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ADVANCING A **NEXUS APPROACH**
TO THE SUSTAINABLE MANAGEMENT
OF **WATER, SOIL AND WASTE**



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Applying the nexus approach in the context of waste water irrigation and livelihood provision

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Rationale

- Wastewater use for irrigation is **one of the most used examples for the nexus approach**
- There is consensus that a **regulated reuse of treated wastewater holds a great potential** for both environment protection as well as for food security and livelihoods

Key questions to refer to:

- What are **current practices** in managing wastewater in **Vietnam**?
- In which sense do these practices **succeed/fail to manage** water, soil and waste resources in an integrated way?
- How can the **benefits of adopting a nexus approach be defined and quantified** in the context of wastewater reuse?



Wastewater in Asia

- Asia: accelerated urbanization
- Growing pressure on water in particular on waste water collection, treatment and disposal, or reuse
- The natural assimilative capacity of water ecosystems will be likely exceeded
- Wastewater treatment : typically only about 10% of urban wastewater treated in Asia
- For industrial zones, conflicting data, but likely similar while impacts and likely more severe and long-term

Source: ADB (2013) Thinking about water differently: Managing the water–food–energy nexus.



Wastewater use in Vietnam

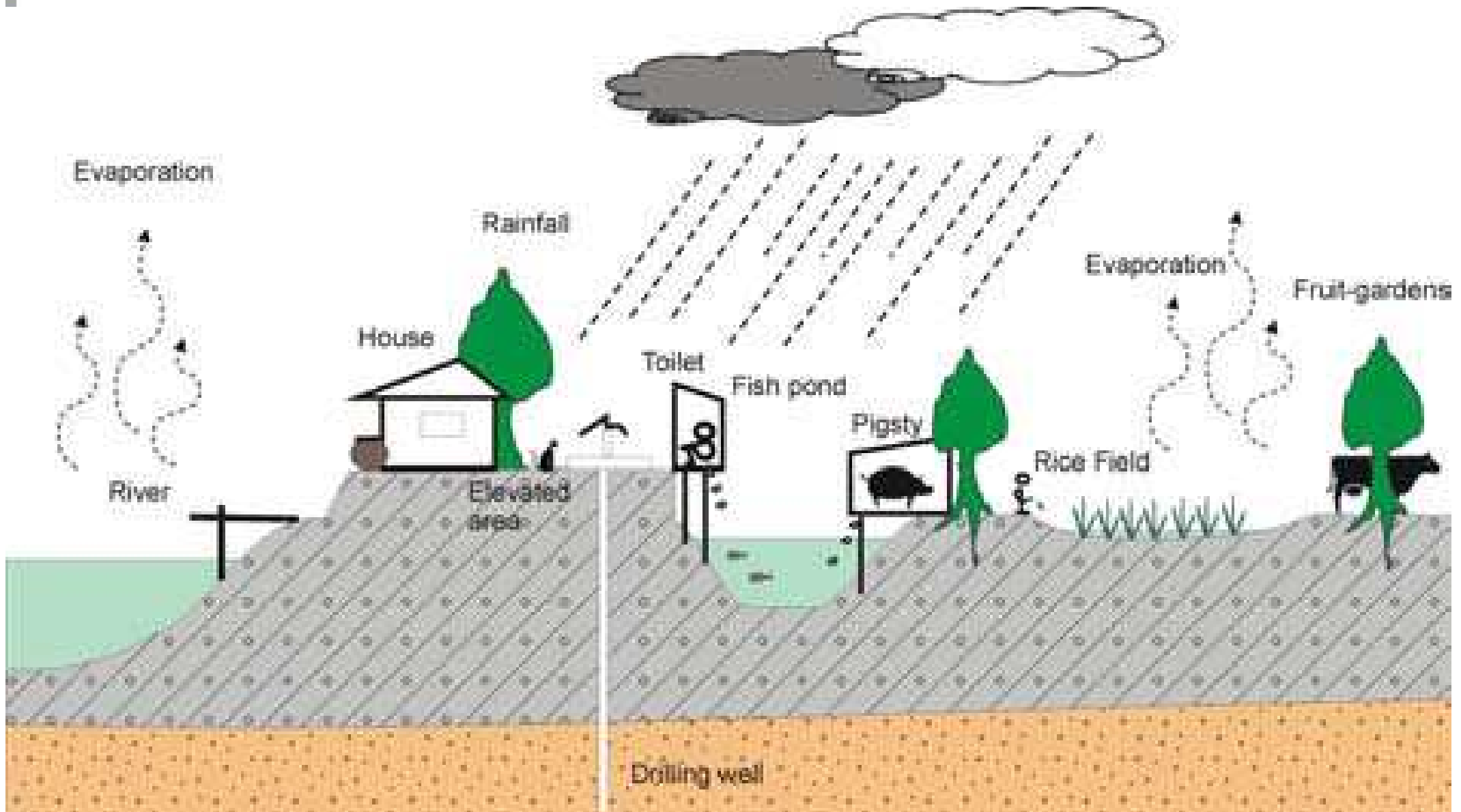
- Wastewater is **often directly discharged** into rivers and lakes
- Municipal wastewater
 - only 6 cities have centralized domestic wastewater treatment
- 283 industrial and processing zones
 - 43.3% with centralized WWT system; 12.8% with insufficient centralized WWT system; 43.9% without centralized WWT system
 - Observation in Can Tho industrial zone: WWT is there but insufficient and often not working



- Wastewater use in agriculture: mainly **indirect reuse**, result of the use of polluted surface water
- **Direct reuse** is mainly applied on small (farm) scale
- E.g. VAC integrated model practiced widely in Vietnam
 - **Vuon** - garden or orchard
 - **Ao** - fish pond
 - **Chuong** - pigsty or poultry
- Old model, but since 1988 (decollectivisation in agriculture) strongly promoted by Gardener's Association / government



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Scheme of a typical VAC farm (T. Le Anh; 2003)

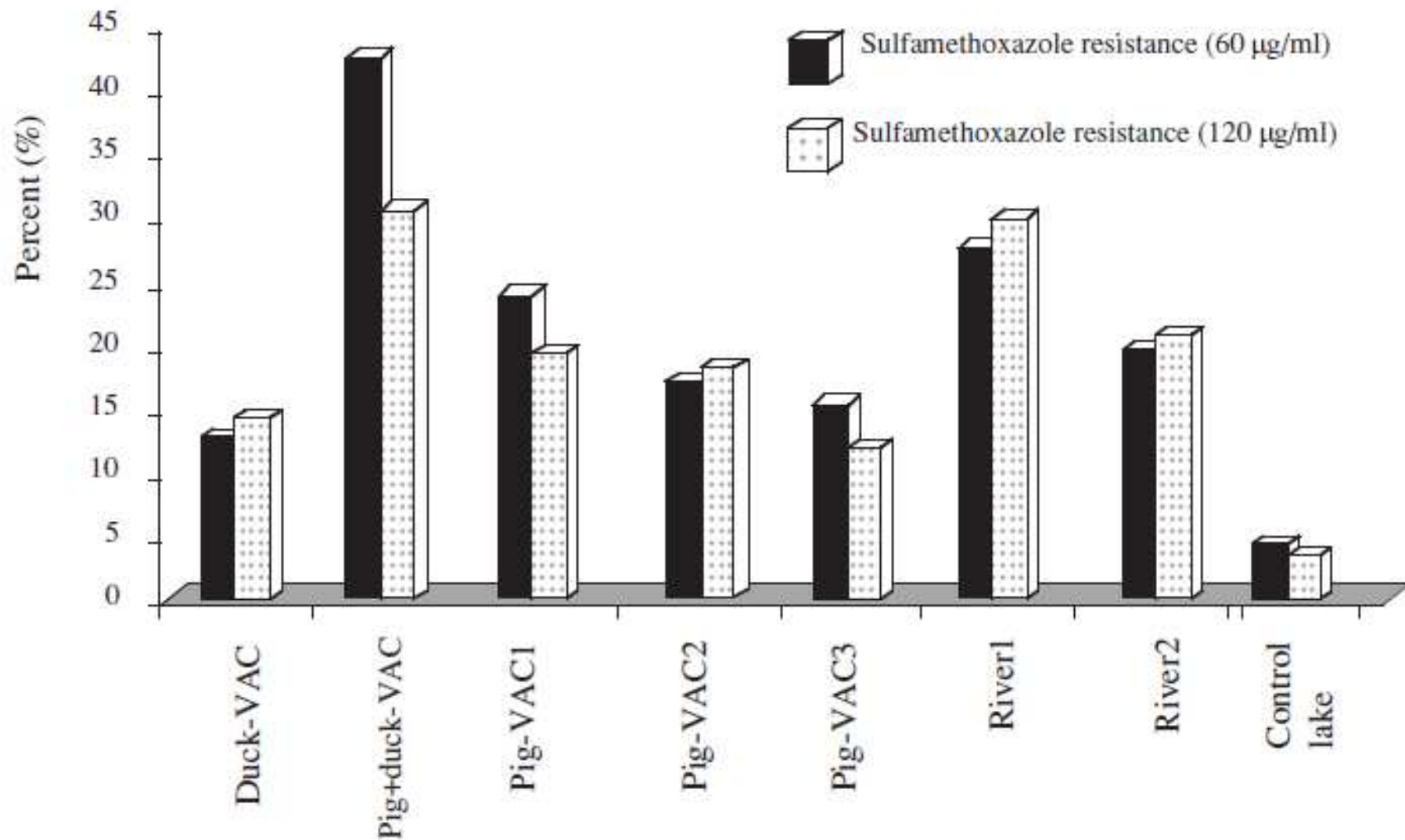


Fig. 2. Occurrence rate of sulfamethoxazole-resistant bacteria.



Example Hanoi

- Wastewater irrigation in peri-urban areas
 - a 658,000 farmers use wastewater to irrigate 43,000 ha around Hanoi, mostly in Thanh Tri
 - 1960s: central canal system constructed
 - Fishponds at the canals, rice fields and vegetable behind
- No official regulations for wastewater use in Vietnam, except for microbiological quality standards (max. total coliform count for effluent discharge to surface water)



Example Hanoi

- **Health issues:** skin diseases, worms, diarrhea etc.
- Wastewater irrigation is **under pressure** due to e.g.
 - increasing **contamination** with industrial effluents
 - availability of pelleted feed (**less need** for WW in ponds)
- As **response** some **communes** (e.g. Thanh Liet)
 - Constructed a decentralized wastewater management system
 - Converted low productivity agricultural land to ponds, 2011: 85 hectares used wastewater fed ponds
- **Individual response:** WW mix with groundwater in ponds, farmers increasingly wear protection clothes

Source: Thang & Yen 2002, Lan Huong Nguyen et al 2012



Wastewater management Hanoi

- Urban wastewater and irrigation **water used** in suburban agriculture are **linked**
 - strict **institutional separation** of urban wastewater **management** and wastewater irrigation
- ↔
- No department/institutions is fully responsible for wastewater management (**scattered responsibility**)
 - Irrigation infrastructure is formal but
 - Wastewater irrigation is **indirect and informal**
 - **Farmers are not recognized** as stakeholders



Formalization and integration needed

- **Formal use** of wastewater instead of informal use
- **Standards** for wastewater re-use in agriculture (with reference to different crops (fodder, food, contact of edible part with water etc.)
- **Coordinated management, vertical integration**
- Institutional **integration** of wastewater use for irrigation **into the overall urban wastewater management**
- **Recognition of the farmer** as stakeholder and provision of training on safe use (include into information flow, control mechanisms etc.)
- **Recognition of the nutrient and pollutant load** of the wastewater (soil conservation, water pollution, income issues)



Identification, quantification of the benefits

- **Monitoring** of the impact of formalized wastewater use on
 - Public health (epidemic studies)
 - Ecosystem health (water and soil resources, biodiversity etc.)
 - Agricultural production (yield, crop diversification etc.)
 - Livelihoods (Income, income diversification)
 - Food security (local to global scale)
- **Compare** with different scenarios (no wastewater use, use of treated wastewater, use of untreated wastewater, use of untreated wastewater in an informal, uncoordinated way,)
- Bring „more nexus“ into the **Water Safety Plans**



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Thank you!

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