

#### 12<sup>th</sup> International Workshop on Decentralized Domestic Wastewater Treatment in Asia











# Performance evaluation and testing of decentralized wastewater treatment facilities in China: Practice and Vision

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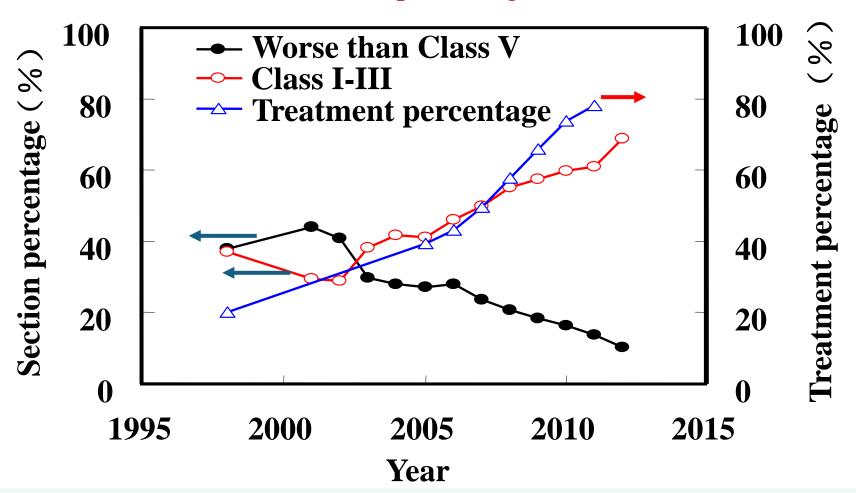
## **Outline**

□ Decentralized wastewater treatment in China

- ☐ Testing system in China
- Perspective

#### Rapid development of urban wastewater treatment

The wastewater treatment percentage reached 80% in 2010.



Water environmental quality was improving very fast with the increase of urban wastewater treatment percentage.

#### Situation in rural areas

Without proper collection and treatment of wastewater, the water environmental quality in rural areas were deteriorating quickly.

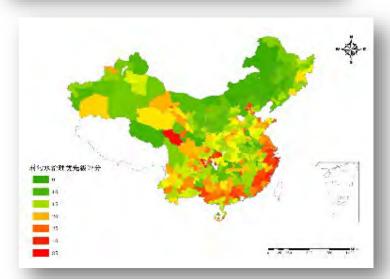


#### **Institutional development**





North Center for Rural Wastewater Treatment Technology was established in RCEES, CAS by the Ministry of Housing and Urban-Rural Development in 2008.







Nationwide survey

Technology development

Development of standards & guidelines

#### Technology development-biological treatment

In the initial stage, the technologies employed for rural wastewater treatment were mainly developed by research institutes and universities.



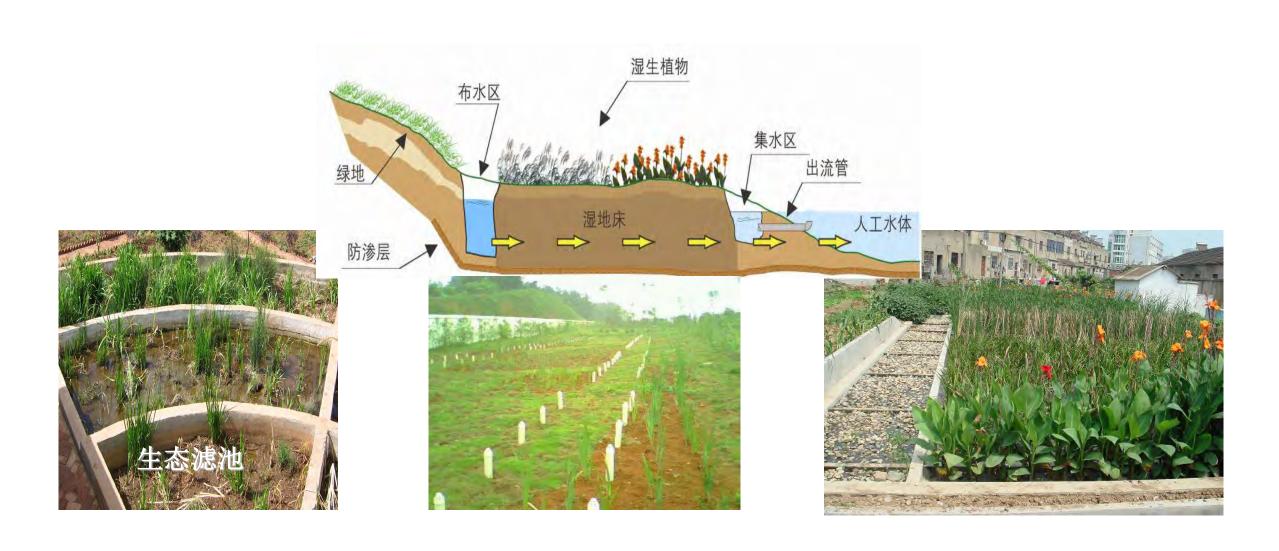






## Technology development-ecological treatment

Wetland systems were developed and widely applied.



## Technology development-household type treatment

Some household type treatment facilities using different processes were also developed and applied, particularly for the mountain areas.













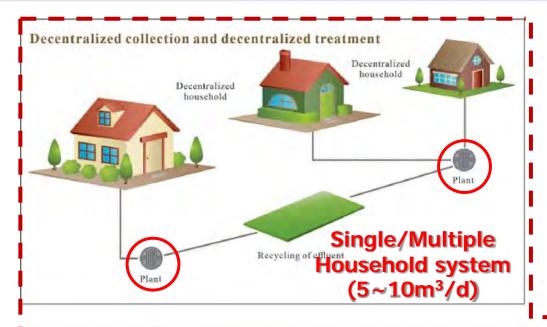
#### Rural wastewater market became attractive

In August 2015, the Ministry of Housing and Urban-Rural Development launched the "100 Rural Wastewater Treatment Demonstration Counties", attracting a lot of companies to enter the market.

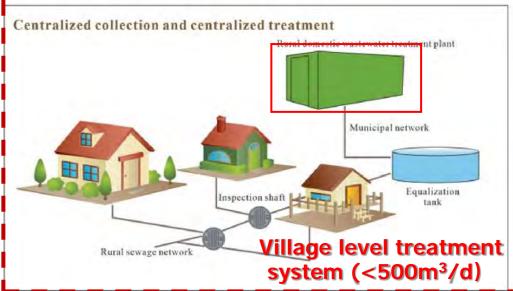


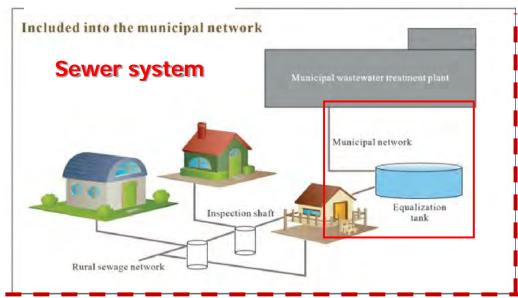
Standardized equipment becomes the dominant products.

#### Typical models for rural wastewater treatment









#### Setting technical standards

#### Upgrading the industry standard to national standard



Technical Specification of wastewater engineering for town and village

Industry Standard



## Making policy for local discharge standard setting

Making principles for setting discharge standards: considering the environmental capacities of receiving water and the facility scales.

## 中华人民共和国生态环境部办公厅中华人民共和国住房和城乡建设部办公厅

环办永体苗 (2018) 1083 号

#### 关于加快制定地方农村生活污水 处理排放标准的通知

各省、自治区、直辖市环境保护厅(局)。住房被乡建设厅(建 委、水务局)。推南省水务厅。

农村生活污水处理排放标准是农村环境管理的重要依据。关 系污水处理技术和工艺的选择。关系污水处理设施建设和运行维 护咸本。为落实《中共中央办公厅 国务院办公厅关于印发〈农 村人居环境整治三年行动方案〉的通知》要求,指导推动各地加 快制定农村生活污水处理排放标准。提升农村生活污水治理水 平,现就有关事项通知如下。

#### 一、总体要求

农村生活污水治理。要以改善农村人居环境为核心, 壓特从 实际出发。因地制宜采用污染治理与资源利用相结合。工程措施 与圭态措施相结合、集中与分散相结合的建设模式和处理工艺。 推动城鎮污水管阿向周边村庄延伸覆盖。积极推广易维护、低成 本、低能耗的污水处理技术, 散励采用生态处理工艺。加强生活

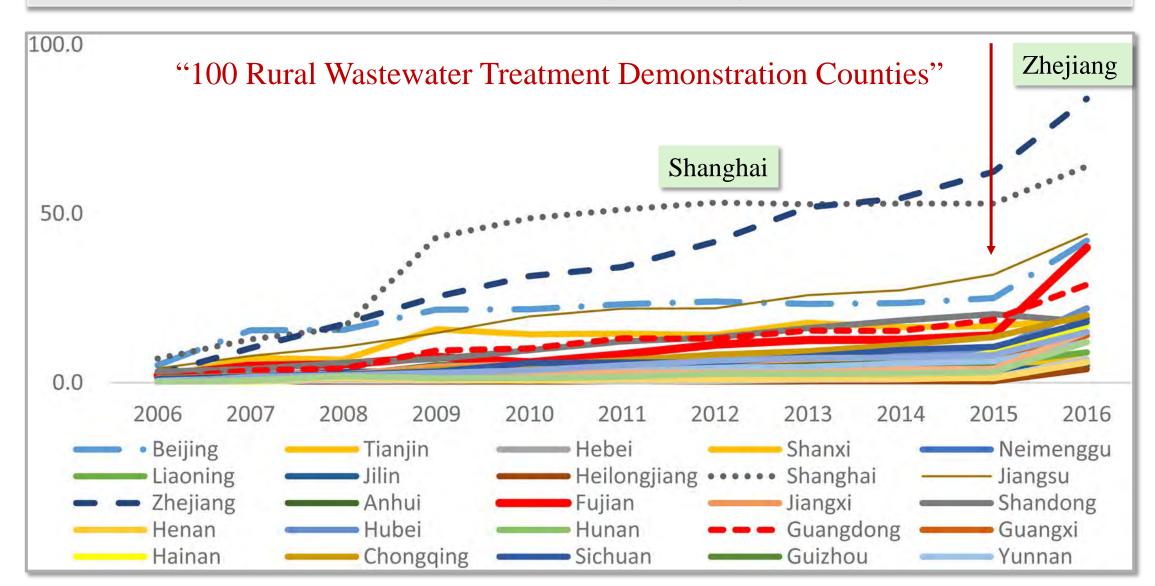
入IV类和V类 态环境部, 住房 采取适当方 (COD<sub>cr</sub>), pH, 未经处理的厕 为氮磷的不达标 和总磷 (TP)。 村不同区位条 确的小微水体, 和人居环境改 不发生黑臭。 重实效、便于 可适当放宽排放 国家或地方相应 《污水排入城镇 /天 (m³/d) 以 污水处理规模、 参照执行 《城镇 并明确监测、 农村生活污水处 的农村生活污水 - 步确定具体处 定地方农村生活 完成。已制定抽 直接排入水体、 市) 依法按程 和排放關值应 要在 10 个工 入Ⅱ类和Ⅲ类 (COD<sub>Cr</sub>), pH,



Two ministries issued Notice on Discharge Standard Setting, 2018

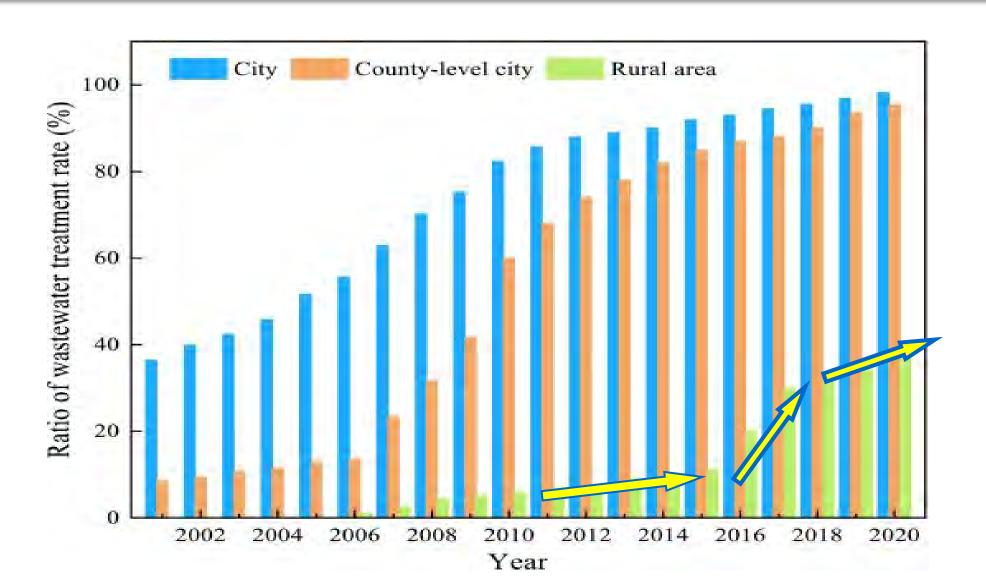
## Development of rural wastewater treatment

Fast increase of treatment percentage since 2015.



#### **Current status of rural wastewater treatment**

There is much room for improvement in rural wastewater treatment.



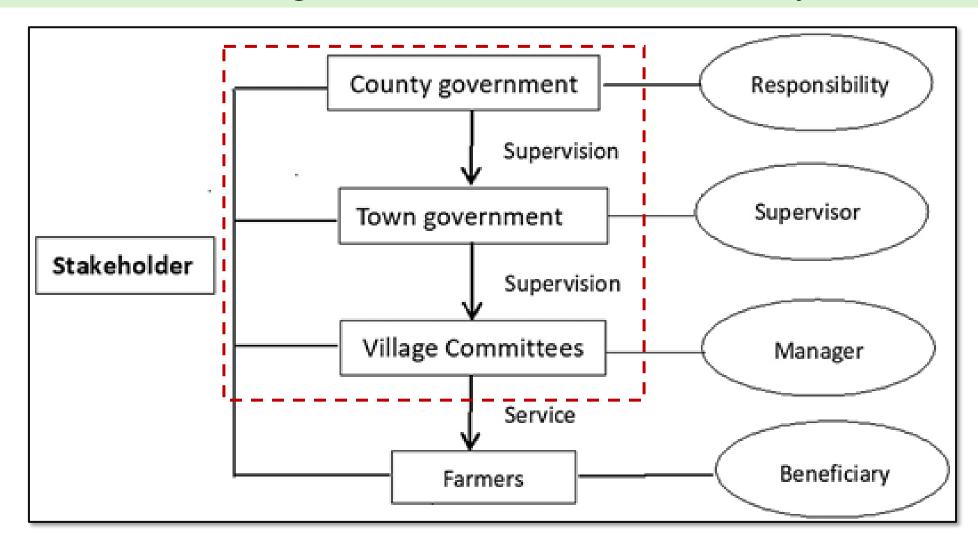
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#### Major stakeholders of rural wastewater treatment

The local governments, which do not have the professional knowledge, are responsible for establishing the rural wastewater treatment systems.



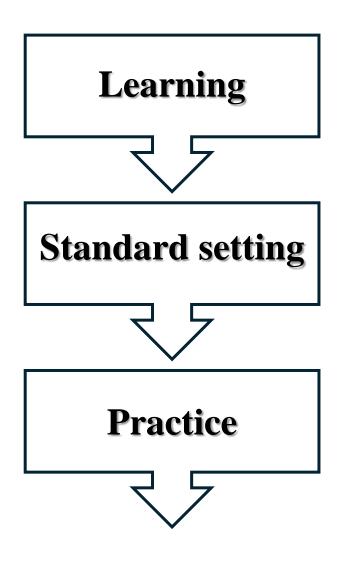
#### How to choose suitable products?

Very divers products are appearing in the market. It is very difficult for the local officials to choose the rural wastewater treatment systems and products.



Objective and unbiased product performance evaluation is expected.

#### Preparation for establishing testing systems



International workshops, technical visits (Japan, Germany), experts consulting,...

Japanese system, German system (BSI)

**On-site performance evaluation** 

## **Visiting BSI in Germany**







**Notified Body** 







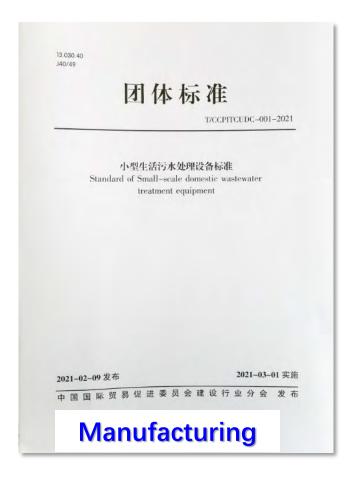
**Complete product performance testing** 

Test of nutrients removal performance

Market Sales License Regulatory Basis

#### Standard setting

Group standards were issued for the production, evaluation, and maintenance of the decentralized wastewater treatment systems.







#### Establishment of on-site testing procedure

- Watertightness testing
- Nutrients removal performance testing
- Noise testing
- Energy consumption testing





京 号	公司=	地点。	I艺》	设计里。 m³da	进水计量 m3/n₽			电表KWh			pH		水温℃□		备注と
					上次中	当前	进水量-	上次表底。	当前表底。	消耗电量。	进水平	出水产	进水。	出水。	
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Inflow and outflow measurement

**Sampling** 

**Record sheet** 

#### **Example of on-site testing**



- ☐ Sixteen facilities consisting of 4 processes in 4 villages in Jiangsu Province
- ☐ Duration, 4 months; The result was used for supporting governmental decision.

#### **Example of platform testing**

2019-2022, two sets of equipment with different processes were tested:

#### **■** Design scale:

1m<sup>3</sup>/d, respectively

#### **■** Test content:

Treatment performance under normal/low temperature and overloading/underloading

#### **■** Location:

Beijing Bishui Water Reclamation Plant (180,000m<sup>3</sup>/d)

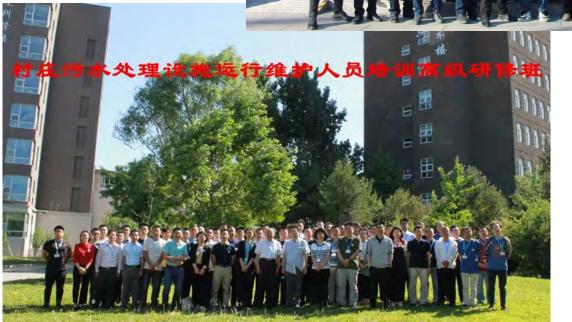


Wastewater treatment equipment performance test

#### **Technical training**

Over 200 trainees from the companies and local authorities participated **Training course** for operation and maintenance management of small-scale sewage treatment facilities.





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#### Perspective

There is a strong need for establishing the performance evaluation and testing systems.

The conditions are maturing: related standards, some practices

It is the time to find a suitable institution to implement the evaluation and testing work.

It is suggested to establish an Asian Performance Evaluation Network to unify the evaluation standards and procedures.

## ご清聴 ありがとうございました。

