



**6th International Workshop
on Decentralized Domestic Wastewater
Treatment in Asia**

Decentralized Wastewater Management in Vietnam

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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 WWTP stations</u> (WWTS) in paper, 50% of them are functioning in reality = <u>200 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 - <u>Total: 14,500 WWTS</u> - <u>Besides: 25,000 systems</u> with Septic tanks only - Livestock farms: 400,000 m³/d x 30% with biogas digester	
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	- Hospitals: <u>1,012,500</u> persons are served - Hotels, resorts: <u>1,260,000</u> p. served - Factories: <u>300,000</u> p.	

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

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

Design:

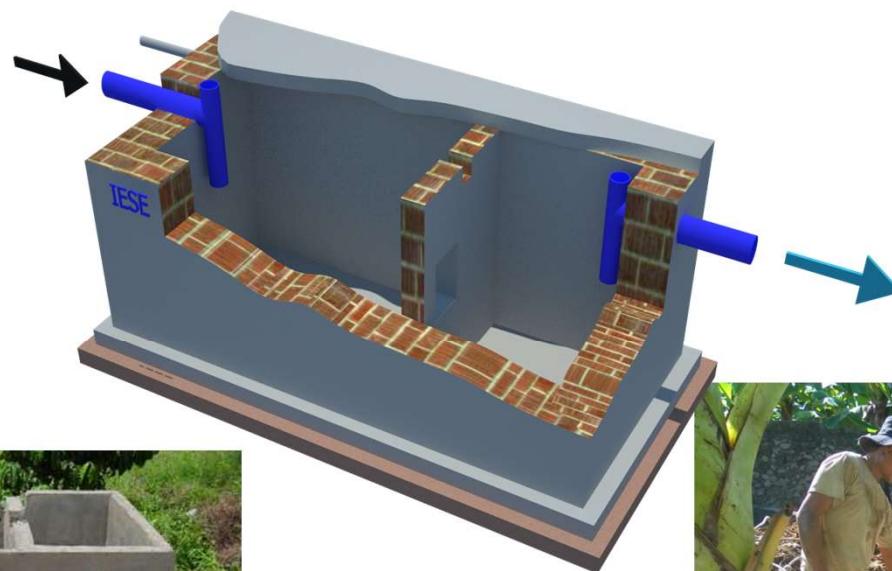
- No official Design Standard (MOH: Manual only)
- Volume if not enough?
- No water proof?
- Some use house foundation to make tank wall
- “Not allowed” Infiltration chamber (soak pit)

Build:

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

Operation:

- 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:

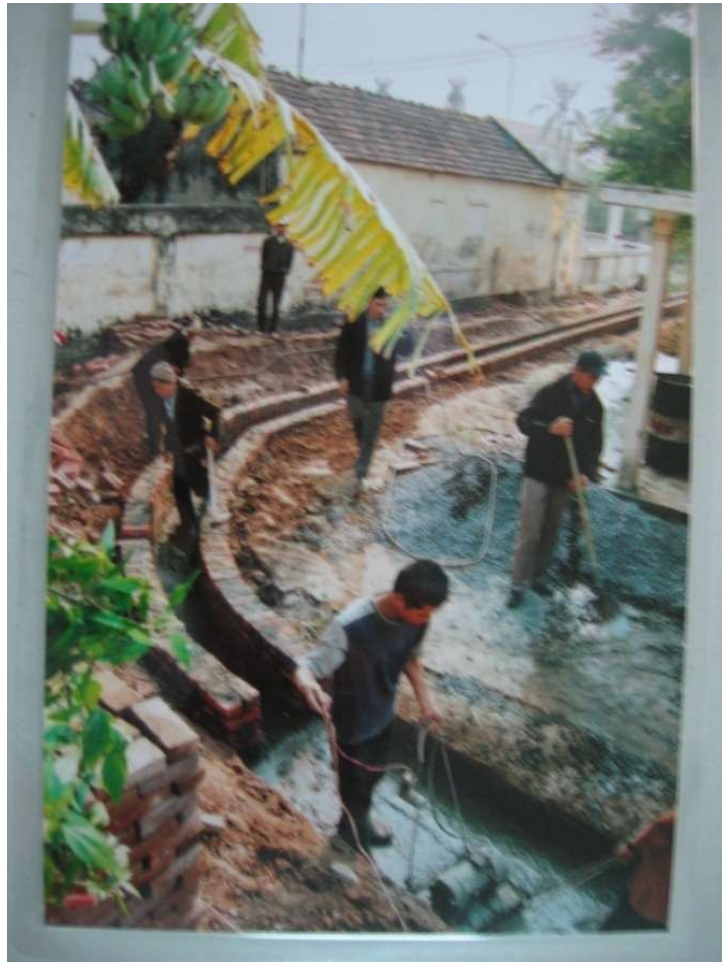
- Connection is not a concern of many wastewater projects
- Wrong selection of collection network type
- Lack of low-cost sewerage solutions
- Lack of integration with drainage system

Build:

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

Operation:

- 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

Operation:

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

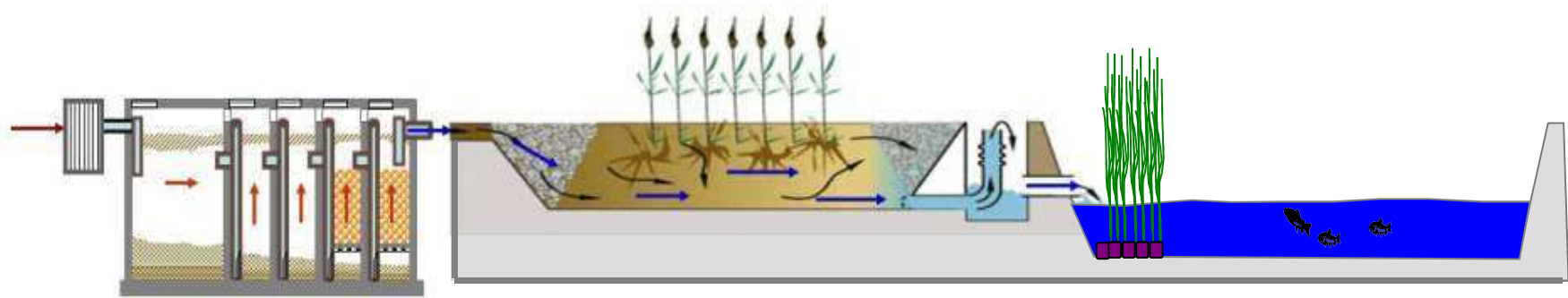
QCVN 14:2008/BTNMT

No	Parameters	Column A ^(a)	Column B ^(b)
1	pH	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

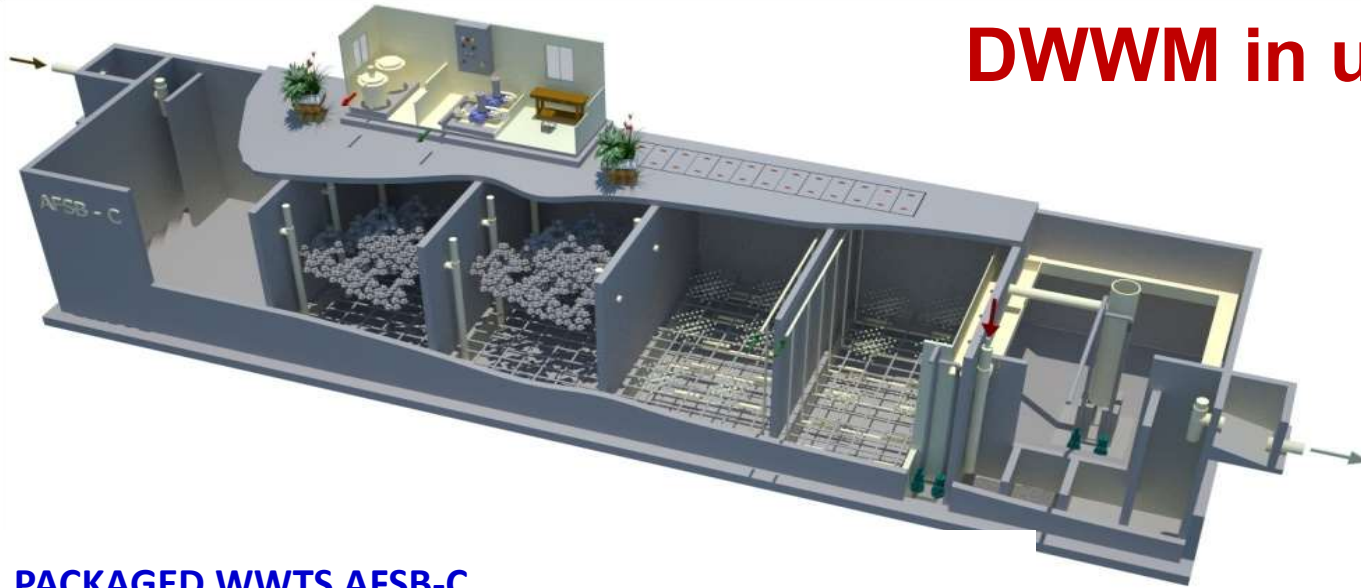
Build:

- “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

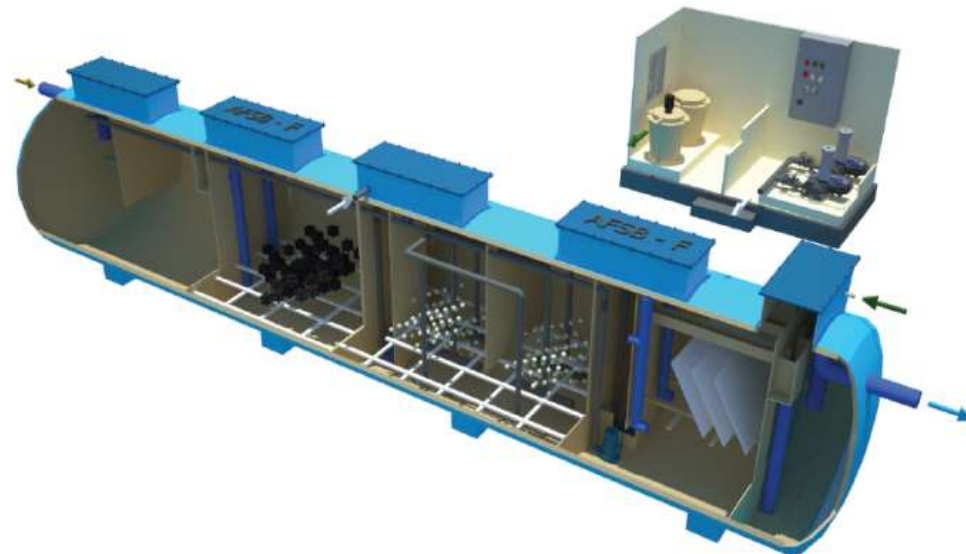
Operation:

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

DWWM in urban areas



PACKAGED WWTS AFSB-C



PACKAGED WWTS AFSB-F

DWWM in urban areas



VIDB building, Hanoi



Pacific building, Hanoi
35 FRP tanks



PVN bldg, Hanoi



Ngo Thi Nham apartment,
Ha Dong, Hanoi



Sofitel Plaza, Hanoi



Planning Palace,
My Dinh, Hanoi



VCB bldg, 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 DWWMM*
- *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.*

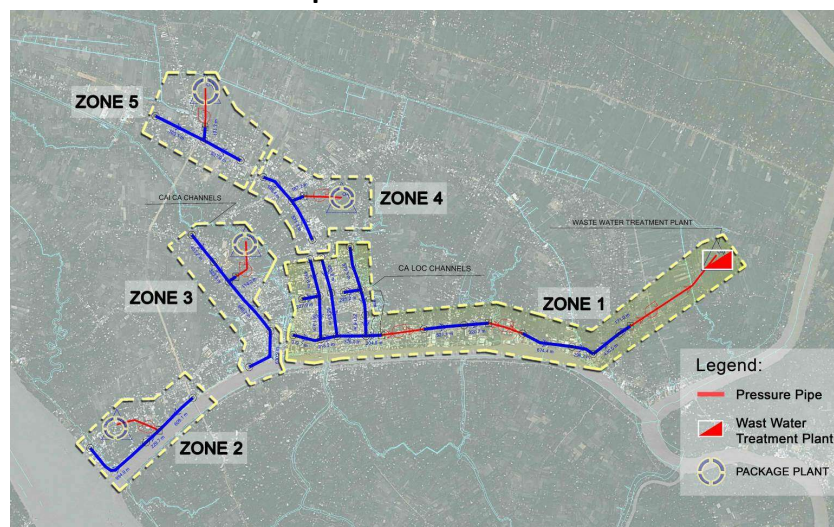


Solutions for improvement

- 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 out-sourced. 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

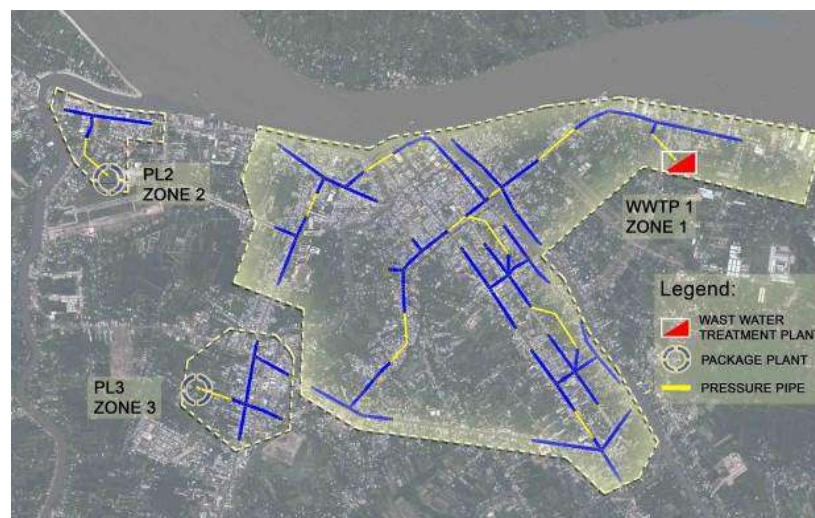
Ben Tre Option 2-Decentralized



Vinh Long- CSS Option 2-Decentralized



Vinh Long- CSS Option 3-Centralized/Decentralised



**Thank you very much
for your attention**



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