

# Improving Farmers' Wastewater Handling Practice in Vietnam

**This study focuses on perceptions and awareness of farmers and practical aspects of wastewater reuse in two communities of northern Vietnam. The results reveal that raising farmers' awareness of the health risks associated with wastewater reuse and improving their ability to cope with these risks enhances safe handling of waste and contributes to improved hygiene and health practices.**

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## Agricultural wastewater reuse in Vietnam

Use of wastewater for irrigation and in aquaculture has a long tradition in Vietnam. While this practice has advantages in terms of economics and environmental impacts, it poses nonetheless potential health risks if wastewater is not properly managed.

In Nhat Tan and Hoang Tay, two communities situated in the Hanam province in northern Vietnam, farmers practice reuse of untreated wastewater. However, these farmers rarely use protective measures when handling wastewater. Diarrhoeal rate is 1.5–2 times higher in these two communities than in other villages of Hanam province. Furthermore, Hanam is also one province where incidence of gastrointestinal illness is highest with 1.5–2.2 % compared to other provinces also directly or indirectly affected by the polluted Nhue and Day rivers [1]. We believe that the negative health impacts on farmers can be attributed to their lacking awareness of the health risks associated with wastewater reuse and their poor hygiene behaviour.

## Protection Motivation Theory (PMT)

Health behaviour theories explain behavioural changes, in particular the mechanisms that either shape an intention to change behaviour or help to maintain a specific health behaviour. The PMT is one

of the health behaviour theories, which includes the element of self-efficacy as one separate component. Self-efficacy affects the intention to change risk behaviour, as the effort required to attain the goal and the necessary persistence to continue in spite of barriers and setbacks may undermine motivation [2]. Therefore, PMT was applied to explore awareness and hygiene practices of people using wastewater in agriculture. Our study aimed at developing a questionnaire to assess perceptions of fear of disease, self-efficacy, response-efficacy, severity, vulnerability, as well as aspects of motivation, hygiene practice and hygiene practice in relation to wastewater use in order to provide the basis for suggesting improvement interventions of safe reuse practice (Fig. 1).

## Method

First we conducted qualitative research in the form of 30 in-depth interviews, group discussions and observations in the Nhat Tan and Hoang Tay communities to formulate the questionnaire centred on PMT. The questionnaire-based survey was then conducted with 335 persons, whereof 66 people were interviewed a second time to verify reliability of the questions. Cronbach's Alpha, used to determine reliability of the questionnaire, is a measure for internal consistency or reliability and should total 0.65 or higher to express reliability.

## Results and conclusions

People in the study area perceive wastewater as smelly and black in colour, whose contact can cause skin problems (e.g. itching). Farmers feel that fish from the Nhue river and vegetables irrigated with wastewater are potential causes for diarrhoea. When working with wastewater, women use protective wear more often than men. This can be explained not by increased awareness but rather due to the fact that women spend more time in the fields than men and pay more attention to their skin and beauty.

The questionnaire, containing 34 questions focusing on eight different aspects, revealed a reliability index exceeding 0.65 Cronbach's Alpha. Correlations of PMT coefficients varied between 0.11 and 0.35 ( $P < 0.05$ ). These correlations show that motivational aspects can be improved by increasing fear of disease and perceived self-efficacy, response-efficacy and threat severity. However, the data reveals that the relation between motivation and practice of improved hygiene was rather weak.

- [1] Environment Report of Vietnam, 2006.
- [2] Rogers, R.W. (1983): Cognitive and physiological processes in fear appeals and attitude change: A revised theory of protection motivation. In J. Cacioppo & R. Petty (Eds.), *Social Psychophysiology*. New York: Guilford Press.

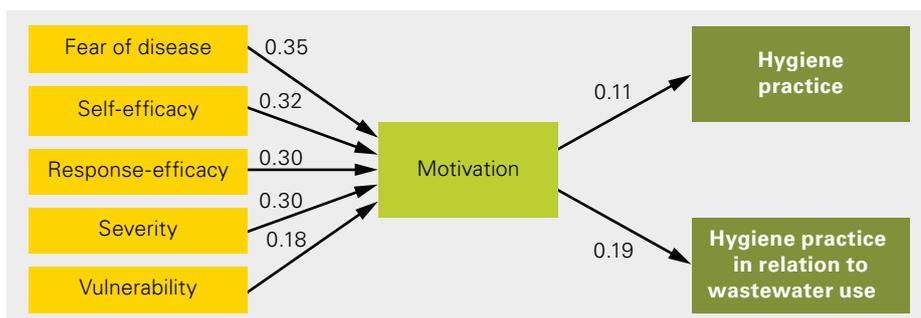


Figure 1: Correlation between awareness, motivation and hygiene practice.

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