

6th International Workshop on Decentralized Domestic Wastewater Treatment in Asia

Decentralized Wastewater Management in Vietnam

Tokyo, September 2018



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Content

- Classification of DWWM models and Country DWWM statistics
- D-B-O issues of DWWM models
- Solutions for improvement

Classification of DWWM models

- Group 1: on-site sanitation systems
 - 1a. Low-cost on-site sanitation systems
 - 1b. Mechanized on-site sanitation systems
- Group 2: Cluster DWWM systems
 - 2a. Wastewater management scheme and wastewater collection network
 - 2b. Low-cost cluster wastewater treatment systems
 - 2c. Mechanized cluster wastewater treatment systems
- Different ownership, sources of funding, modes of management, etc.

Recent situation of the wastewater treatment in Vietnam

	Centralized Wastewater Treatment system (Ex: Sewer system)	Middle scale or cluster type wastewater treatment system	Decentralized wastewater treatment system (Ex: Septic tank, johkasou, pit latrine)	Without any wastewater treatment
Definition of each treatment system in your country	 HHs + Collection + WWTP for city scale serving basin or sub-basin catchment area Septic tanks at HHS as preliminary treatment are in most cases 	- Serving towns, townlets, development areas with sewers	 Non-sewered areas, or short distance sewer lines (resorts, individual apartments, shops, restaurants, hospitals, factories, etc) 	 Sewered + direct discharge Non-sewered areas
Installed plant number	- <u>39 WWTPs</u> in >20 cities	- 10% of 4,000 urban development areas = <u>400</u> <u>WWT stations</u> (WWTS) in paper, 50% of them are functioning in realty = <u>200</u> <u>WWTS</u> such as 2 in Phu My Hung, 1 in Ecopark, 1 in Royal city, 1 in Dang Xa, etc	 Country: 90% of 13,600 medical points (hospitals, clinics, etc) = 12,250 WWTS, among which 35% are in good operation condition. 1,000 WWTS in factories 200 WWTS in restaurants, shops, resorts 1,000 WWTS in hotels Total: 14,500 WWTS Besides: 25,000 systems with Septic tanks only Livestock farms: 400,000 m³/d x 30% with biogas digester Hospitals: 1,012,500 persons are served Hotels, resorts: 1,260,000 p. served Factories: 300,000 p. 	
Number of Population using each wastewater treatment systems	- 17% of urban population = <u>5.5 million</u> persons	 200 WWTS x 50% of design capacity x 500 m³/d or 3,000 persons = <u>30,000 persons</u> Handcraft villages: just few 		

*Reference: figures are calculated by author based on various sources

DBO issues of Group 1, on-site sanitation systems, septic tank

Design:

- No official Design Standard (MOH: Manual only)
- Volume if not enough?
- No water proof?
- Some use house foundation to make tank wall
- "Not allowed" Infiltration chamber (soak pit)

Build:

- No water proof
- No access for check and desludging
- No ventilation
- Misconnection (inlet, outlet, inside the tank)

- Septic tank is a property of household
- No desludging unless clogging
- Sludge management is not controlled
- Miss-use: hazardous waste



DBO issues of Group 2a, Wastewater management scheme and Wastewater collection network

Design:

- Connection is not a concern of many wastewater projects
- Wrong selection of collection network type
- Lack of low-cost sewerage solutions
- Lack of integration with drainage system

Build:

- Quality of construction works
- Misconnection (rainwater and wastewater, household connection, manhole, reverse flow, etc)

- Solids clogging
- No fund for O&M
- No clear solution for dredged sludge treatment/ disposal
- Poor public involvement





DBO issues of Group 2b, Low-cost wastewater treatment systems

Design:

- Lack of Design Standard
- Vietnamese standard QCVN 14:2008/BTNMT, N, Coliforms: not achievable.
- Lack of adequate HH connection and wastewater collection components

Build:

- Quality of construction works
- Planning and phasing
- Start up difficulties

- Solids clogging
- Hydraulic loads
- No fund for O&M
- No clear solution for dredged sludge treatment and disposal
- Limited capacity of operators

QCVN 14:2008/BTNMT

No	Parameters	Column A ^(a)	Column B ^(b)
1	рН	5 - 9	5 – 9
2	BOD ₅ (20°C), mg/l	30	50
3	TSS, mg/l	50	100
4	NH ₄ -N, mg/l	5	10
5	NO ₃ -, mg/l	30	50
6	PO ₄ ³⁻ , mg/l	6	10
7	Total Coliforms, MPN/100 ml	3,000	5,000

^(a) - Maximum allowable values for wastewater discharged to water bodies serving domestic water supply purpose.

^(b) - Maximum allowable values for wastewater discharged to water bodies serving another purposes (irrigation, water transport, etc.).

BASTAF for 160 households







BASTAF for handcraft villages (food processing, livestock breeding, ...)

WWT for 100 HHs in Lim townlet, Bac Ninh prov.

WWTS Q = 100 m³/day, Vietnam Friendship Village, Tu Liem, Hanoi

BASTAF for 400 HHs, Xuan Mai townlet, Chuong My, HN

4 WWTS for 2,600 HHs, Cho Moi townlet, Bac Kan

WWTS for Minh Quan commune clinic, Yen Bai province







BASTAF-GREEN FOR CANAL RESTORATION





DBO issues of Group 2c, Mechanized wastewater treatment systems

Design:

- Lack of Design Standard
- QCVN 14:2008, N, Coliforms: not achievable.
- Lack of adequate wastewater collection component
- Double investment in urban areas
- Too shallow: limited aeration and settling efficiency
- Limited access, especially for underground tanks

Build:

- "Small" thinking, not adequate attention for QA
- Quality of construction works: leaking, sinking, etc.
- FRP tanks: very different quality, not certified
- Start up
- Media wash-out

- Solids clogging
- No fund for O&M
- Smell control
- C/N ratio is to low
- No professional O&M team





PACKAGED WWTS AFSB-F



VIDB building, Hanoi



Pacific building, Hanoi 35 FRP tanks



DWWM in urban areas



Ngo Thi Nham apartment, Ha Dong, Hanoi



Planning Palace, My Dinh, Hanoi



VCB bldg, Hanoi



Sofitel Plaza, Hanoi

AFSB-F at Vicostone Factory

AFSB-F for Residential – Office Complex 12 Thuy Khue, Hanoi





BASTAFAT-F FOR 12 HIGH-CLASS VILLAS AT NCC MY DINH, HANOI



BASTAFAT-F FOR CAT BA ISLAND, HAI PHONG



BASTAFAT-F FOR ECO-RESORT DONG ANH, HANOI



BASTAFAT-F FOR HISTORICAL PLACE K9 (DA CHONG, BA VI, HANOI)







BASTAFAT-F FOR MEDICAL CENTER FOR DRUG EDICTS, YEN BAI PROVINCE



BASTAFAT-F FOR HISTORICAL PLACE K9 (DA CHONG, BA VI, HANOI)

UV DISINFECTION CHAMBER, BASTAFAT-F

Faecal Sludge Management



- One of key components of DWWM
- Poor management practice in most places
- Already mentioned in Decree 80 and some provincial regulations
- Resource recovery from sludge is potential, but sludge reuse Guidance is not yet available.









Solutions for improvement

- Early decision making, integration of DWWM options into *urban* planning
- **Design standards** are to be issued
- *Effluent standards* are to be reviewed, especially on N, and pathogens removal in DWWM systems, and to avoid double investment
- **Testing and Certification** for technology, equipment, operation of w/w systems, sludge management services is needed
- Household connection should be compulsory. All components should be considered in a whole chain: HH facilities – collection network – wastewater treatment – disposal or reuse
- Professional O&M service providers are needed, on-site or outsourced. Branch of provincial sewerage and drainage company is one among options
- **Promotion center**(s) with strong networking is needed

Example: ADB (CDTA 7885-VIE) project, Support to Central and Local Governments to Implementation of Urban Environmental Improvement Programs

Ben Tre Option 2-Decentralized



Vinh Long- CSS Option 2-Decentralized



Vinh Long- CSS Option 3-Centralized/Decentralised





Thank you very much for your attention



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