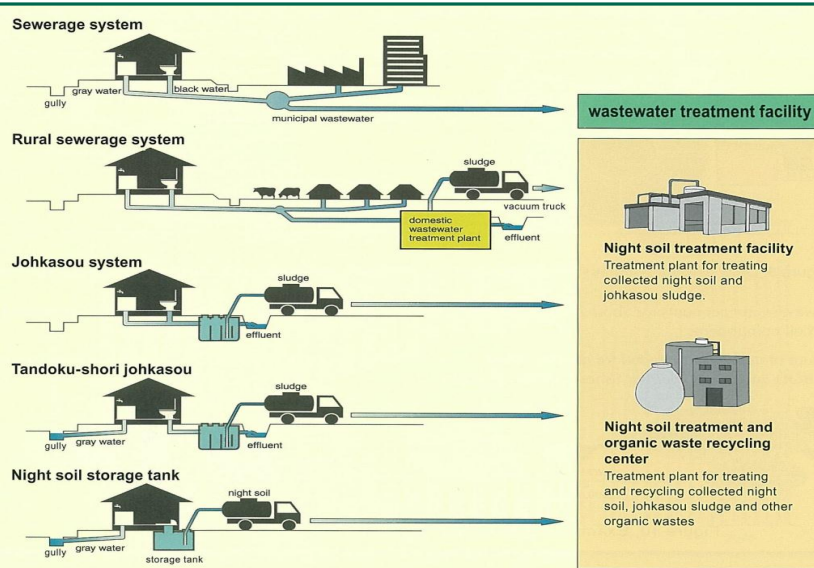
● Night soil and johkasou sludge treatment



● Organic waste



CENTRALIZED & DECENTRALIZED WASTEWATER TREATMENT SYSTEMS IN JAPAN





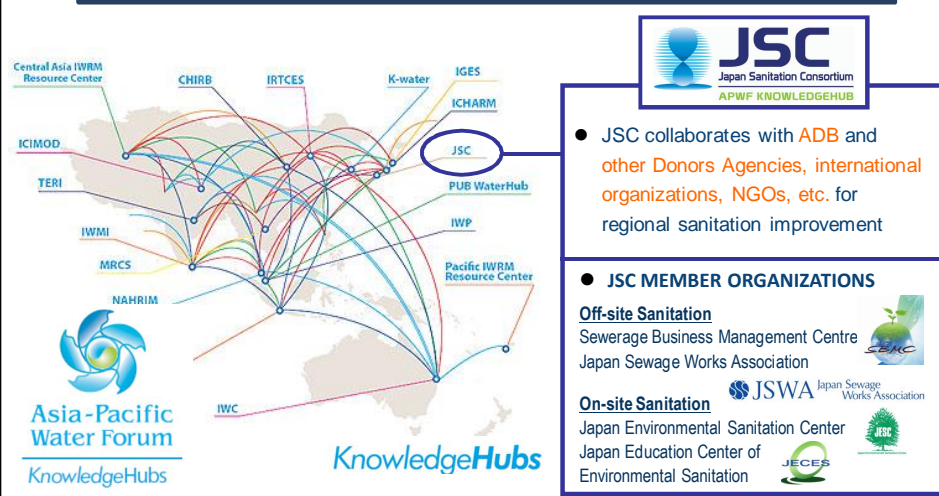
CONCLUSION

To consider for technology selection:

1. Land availability or affordability
2. Desired quality of treated effluent
(depending on regulations/laws, recycling purpose)
3. Availability of water
4. Targeted amount of energy consumption
5. Required system management and level of expertise for O&M
6. Specific requirements: e.g. odours/fly, etc.



- The Japan Sanitation Consortium (JSC) was launched on 16 October 2009
- JSC consists of the 4 main national agencies managing on-site and off-site sanitation in Japan
- JSC aims to utilize Japan's advanced experience in sanitation and successful models from other countries to solve related issues in the region





JSC Sanitation KnowledgeHub, Japan
Regional Water Knowledge Hub for Sanitation

■ **JSC Expertise**

- Member of a regional network of water specialists, committed for sanitation development in the Asia-Pacific region
- On-site and off-site sanitation specialized organization

■ **JSC Services**

- Networking, Information Gathering & Sharing, Knowledge Dissemination, Support to International Donor Organizations

■ **JSC Partners**

- ADB, JICA, Japan Water Forum, UNICEF, etc.



Thank you for your attention

Knowledge Networking for Water Security in the 21st Century

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