SANSED: Closing Nutrient Cycles with hygienically safe substrates of decentralised water management systems in the Mekong-Delta, Vietnam

Microbial load of decentralised water management systems and their impact on public health

(Subgroup hygiene)

Introduction

Water-associated infectious diseases comprise the classical bacterial infections such as cholera, typhoid fever, dysentery, but also the whole group of the gastrointestinal infections with the main symptoms diarrhoea and vomiting.

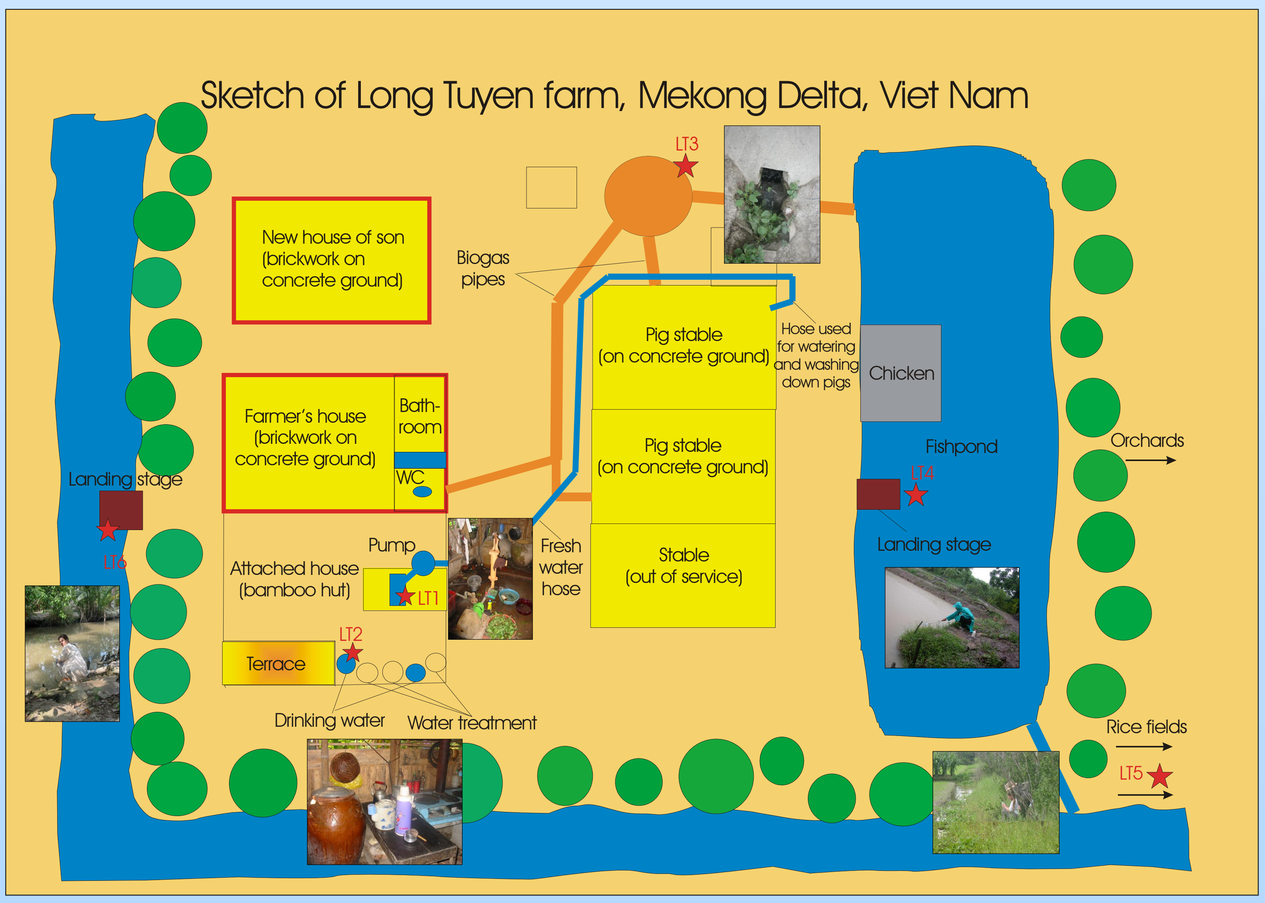
Due to manifold routes of transmission, improvements in the availability and quality of water and sanitation are important factors to reduce disease and death cases from waterborne illnesses.

In order to ensure the aim governed by health of a sustainable drinking water supply and sewage disposal in the Mekong delta, the health-relevant aspects of the different concepts and technologies will be registered, analysed and assessed in the partial project of the environmental hygiene group.

___Activities

- Establish detection methods in the laboratory of the CoT for
  - indicator organisms (*E.coli*, coliform, fecal streptococci)
  - selected pathogen (Salmonella)
  - helminth eggs (to be introduced)
- Examine the hygienic quality of water used for human consumption (drinking, washing...). Compare different drinking water sources and types of water storage.
- Examine sewage and irrigation water for microbiological quality. Special attention is paid to water in direct contact with humans.
- Collect data about potential water-related diseases (e.g. acute gastro-intestinal diseases, cholera, typhoid fever, hepatitis A and E) in the Mekong Delta, on province, district and community levels.

Scheme of the farm in Long Tuyen, where samples are taken. Samling points are marked red.



Sanitary inspections of the area under investigation constitute an important step towards the development of prevention strategies.

First sanitary inspection of sampling site Long Tuyen, **Date: 09/04/2003**

Household members: 10 people of which are two children
3 people work on the farm, 5 work on other jobs (tailor),
house: half wooden, half brickwork, kitchen wooden
biogas plant: in use for human and animal wastes
VACB model since 1996
Size of of farm: 1.4 ha

Sanitation
Distance of latrine in m

to well:	~4 m
to canal:	25 m
to fish pond:	6-7 m
to the nearest irrigation drain:	10 m
to house:	in house, beside kitchen
to biogas plant:	6 m
to drinking water storage:	5 m

Remark: latrine and bath separate in house; pipes of biogas plant are under floor

Drinking water supply
origin of drinking water: ground water;
Condition of well
depth of well: 105 m,
material: PVC pipes, 60 mm diameter, iron hand pump, no filter phase
build in: 1996, registered well

- well situated in the kitchen, sealed surface of about 2 qm^2, slightly steep to drain water outside the kitchen (between wall and bottom connection to a small drain)
- no visible contamination of pump and tap
- hand pump for use in the kitchen and electric pump for pumping water to the pig house, access for chicken, cats and other animals directly to hand pump
- plastic pipes lead groundwater from the well to taps outside the house, three connections, currently only 2 in use for cleaning and watering the pigs and cleaning the toilet
- well lays deeper than latrine, pig house and biogas plant (reflow due to loss of pressure in the pipes or contamination by leakages may be possible

Storage of drinking water:

number of clay pots:	5
volume of pots:	150 L
clay pots	protected from sun, in kitchen 2 covered used for the clean water, sufficient for 15 days, 3 are used for treatment and are not lid
small plastic pot:	outside clay pot
storage of boiled water :	can
treatment:	aluminiumsulfate (sediments in water), boiling

water consumption of boiled water: 5 to 6 liter a day

family never uses canal water, or rain water

Table.: *E. coli* concentrations (CFU/100 mL) at different sampling points, representing different water types, during 4 months.

	LT1	LT2	LT3	LT4	LT5	LT6	LT7
Date	CFU/100mL	CFU/100mL	CFU/100mL	CFU/100mL	CFU/100mL	CFU/100mL	CFU/100mL
07 May 03	10	14	21.000.000	not done	180	160.000	2
04 June 03	0	71	29.900.000	18.000	360	12.000	120
02 July 03	0	102	8.910.000	7.270	0	7.730	1
August 03	20	14	6.730.000	36.400	1.090	7.180	0

Work Plan

Spring 2003:
Data and literature review, establishment of laboratory methods, choosing of the test areas, inspection and mapping of the chosen systems

Autumn 2003:
Interviews with the health authorities, choosing of a further location with the other groups, inspection and mapping of the system, establishment of further laboratory methods.

Spring until summer 2004: data analysis, elaboration of recommendations, handbook

Expected output:

- **Analysis and evaluation of the microbial load of raw-, drinking-, sewage and irrigation water**
- **Assessment of health risks related to decentraliced water management systems with regard to individual consumption habits**
- **Preparation of recommendations for the safe use of raw- and drinking water to avoid health risks**

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