

The Fear of Bad Smell: Health Risk Awareness Related to Using Waste in Agricultural Production in Vietnam

*LG Knudsen¹, H Samuelsen¹, PD Phuc², Nguyen Thi Hiep³,
Ngoc Anh¹, L Raschid-Sally⁴, A Dalsgaard A⁵, F Konradsen^{1,3}*

Introduction

The use of different kinds of waste as input in agri- and aquaculture is widespread in many areas of Vietnam. In Northern Vietnam human excreta has been used as fertilizer in agricultural production for centuries, and has remained a common practice (Kjaer Jensen 2003). Also, in Hanoi and many other cities in Southeast Asia, farmers often bred fish and cultivated aquatic vegetables in ponds receiving wastewater from the city, which provides aquatic vegetables for almost entire cities (Leschen et.al. 2005).

Ongoing research in Phnom Penh shows that exposure to untreated wastewater, creates a risk for skin diseases, especially dermatitis, on hands and legs of aquatic producers (van der Hoek et al 2005). Furthermore the use of wastewater and human excreta expose agri- and aquaculture producers to risks of infections with Ascaris, Trichuris and Hookworm and therefore the Vietnamese Ministry of Health (MOH) seeks to regulate the use of human excreta. According to the current legislation of the Ministry of Health, the composting time should be at least six months (Kjaer Jensen 2003). Nevertheless, several studies have shown that the composting time is often less than this (Pham 2003, WSP-EAP 2002, CERWASS 2002).

In effecting change to minimise the risk from exposure to wastewater and fecal matter it was important to understand the perceptions and association of ideas made by farmers using this source of fertiliser. This is specially necessary in formulating effective awareness raising programs and for making more effective use of nutrients in waste. This paper addresses this need. It is based on an in-depth anthropological study of why and how farmers use wastewater and human feces in agri- and aquaculture.

Methodology

The two study sites selected in Vietnam: were Bang B village in Thanh Tri district situated in peri-urban Hanoi, and Phuc Son commune in the north central province, Nghe An. Bang B was selected because aquaculture producers in this area use untreated wastewater for their production of aquatic plants and fish. Phuc Son was selected because farmers here use human feces for agricultural production of rice. These study sites though not in Nam Dinh, were selected because of the availability of specific facilities for such in-depth anthropological studies.

Key informant interviews, and Focus group discussions were initially used to gather general information and get to know the commune and their concerns. A total of nine focus group discussions were held with about eight participants in each. Men and women focus groups were held separately. In addition 45 semi-structured interviews were conducted with farmers who used

¹ Department of International Health, University of Copenhagen, Denmark;

² Department of Microbiology, National Institute of Hygiene and Epidemiology, Hanoi, Viet Nam;

³ Research Centre for Gender, Family and Environment in Development, Viet Nam.

⁴ International Water Management Institute, IWMI West Africa Office, Accra, Ghana;

⁵ Department of Veterinary Pathobiology, Royal Veterinary and Agricultural University, Frederiksberg, Denmark

either human feces or wastewater in their production. This was a useful method of studying perceptions of health risks and achieving knowledge about practices related to work tasks at other times of the agricultural calendar.

The main method used was *Participant observations and informal interviews*. Participant observation was a way of making the research resemble 'real life' as much as possible. It took place while informants carried out their daily tasks, with the researchers acting as 'natural members' of the community. Doing things with informants the researchers often got a chance to make informal interviews about how they perceived and practiced the work tasks and terms relevant for the study. Especially for the purpose of studying practical everyday practices, which people were not used to verbalizing, participant observation and informal interviews were important tools.

Results and Discussion

Findings in Phuc Son

Phuc Son is a mountainous rural commune close to the border with Laos. It is the central commune in Anh Son district and is relatively wealthy, urbanized and modern. Nevertheless, many families in Phuc Son still live under poor conditions, especially the ethnic minorities who live in the mountainous outskirts of the commune. The main occupation in the commune is agriculture and many households raise buffalos, pigs, chickens and ducks. Rice is the main crop and usually planted twice a year – in January-February and June. Corn is the third crop of the year, and planted in October. Most families also cultivate vegetables in their gardens. An additional source of income for some families is work in the tea plantations. Even the poorer households can afford to invest in toilets thanks to loans from the Water and Sanitation Program which also conducts hygiene education and awareness raising activities. Toilets are either the traditional single or double vault latrines or the newer ventilated improved type. Only few households could afford septic tanks, but usually they were not popular with agricultural households because they did not give access to the feces for use in the fields.

How farmers use human feces in agriculture

Interviews revealed that people with single vault latrines emptied them when they were full - including the fresh on top - through a door on the outside. They then composted the excreta outside the latrine usually for less than a month before carrying it in baskets to fertilize the fields. Households with double vault latrines sealed off one vault when it was full and then used the other vault. In this way they could compost the excreta more hygienically inside the latrine. They considered it decomposed when it had no or very little smell. They said they always composted human feces in order to achieve a hygienic product.

Appreciation of human feces as fertilizer and analogies made with medicine and nutrition

All interviewed farmers, local authorities and health staff agreed that human feces was the best fertilizer. At the same time everyone agreed that human feces was the "dirtiest" fertilizer with a very bad smell (*mui hoi/hoi thoi*). Despite the fact that it was a cost free fertilizer they did not mention this when discussing its advantages, rather they praised its nutritive value for the soil and plants. Farmers ranked human feces as the dirtiest, smelliest, and most nutritive fertilizer; pigs' feces was the second best by these standards; followed by chicken feces and buffalo feces. Their explanation was that people eat more nutritive and varied food than pigs, pigs eat better food than chickens and so on hence the value of the fertilizer linked to nutrition.

Some farmers made an analogy between fertilizer medicine. Western and Eastern (traditional Chinese and Vietnamese medicine) medicine exist as two parallel and often complementary systems in Vietnam. Whereas Eastern medicine strengthens the whole body, Western medicine immediately affects the infected part of the body (see also Craig 2002). Similarly human feces (and other organic fertilizers) was equated to Eastern medicine, as having a strengthening and long-term effect on the soil and plants. Chemical fertilizers were like Western medicine, which had an immediate effect with a short-term impact.

The parallel between fertilizing with human feces and eating habits was also expressed by an older woman who explained how she was careful not to use too much human feces for her plants. She compared plants over-fertilized with human feces to humans eating too much food. Both result in sickness or death.

Association of bad smell with health risk

Farmers appreciated human feces but at the same time they knew it carried health risks. They associated these health risks with the bad smell. If the human feces did not smell they thought it was clean and decomposed. Their definition of decomposed human feces was a dry, dark ashy substance with no or very little smell. They described fresh, un-composted human feces as extremely dirty because it was wet and had a terrible smell. ‘Dirty’ and bad smell were synonymous. In fact they often said they ‘feared’ the bad smell. They considered it decomposed and clean when it had no or very little smell.

This perception of health risks affected their practices. They found it unnecessary to protect themselves when the feces did not smell. Farmers rarely mentioned any protective practices for their work in the fields and when applying composted feces. They typically wore only a hat, canvas working clothes and occasionally a mask when they applied human feces. They knew they should wear protective measures but in practice they did not find this risk worth bothering with.

Meanwhile, they found it necessary to protect themselves when collecting fresh human feces because it smelled and therefore could affect their health. Although not everyone said they wore masks the farmers were more likely to emphasize the importance of masks when collecting feces than when applying feces. Moreover, the fact that masks were the most frequently used protective measures indicates that smelly air was thought of as harmful. They said they wore masks “to protect their health”. They thought non-composted human feces could infect people through food or smelly air. Most people did not know what diseases the smelly air caused. Some had an idea that it caused diseases in the respiratory or digestive system.

The idea that polluted air/bad smell caused health problems was not just people’s own home-made idea. The leader of the health station expressed a similar concern with health risks from the smell of human feces. His explanation was that smell can affect the food and then infect people when they eat this food.

Familiarity synonymous with cleanliness

An important aspect of people’s perceptions of cleanliness and hygiene was ‘familiarity’ (see Craig 2002). People avoided using other people’s latrines, because they were afraid it was not cleaned well enough. They would never fertilize with human feces from a latrine which did not belong to family members. The smell from neighbors’ feces was a point of annoyance and hidden conflicts. During informal interviews many people would bring up the topic of how they were bothered by smell from the neighbor’s dirty latrine. In a focus group discussion a woman said:

"My house is over there. My neighbor's house's septic tank is located next to my entrance. When I pass by his house I can smell bad things. When it has high humidity, we can't stand the smell. It evaporates the bad smell."

An older man had even built a double-height fence to keep out the smell from the neighbor's latrine. Meanwhile they did not fear their own children's feces as much as adults' because they were already 'familiar' with their children after having brought them up.

Findings in Bang B

Bang B is a village with 1,310 inhabitants in the outskirts of Hanoi in a precinct with ongoing urbanization. By 2010 Bang B will also be included in this urbanization but so far it is primarily rural with 80 percent farmers. Farmers in Bang B have abandoned rice cultivation in favor of land-intensive aquaculture, which brings them a much higher income. A pump station supplies the irrigation canals with untreated wastewater from Hanoi, which runs into the water fields via small pipes. The farmers grow aquatic vegetables such as Water Morning Glory, Water Dropwort, Water Cress, and Water Mimosa. These vegetables are sold in markets in and around Hanoi. There are six fish pond-owners in Bang B, who all raise their fish with wastewater from the To Lich River.

How farmers use untreated wastewater

Aquatic fields are normally cultivated by the family. Women are the main workforce in the fields, while men help with heavy tasks such as carrying tools and harvested plants. Only men work with fish production and pond-owners usually hire a couple of young men as help. Aquatic vegetable production and fish production is labor-intensive and demands a rigorous work schedule. Harvests often take place in the dark morning hours from 4 am, before the vendor arrives on bicycle at 6 am to pick up the newly harvested vegetables to sell at the market. Before the vendor arrives the farmers rinse the vegetables in one of the wastewater ponds to make them look fresh and clean. The working hours and schedule depend very much on the type of plant, but in general there can be around six harvests within one year. Thus, agricultural producers are almost always busy in their fields or fish ponds.

Bad "smell" associated with good (organic) fertilizer

Their descriptions of the positive effects of wastewater resembled the descriptions of human feces' value as fertilizer – the bad smell was emphasized. Usually they did not use the official word for wastewater (*nuoc thai*) but *nuoc thoi*, which means "bad smelling water". Bad smelling water was the most common kind of water and was black with white bubbles. Normally the water was a mixture of organic and chemical waste. According to farmers the chemical waste settled at the bottom of the fields and ponds one or two days after they had pumped in new wastewater. At this stage they called it "organic fertilizer water" (*nuoc phan*).

They found that organic wastewater had a positive long-term effect on the soil, and were aware that chemical wastewater damaged the soil and even destroyed the aquaculture products. They did not however have any other choice but using wastewater for their production. While everyone had domestic water treatment systems, the only water available for aqua- and agriculture was the wastewater. Some aquatic producers preferred to use rainwater because it was cleaner than wastewater. Still, they appreciated the wastewater because the plants needed more water than the rain could provide.

They perceived wastewater as dirty and harmful for people but the dirt was nutritious for plants and fish. Since the plants were fundamental to farmers' survival, wastewater was seen as beneficial to farmers in the end. As one farmer in a focus group discussion said:

"In my opinion, health and food are both necessary and important. I think they are two sides of the same coin. All of us need both: health and food. I mean that when we are strong, we can produce food, whereas we get energy by eating food, and our health can be kept."

Use of protective measures and interpretation of such use

Aquatic producers' use of gloves and boots depended on their gender. During participant observations the researchers found that women generally wore protective measures more frequently than men and furthermore they used different kinds of protective measures than men. Women used three types of gloves – elbow-long thick rubber gloves, short latex gloves, and elbow-long cotton gloves. Men only used the first two types of gloves. Both men and women wore two kinds of boots – knee-high thin rubber boots and thicker rubber boots below the knee. Nevertheless, women mostly wore the long boots, and men mostly wore the shorter boots. In general, observations revealed that men more often than women had naked feet or only wore plastic slippers. During the fish harvests, when men swam in the wastewater ponds to hold the nets, they rarely wore anything but a pair of shorts, a t-shirt and sometimes plastic slippers.

Cotton masks were used by men only sometimes when spraying pesticides, whereas many younger women wore masks when the sun was out to keep their skin light.

When asked why there was this difference between men's and women's use of protective measures, they explained that it was easier for women to wear gloves and boots given the nature of their work. Aquaculture producers felt that women could better cope with working "unnaturally" and slowly, than men. Everyone – men as well as women – thought that women's work tasks like washing vegetables planting or harvesting, would be less hindered by gloves and boots than men's. The typical explanation for this was the sedentary nature of women's tasks - "men have to walk a lot and therefore it is difficult for them to wear boots whereas women can work in the same place." Men also did the "heavy work". Gloves and boots were seen as limiting men's natural mobility. Nevertheless, observations showed that men often did "women's jobs" too but did not use protective measures. One man explained this as helping out and not his real job, so it was seen as temporary.

Nevertheless, women also found it very unpractical to wear gloves, especially the long thick rubber gloves. When the researchers showed up wearing these gloves, the female informants immediately said that these would slow their planting work. Informants explained that their use of gloves depended on their work tasks. E.g. all informants said that they could not wear gloves when harvesting Water Morning Glory because they needed the close contact between fingertips and the plants in order to pick off the product. They said they needed "the real hand". When they planted Water Dropwort it was also unpractical to wear gloves because it needed precision, whereas it was possible to plant Water Morning Glory and harvest Water Dropwort with gloves. Women who washed plants at the ponds said that thick rubber gloves interfered with bundling of the cleaned plants. Many women preferred the long cotton gloves because they were tighter, more like their "real hand", and easier to work with. Cotton gloves could protect them against both the cold from the water and against the sun. Many women mentioned keeping their hands warm and their skin light before they mentioned preventing skin problems from the polluted water. While male and female aquaculture producers considered gloves and boots as a way of reducing their skin problems

related to working in the wastewater, they did not think it was possible for them to carry out all of their work tasks with gloves and boots. Skin problems were considered an unavoidable occupational hazard.

During observations of fish harvests the cold turned out to be a major health concern. The owner of the fish pond shouted to his employees that they should hurry up before it got too cold. This information was confirmed during interviews where the fish pond owners said there was no way in which they could prevent the water from contacting their skin. They wore plastic sandals to protect against sharp things and warm clothes if the weather was cold rather than as a measure of protection against skin disease.

Conclusions and Perspectives

Awareness of risk and its association with bad smell

This study demonstrated that farmers knew that there were health risks associated with their use of waste but viewed these as unavoidable occupational hazards. The above analysis also pointed to an important difference between health risk awareness related to the use of wastewater versus the use of human feces. Wastewater-related health problems were mostly perceived as surface problems which were not serious as long as they only caused skin problems and did not enter the body's orifices. In contrast, farmers perceived human feces as carrying much more harmful and unspecific health risks associated with smell. They understood health risks from human feces as coming from the bad smell which could enter the body through mouth/nose.

"Inside"- "outside"

In *Familiar Medicine*, 2002, the anthropologist David Craig writes that in the everyday knowledge the Vietnamese make a strong distinction between the "inside" or depths of the body and the "outside", the surface of the body. Within this understanding it is important to maintain an inner strength and stability to be able to resist influences from outside. "Possible thresholds between inside and outside domains become important foci for resisting pathological influences" (Craig 2002). Harmful pathogens can either stay on the surface of the body, where they only cause light diseases, or they can enter via bodily orifices into the depths of the body, causing severe diseases (Craig 2002). This corresponds with the data found in the present study where farmers mostly worried about orifices in their bodies where pathogens could enter (see also Craig 2002).

The widespread concern with air, wind, gas and smell, found in this study, is a common way of explaining diseases in Vietnam. This perception is related with Chinese medical theory where air/winds are attributed a central disease-causing function. All sorts of 'wind' are understood as very harmful to people. Winds can bring disorder, changes and carry dirt and germs, and make people sick if they breathe it (Craig 2002). Craig writes how germ theory in Vietnam has been linked with the local concept of 'dirt'. This has resulted in the common understanding that germs follow dirty things moving from the "outside" (Craig 2002).

Protecting the "inside" and associations with a woman's body

In this study informants' perceptions of the body paralleled their perceptions of the family home. This analogy between body and home has been pointed out by several others, i.e. Gammeltoft 1999, Douglas 1966. Farmers' perception of an inside-outside dichotomy involved more than the bodily sphere – it organized the spatial perceptions of health risk zones. They perceived the world outside the home as potentially polluting to the inside of the home. Thus they emphasized protecting

entrances into the home. For example, they were very careful to clean off dirt from the fields before entering the homes, and they always mentioned the importance of cleaning themselves upon returning home when we asked them about hygiene. On the other hand farmers were more carefree when they actually worked in the wastewater or applied human feces in the fields.

Women mostly used protective measures in the fields. This may be due to the fact that many of the risks, such as dark skin, skin diseases and eroding nails, were associated with beauty concerns. In Vietnam concepts of beauty and appearance involve more than aesthetics in a strict sense. Health is defined by social, moral, aesthetic as well as physical concerns (Gammeltoft 1999, Craig 2002). Presenting a nice and pleasant appearance to the social surroundings reveals a socially, morally and physically healthy family. Vietnamese women are typically responsible for the inner functions of the family and home and are supposed to invest their energy in the health of the family while men take care of concerns outside the family (Gammeltoft 1999; Craig 2002; Pham 1999). Hygiene and health of the family were also mainly women's concerns in this study. Even though both men and women were exposed to wastewater and human feces it was women's responsibility to care about this, not men's. It seemed as if the bodies of women represented the family's health – the "inside" of the family – and therefore it was most important that women protected their bodies/health. If women were protected the family would be able to resist outside pathogens because such could not get "inside" the family.

Practices such as wearing a mask to avoid breathing bad smell and washing in wastewater before going home from work might at first sight not have much to do with protecting health. But, when understood in people's own perspectives these practices are ways of protecting the family's health. Health is one of the most common everyday conversation topics in Vietnam (Gammeltoft 1999, Craig 2002). The will and intention to care for health is definitely present but understood and practiced differently. Hygiene information needs to be improved. This information should to a large extent be directed towards men's responsibilities and vulnerabilities to health risks. Moreover, understanding of germs, parasites and viruses should be separated from the local concept of 'dirt' which is a term that also serves to organize people's social world (Douglas 1966). In the present study, farmers saw 'dirt' as coming from outside the home and potentially infecting what they understood as the 'clean' family unit. Therefore, more information needs to be shared, on the risk of infection coming from inside the home and while working outside in the fields. It should also be made clear that sources of health risks do not always look or smell dirty, and that it is not the smell itself that affects humans.

References

- CERWAS 2002. *Overall PRA report on Knowledge, attitude and practice (KAP) of villagers in connection with clean water and sanitation*. Carl Bro International
- CERWAS 2002. *Report on PRA Survey in Gia Pho Commune, Ha Tinh Province*. Carl Bro International
- CERWAS 2002. *Report on PRA Survey about knowledge, attitude and Practice (KAP) of Rural People Related to Clean Water and Environmental Sanitation at Duc Son Commune, Anh Son District, Nghe An Province*. Carl Bro International

CERWAS 2002. *Report on PRA Survey about Knowledge, Attitude and Practice (KAP) of Rural People Related to Clean Water and Environmental Sanitation at Khai Son Commune, Anh Son District, Nghe An Province*. Carl Bro International

Craig, David 2000. Practical logics: the shapes and lessons of popular medical knowledge and practice – examples from Vietnam and Indigenous Australia. In *Social Science & Medicine* 51:703-711.

Craig, David 2002. *Familiar Medicine. Everyday Health Knowledge and Practice in Today's Vietnam*. Honolulu: University of Hawai'i Press

Douglas, Mary 1966. *Purity and Danger*. London, Boston and Henley: Routledge & Kegan Paul.

Gammeltoft, Tine 1999. *Women's Bodies, Women's Worries. Health and Family Planning in a Vietnamese Rural Community*. Surrey: Curzon Press.

Kjær Jensen, Peter 2003 *Application for a two-year Post Doc. Study Title: Human excreta use in agriculture in Vietnam – a study from the field to the latrine*. University of Copenhagen, Department of International Health.

Leschen, Will, David Little and Stuart Bunting 2005. Urban Aquatic Production. Pp.1-7 in *Urban Agriculture Magazine*. No. 14, July 2005.

Ministry of Agriculture and Rural Development (MARD) and Ministry of Construction (MOC) 2000 *National Rural Water Supply and Sanitation Strategy up to Year 2020*

Ministry of Agriculture and Rural Development (MARD) 2003 *Information – Education – Communication for Rural Water Supply and Environmental Sanitation*. Hanoi.

Pham Duc Phuc 2003 *Study of People's Perception and Handling Practices of the Use of Latrine Wastes as Fertilizers in Agriculture in Phuc Son commune, Nghe An Province, Viet Nam*. Master thesis at University of Copenhagen, Department of International Health.

Pham Van Bich 1999. *The Vietnamese Family in Change. The Case of the Red River Delta*. Surrey: Curzon Press.

van der Hoek, Wim, Vuong Tuan Anh, Phung Dac Cam, Chan Vicheth, Anders Dalsgaard 2005. Skin Diseases Among People Using Urban Wastewater in Phnom Penh. Pp.30-31 in *Urban Agriculture Magazine*. No. 14, July 2005

Water and Sanitation Program East Asia and the Pacific (WSP-EAP) 2002 *Selling Sanitation in Vietnam. What Works?*