



**TỔNG CỤC MÔI TRƯỜNG**

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**CENTER FOR ENVIRONMENTAL CONSULTANCY AND TECHNOLOGY**

# **Technical assistance for decentralized wastewater treatment and development orientation in Vietnam**

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**VIETNAM ENVIRONMENT ADMINISTRATION**

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# CONTENT

1

Overview of the situation of domestic wastewater treatment in Vietnam

2

Advantages and limitations of decentralized wastewater treatment in Vietnam

3

Objects of the application of decentralized wastewater treatment solutions in Vietnam

4

Criteria for selecting technology to apply decentralized wastewater treatment in Vietnam

5

Technologies applied to implement decentralized wastewater treatment

6

Some recommendations of CECT to develop decentralized wastewater treatment in Vietnam

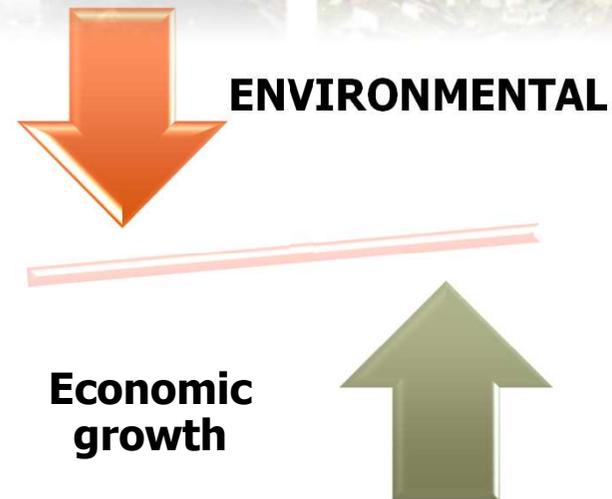
7

CECT's support in developing decentralized wastewater treatment in Vietnam

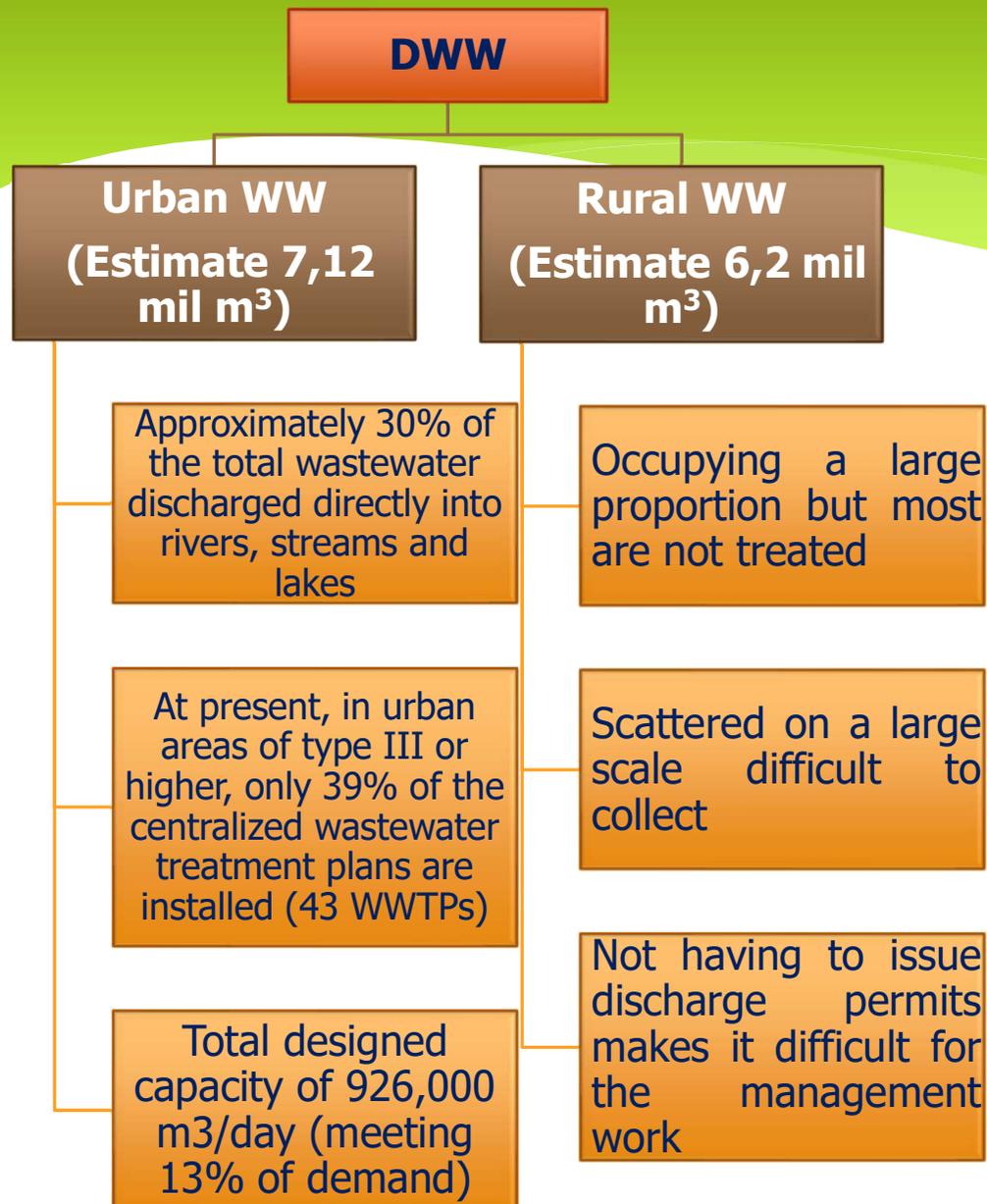
# 1. OVERVIEW OF THE SITUATION OF DOMESTIC WASTEWATER TREATMENT IN VIETNAM

Over the past years, Vietnam's economy has achieved many important achievements, surpassed the poverty line and is in the period of growth and development. However, due to the negative side of the development, ENVIRONMENTAL POLLUTION especially WATER POLLUTION in recent years has also increased.

One of the main causes of WATER POLLUTION in Vietnam today is the issue of DOMESTIC WASTEWATER (**DWW**).



# 1. OVERVIEW OF THE SITUATION OF DOMESTIC WASTEWATER TREATMENT IN VIETNAM



In big cities: special and grade-I urban areas, the rate of wastewater treated is higher than that of small and medium-sized cities and rural areas but still at a low level that cannot meet the current rate of urbanization

According to a report of the MONRE as of 2018, only **20.62%** of the city's domestic wastewater was treated in Hanoi, while in HCMC. In Ho Chi Minh City, the proportion of DWW is treated only about **10%**.

# 1. OVERVIEW OF THE SITUATION OF DOMESTIC WASTEWATER TREATMENT IN VIETNAM

The urban drainage system in particular and the drainage system in general of Vietnam still have many shortcomings:



## Collection network

- Patchwork, asynchronous
- The total length of the network is too short compared to the length of streets and alleys



## Performance of centralized WWTPs

- The collection system is not complete, so many places only operate about 20% of designed capacity



## Overloading urban drainage network

- The population density and waste standards in urban areas are much higher than in other areas and therefore often overloaded



## Funds for Centralized WWTP investment

- Still too luxurious with 833 large and small cities in Vietnam
- Too difficult for rural, mountainous and other areas



## Increasing pressure on the environment in the future

- Population growth
- High speed of urbanization
- Living standards and standards for water discharge have increased



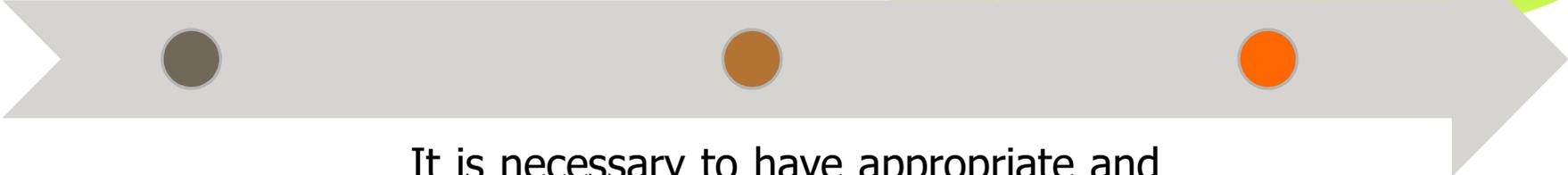
## Rural domestic wastewater collection network

- Most do not have a collection network

# 1. OVERVIEW OF THE SITUATION OF DOMESTIC WASTEWATER TREATMENT IN VIETNAM

Centralized wastewater treatment in Vietnam is facing many difficulties and shortcomings as at present

Decentralized wastewater treatment in Vietnam is an appropriate solution today



It is necessary to have appropriate and simple solutions and collection technologies and wastewater treatment with low construction and operating costs and convenience in wastewater collection with Vietnamese conditions.

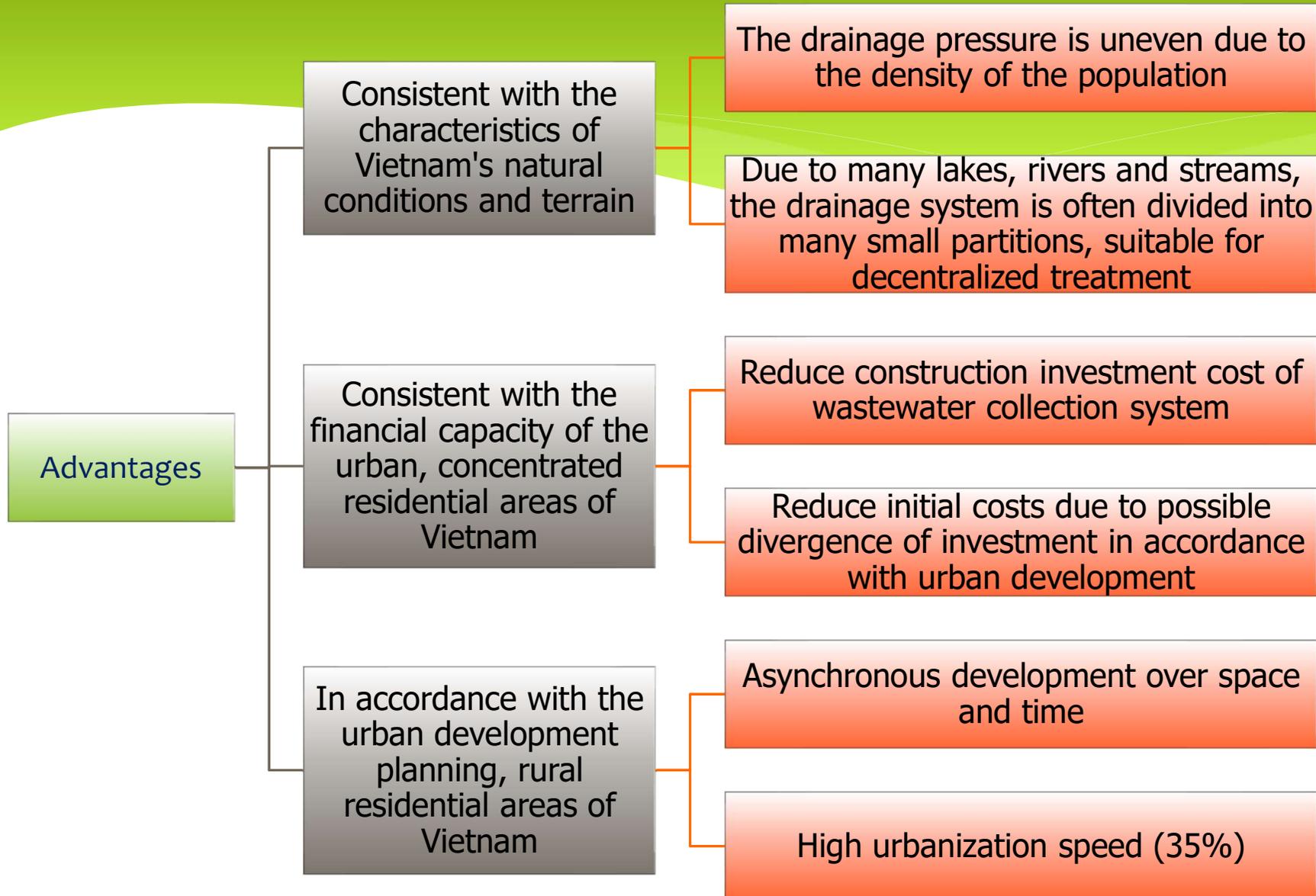
Currently, the Institute of Environmental Science and Technology of the National University of Civil Engineering, a number of centers under the Ministry of Construction, Center for Consulting and Environmental Technology, VIETNAM ENVIRONMENT ADMINISTRATION, and a number of Japanese and Korean companies etc. have successfully applied and tested a number of models of domestic wastewater treatment at small scale for localities across the country.

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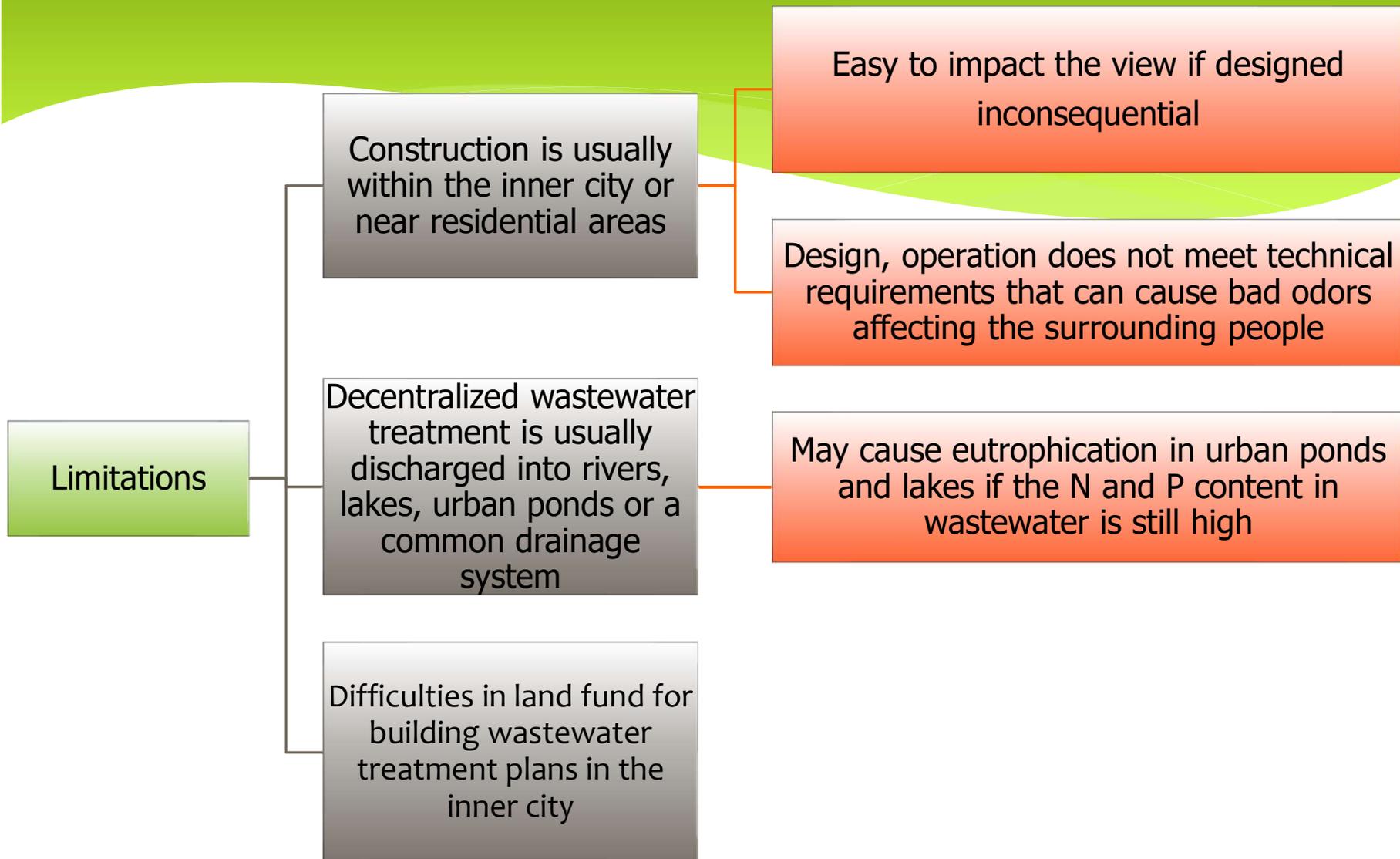


*Figure 2: Some decentralized wastewater treatment technologies are applied in Vietnam*

## 2. ADVANTAGES AND LIMITATIONS OF DECENTRALIZED WASTEWATER TREATMENT IN VIETNAM

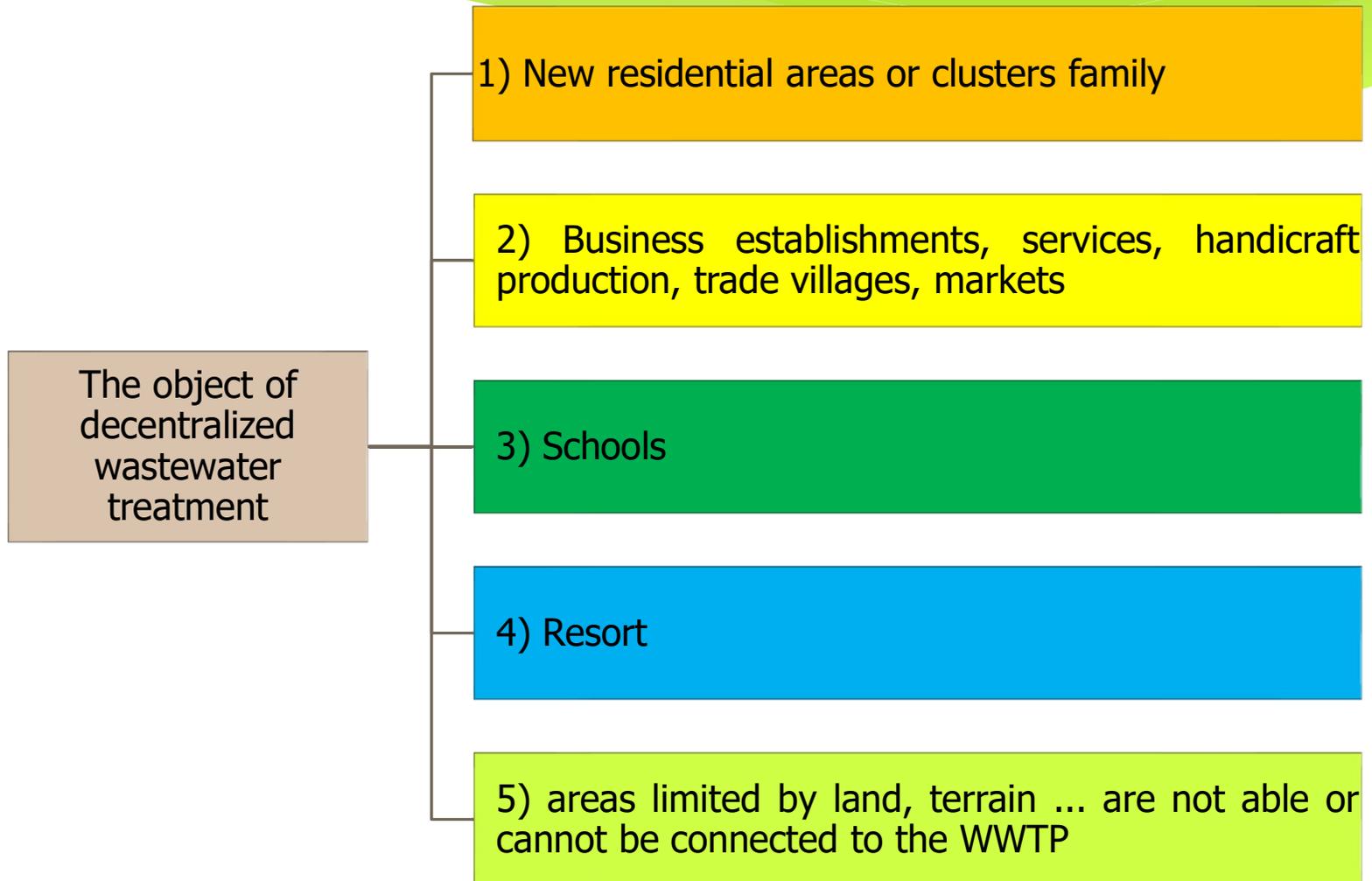


## 2. ADVANTAGES AND LIMITATIONS OF DECENTRALIZED WASTEWATER TREATMENT IN VIETNAM



### 3. OBJECTS OF THE APPLICATION OF DECENTRALIZED WASTEWATER TREATMENT SOLUTIONS IN VIETNAM

In Vietnam, according to the current provisions of Circular 04/2015 / TT-BXD, decentralized drainage is applied to:



### 3. OBJECTS OF THE APPLICATION OF DECENTRALIZED WASTEWATER TREATMENT SOLUTIONS IN VIETNAM

Decentralized wastewater treatment solutions in Vietnam are divided into 03 categories:

#### On site Decentralized wastewater treatment

- Applies to individual drainage households.
- $Q < 50 \text{ m}^3 / \text{ day}$ .

#### Decentralized wastewater treatment in clusters

- Apply to the drainage households near each other.
- $Q: 50 - 200 \text{ m}^3 / \text{ day}$ .

#### Decentralized wastewater treatment by region

- Applied in an administrative boundary.
- $Q: 200 - 1000 \text{ m}^3 / \text{ day}$ .

## 4. CRITERIA FOR SELECTING TECHNOLOGY TO APPLY DECENTRALIZED WWT IN VIETNAM

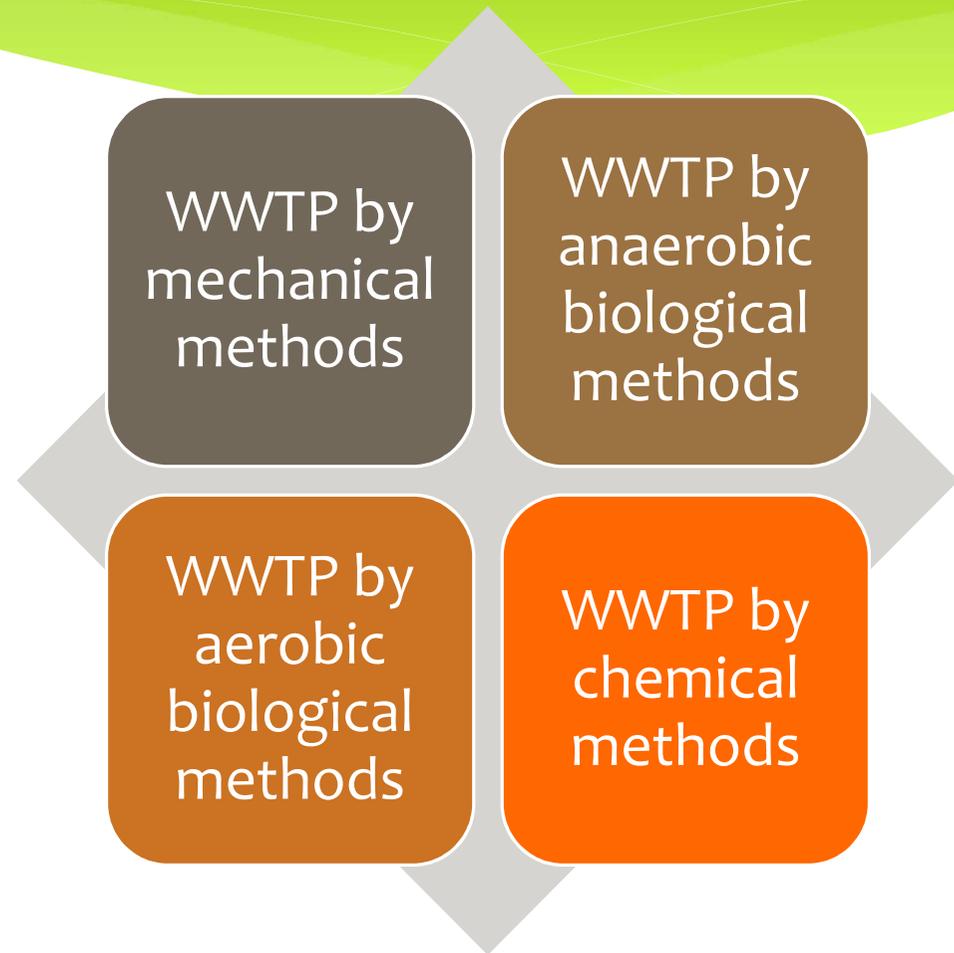
To select decentralized wastewater treatment technology, the following criteria should be applied:

1. Capacity of WWTP
2. Components and nature of wastewater, load-bearing capacity, location of discharging sewage after generating wastewater
3. The level of energy use required for collection and treatment
4. Requirements according to standards and standards on the quality of treated waste water
5. Technical, financial and managerial conditions for management and operation of WWTPs
6. Climatic conditions, topography, engineering geology and hydrogeology
7. The ability to expand or increase capacity and the ability to connect to the centralized wastewater treatment system in the future
8. Other environmental factors are involved

## 5. TECHNOLOGIES APPLIED TO IMPLEMENT DECENTRALIZED WASTEWATER TREATMENT

Depending on the construction planning or drainage planning conditions, the specific local conditions and the above criteria that the technology applied to decentralized wastewater treatment will have different options between locations. methods and works.

However, in theory, decentralized wastewater treatment technologies can be classified into four categories as follows:

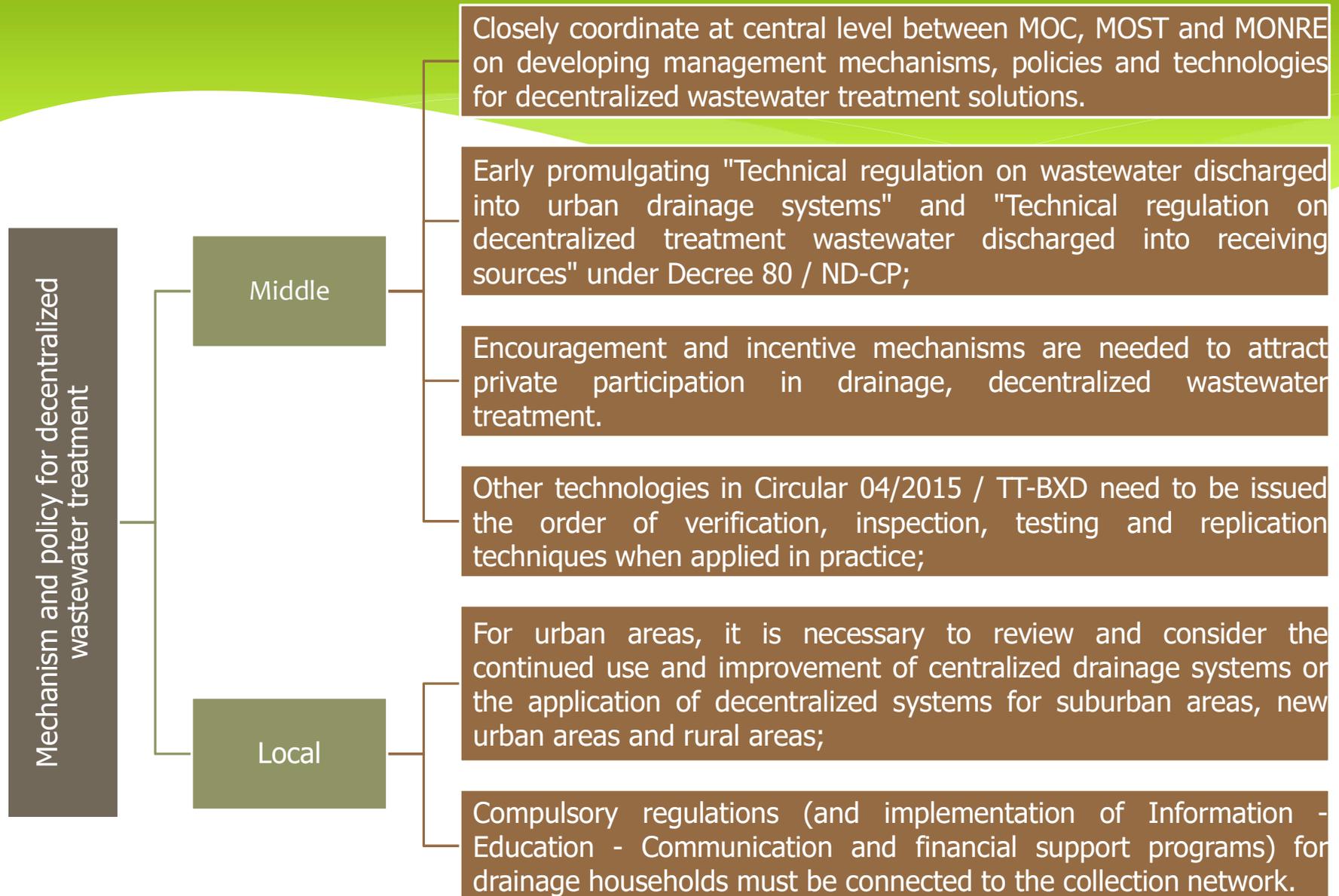


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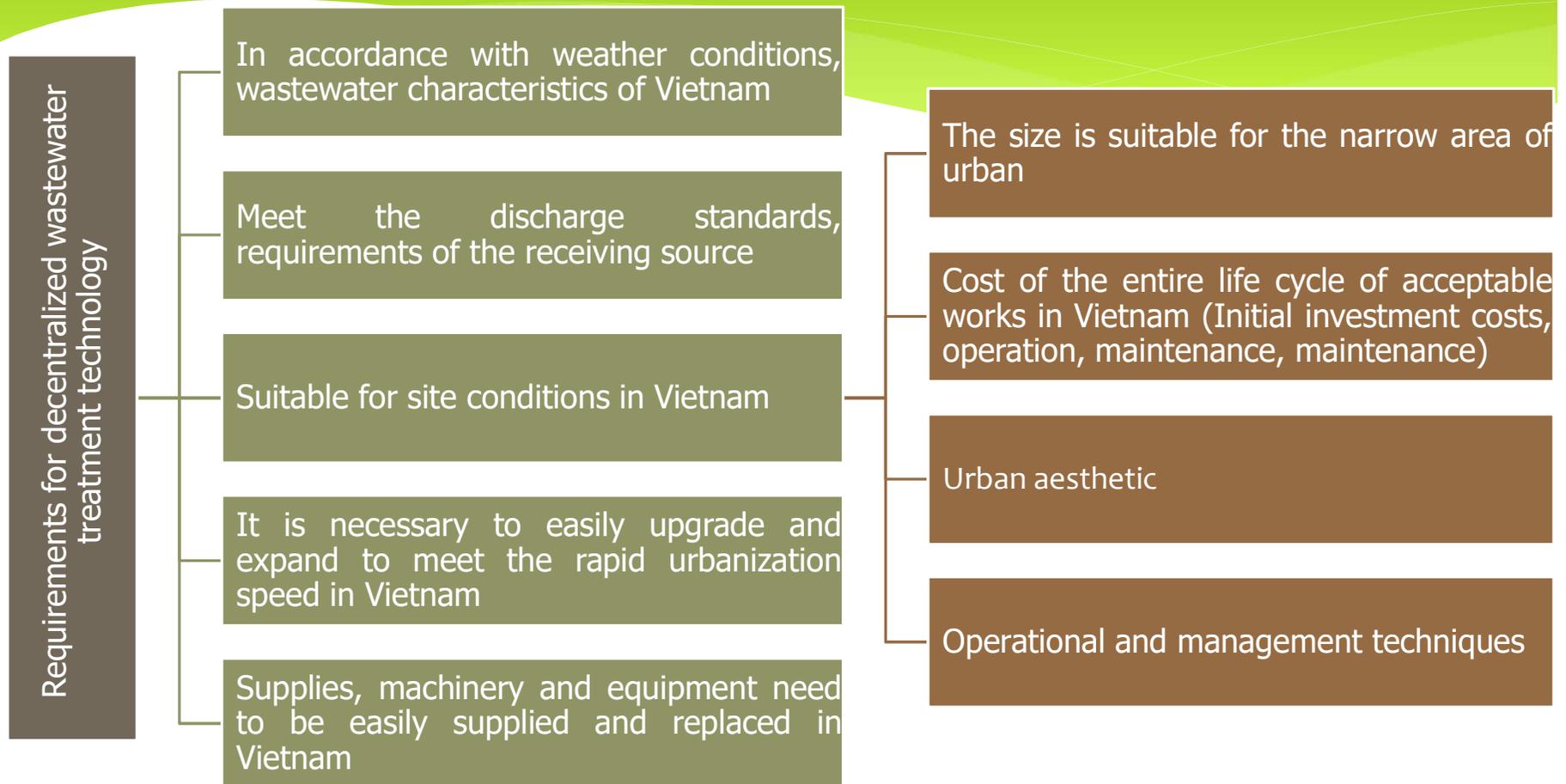
Currently, some of the technologies currently being guided by the Ministry of Construction in Circular 04/2015 / TT-BXD to apply decentralized wastewater treatment are as follows:

- 1 Septic tank
- 2 Anaerobic filter tank with partition
- 3 Improved septic tank with baffles and anaerobic filter compartment upstream
- 4 Anaerobic lakes, anaerobic lakes, stable lakes
- 5 constructed wetlands
- 6 Batch reactor
- 7 Other technology

## 6. SOME RECOMMENDATIONS OF CECT TO DEVELOP DECENTRALIZED WWT IN VIETNAM



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### Implementation of technology application

It is necessary to be verified and appraised for other technologies in Circular 04/2015/TT-BXD before applying

Environmental procedures should be implemented in accordance with the regulations of the Vietnamese Government before implementation

Construct synchronously the system of collection network and WWTPs to ensure connectivity and reduce waste in investment

The supplier in Vietnam is capable of maintaining and replacing equipment for emergency treatment when an incident occurs.

Reduce investment, operation and maintenance costs in accordance with Vietnam's economic conditions

High localization rate

Low energy consumption, alternative supplies

Maximize use of Vietnamese human resources in construction, installation and maintenance

Production, installation and transfer in the country

Spare parts and materials are easily replaced by materials in Vietnam

# 7. CECT'S SUPPORT IN DEVELOPING DECENTRALIZED WASTEWATER TREATMENT IN VIETNAM

## GENERAL INTRODUCTION

### **Establishment decisions**

### **Functions and powers**



- Center for Environmental Consultancy and Technology (CECT) is a unit under the Vietnam Environment Administration, established under Decision No. 2465/QĐ-BTNMT dated November 26<sup>th</sup>, 2008 of the Minister of Natural Resources and Environment.
- Functions, tasks, powers and organizational structure according to Decision No. 1313/QĐ-BTNMT dated April 26<sup>th</sup>, 2018 of the Minister of Natural Resources and Environment.

# FIELD OF OPERATION OF CECT

**CECT** operates in the fields of:  
Environmental protection consultancy;  
Research, Application and Technology Transfer for Environmental Pollution Treatment.



- Organizing applied research, implementing scientific and technological advances in the field of environment;
- Building and organizing the implementation of key projects on application of environmental science and technology achievements;
- Participating in evaluation and assessment of environmental pollution treatment technology, waste treatment facilities and equipment prior to operation.
- Organizing the implementation of international cooperation programs and projects as assigned by the Director General.

# PROJECT OF HANDLING OF ENVIRONMENTAL POLLUTION HAS BEEN IMPROVED AND TRANSFERRED BY CECT

**1. Project:** XLYON and CTMT for urban residential areas in the Nhue-Day river basin



*Location Tay Mo Ward, Nam Tu Liem District, Hanoi*

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## 2. Project:

Preventing pollution and improving Cau river's water source by controlling and treating highly durable organic substances in leachate by means of advanced oxidation combined with biology



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**3. Project:** Building a model to treat Mixed waste water - processing of agricultural products and foodstuffs rich in organic matter (brewing wine, making tofu, making rice cakes, rice vermicelli, raising animals ...) at low cost, applicable to residential areas in the Nhue-Day river basin



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## 4. Project:

Overcoming pollution, improving the landscape of Cau River basin by pilot domestic wastewater treatment by anaerobic filtration technology combined with underground filtration yards to plant trees



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