

## Municipal Human Excreta Management in Northeast Thailand

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**Abstract:** The study aimed at exploring the situation of municipal Human Excreta Management (HEM) in Northeast Thailand. Both qualitative and quantitative methods were used for data collection. The findings indicated that nearly all municipalities (98%) had their own legislation regarding HEM. However, the HEM policies were not clear (89%). Regarding collection and transportation services, 78% were serviced by private licensed companies, 13.04% by unlicensed private companies and 9% by the municipalities. Municipalities had only 26% appropriate disposal sites. Only 4% of these disposal sites could be used in practice because of long transfer distances, lack of maintenance, or inappropriate treatment system or model. Municipalities that had no disposal system took them into public land, grassland, or orchard and rice fields, with or without permission from the landowner. Thus, having no disposal system and untreated human excreta is the principal cause in the transmission of pathogens leading to human illnesses. Therefore, for effective management of sanitation, it is necessary for related organizations to balance the sometimes-competing requirements for planning, design and construction of facilities, as well as to monitor the safe operation of their HEM.

**Key words:** Human excreta management, faecal sludge, disposal, municipal, unsanitation, Thailand

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### INTRODUCTION

The unsafe disposal of excreta is a principal cause in the transmission of pathogens within the environment and improvements in excreta management provide significant reductions in diarrhea disease (Schmoll *et al.*, 2006). The World Health Organization (WHO) estimates that 2.2 million people die annually from diarrhoeal diseases and that 10% of the population of the developing world are severely infected with intestinal worms related to improper waste and excreta management (Rechard, 2001).

Not only health is affected. Lack of adequate sanitation contributes to the irreversible contamination of often scarce natural water resources. Like many other developing countries, the prominence of emptying and transport service of thousands of tons per day of Fecal Sludge (FS) from On-site Sanitation System (OSS) (Ingallinella *et al.*, 2002) that is untreated (dry) household and public toilets and septic tanks, has been a matter of concern in Thailand.

The Public Health Act BE 1992 defines authorities of local governments on Human Excreta Management (HEM) or authorities license private enterprise under municipal control (Chamchanya *et al.*, 1997). However, local governments focus more attention on the constructional provision of individual facilities than on keeping and facilitating the operational services such as FS collection and transportation. Accordingly, every 5-10 years, 98% of

household pour-flush latrines (Ministry of Public Health, 2008): a means of human excreta disposal into septic tanks or cesspool, must pay for FS emptying and transport service themselves. Unfortunately, due to a lack of appropriate disposal sites, the private vacuum-truck disposed all collected FS into public spaces, grassland, orchards and rice fields with or without permission from the landowner (Schouw *et al.*, 2002).

This research, therefore seeks to explore the municipal human excreta management situation that will add further revelations on how to plan for appropriate management of human excreta towards sustainable on-site sanitation system in Northeast of Thailand.

### MATERIALS AND METHODS

The study was conducted in 19 provinces in Northeast of Thailand. Surveys using questionnaires, semi-structured interviews, field observations and literature reviews were employed for gathering baseline data. A total of 46 municipalities: 4 county, 25 township and 17 sub-district municipalities were selected randomly using multistage method of sampling for interview and observation.

To fulfill the study objectives and also find out inherent explanation of the researchable questions indepth interviews are also conducted in the selected study areas. The interview method was applied to fill up the questionnaire by the respective authorities. They were

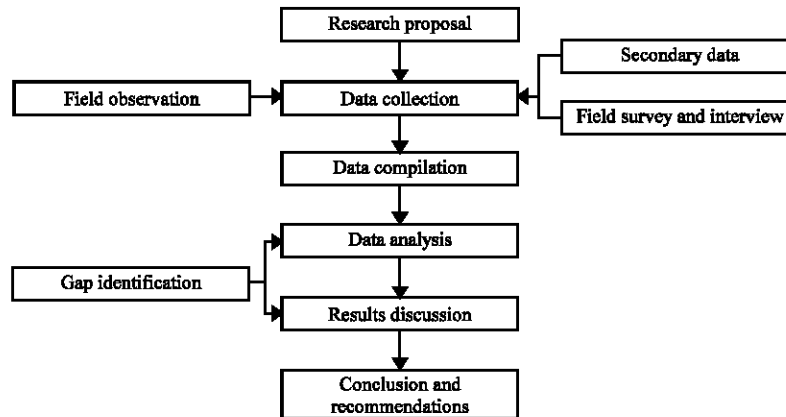


Fig. 1: Research process

considered to play an important role in evaluating sanitary condition in their respective localities (Fig. 1). The protocol was approved by the ethics committee of Khon Kaen University.

### RESULTS AND DISCUSSION

The findings indicated that most of municipalities (97.83%) had established a rigorous policy for Human Excreta Management (HEM). However, the Codes of Practices or the strategic planning towards HEM did not have much reference after the publications (89.13%). In managing sludge disposal facilities, all municipalities reported of having the provision of emptying services facilities by compelling all vacuum truckers for the FS emptying and transport. However, only 13.04% were the municipalities' authorities, while 86.96% were private enterprises: 78.26% had licenses but 8.70% had no license. Only 32.61% of all municipalities had appropriate disposal sites.

Almost disposal sites (28.26%) were anaerobic digestion reactor of 28 days model. Of these only 6.67% of disposal sites were able to use in practicality. Other municipalities having no disposal system, 37.50% were managed by private enterprises, 22.50% were disposed into inappropriate disposal sites, but 17.50% were discharged into public land, grassland, orchard and rice fields with or without permission from the landowner. However, only 2.18% were reused treated human excreta as manure and fertilizer in crop production (Table 1).

Based on the semi-structure interviews with key informants in the studied communities, there were four HEM structures/methods (Fig. 2-5). When asking about their opinions towards each FS structures, community people said that the structure that manage by the municipality took so many steps to request for services

Table 1: Number and percentage of HEM in Northeast of Thailand

Human excreta management	No.	%
<b>Human excreta management plans/policies</b>		
Had clear action plans/policies	5	10.87
Had unclear action plans/policies	41	89.13
<b>Establishment of municipal regulation</b>		
Had municipal regulation	45	97.83
Had no municipal regulation	1	2.17
<b>Provision of HEM facilities</b>		
Municipalities' vacuum trucks authorities	3	6.52
Authorizing private operation approved by the municipalities	1	2.17
Private operation with license	36	78.26
Private operation with non-license	6	13.04
<b>Private operation for HEM</b>		
Private enterprise tenders	23	62.16
Licensing private enterprises	14	37.84
<b>Excreta disposal systems</b>		
No	31	67.39
Yes	15	32.61
Anaerobic digestion reactor 28 days model	13	28.26
Planted sand drying bed	1	2.17
Controlled aerobic decomposition process	1	2.17
<b>Working conditions of excreta disposal systems</b>		
Were able to use in practicality	1	6.67
No longer for practicality/use	7	46.66
Complete constructed but not ready to operate	6	40.00
Under constructed without unsanitary principles	1	6.67
<b>Excreta disposal sites</b>		
Disposed in forests or vacant lots	7	17.50
Managed by private entrepreneur	15	37.50
Discharged into public spaces, grassland, orchard or rice fields	7	17.50
Managed at inappropriate disposal sites e.g., solid waste disposal sites	9	22.50
Treated at disposal plants	2	5.00
<b>Reused of treated excreta</b>		
Had no treated excreta systems/plants	31	67.39
Not reused	14	30.44
Reused	1	2.17

and then have to wait for along time to have service. As one said;

Slow services, the officials do not work in weekend or not responsible persons to contacts, do not know the service schedule after request for services (Community people...21/12/06)

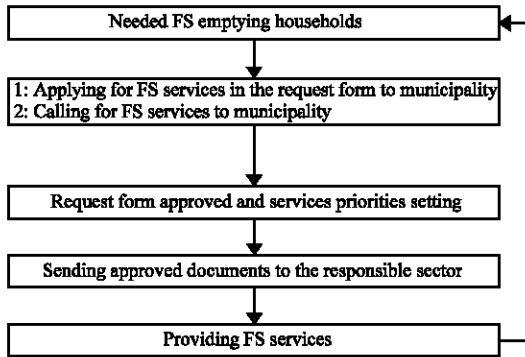


Fig. 2: HEM by municipalities

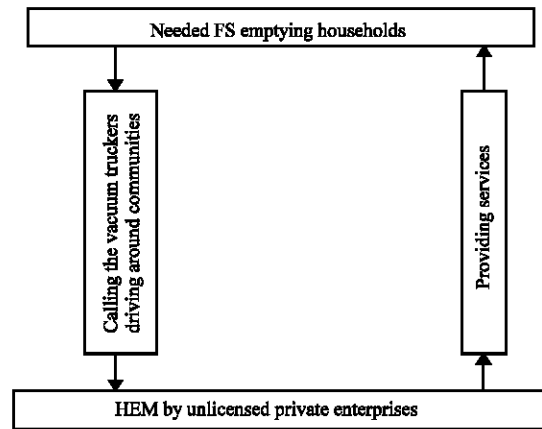


Fig. 5: HEM by unlicensed private enterprises

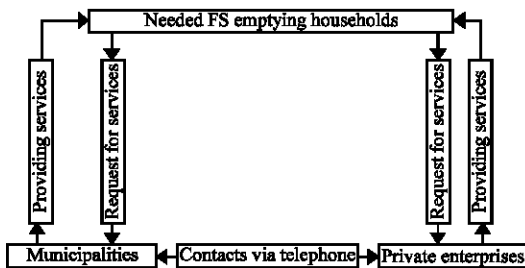


Fig. 3: HEM by municipalities and private enterprises

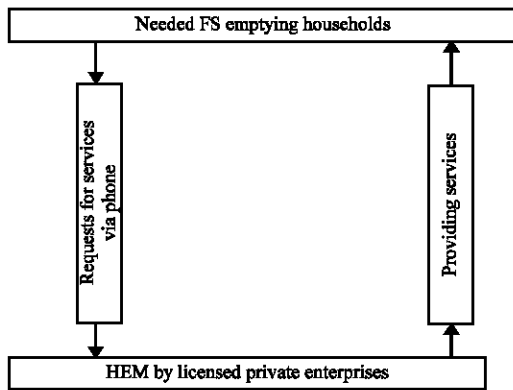


Fig. 4: HEM by licensed private enterprises

However, they said that for the HEM by the municipality and private enterprises provide more chances for people to get services and the municipality can control the provision and cost of services. As one said;

It is easy to contact e.g. via telephone. Then they will come in the day, with reasonable service costs and do not have to wait for a long time (Community people... 21/12/06)

Besides, the last two structures are normally organized in the small or new municipality areas. The municipalities have the HEM policy but cannot manage it by themselves due mainly to financial aspect. As one municipality mayor said;

We have the HEM policy but we cannot manage it effectively by ourselves because the emptying and transportation trucks are very expensive. So, we decided to give the licensed to the private enterprise to do it (Mayor of Municipality... 4/07/07)

However, when asking community people, some said that;

Only one private manage the services. So it is expensive but do not care about sanitation or we do not trust them, especially there will no any responsible persons when things were lost or mistakes occurs because we do not know their permanent address to contact (Community people... 23/4/07)

The study found that only 10.87% of municipalities had action plans. However, as pointed out by Strauss and Kone (2003), yet many local authorities have not taken the necessary steps to deregulate the provision of this service and thereby allow the private sector to offer a competitive and more reliable service to the general public or Some were lack of concerns about the impacts of an absence of effective human excreta disposal system.

Even though, this study indicated that all municipalities were able to provide FS emptying and transport services within their jurisdiction, the private vacuum trucks were not maintained in good working conditions e.g., the leakage of truck containers, the truck containers were no longer structurally sound to perform its function and did not posted Faecal Sludge Emptying, the enterprise's name, contact address as well as licensing enterprises on trucks. Changdum *et al.* (2005) also pointed out that some vacuum trucks posting uncompleted statement with the accordance with Public Health Act, 1992.

Regarding the disposal sites, approximately 32.61% of all municipalities had appropriate disposal sites. It appears that were anaerobic digestion reactor of 28 days model. Only 4.34% of these disposal sites were able to use in practicality.

The similar studied results can be seen in the study of Changdum *et al.* (2005), which indicated that all municipalities owned and managed appropriate disposal sites and 92.5% of private enterprises had no appropriate disposal sites and the study of Luckrod showed that only six municipalities (5.2%) in Western of Thailand had appropriate disposal sites but only 2 were in structurally conditions.

Nevertheless, other municipalities having no disposal system disposed, the municipalities decided to open up the provision of emptying services to those licensed private operators who complied with a common set of rules and regulations intended to ensure fair pricing and proper handling of excreta emptying.

However, lacking of sludge disposal sites, private entrepreneur have often developed informally in response to demand and more often than not prior to the regulation of service provision functions by the municipality. As a result, they disposed FS into inappropriate disposal sites such as public land, grassland, orchard and rice fields with or without permission from the owner as well as the vacant lots.

The studies of Changdum *et al.* (2005) and Luckrod *et al.* (2006) showed that 33.3 and 55.5% were disposed into orchard and rice fields with or without permission from the landowner, 33.3 and 30% the owners bought them for plants fertilizers, respectively.

Furthermore, studies (Schouw *et al.*, 2002; Strauss *et al.*, 2003a) showed that the private enterprises lack of human excreta disposal sites; thus, the unsanitary methods were adopted for human excreta disposal which lead to groundwater contamination and therefore potentially lead to a risk to public health derived from use of this contaminated water (Jeuland *et al.*, 2004; Ministry of Public Health, 2007).

This is consistent with the study conducted by Strauss *et al.* (2003a, b) reported that the *Schistosomiasis*, *Taenia sp.* and *Salmonellosis* were significantly reported in the field researchers who used composted human excreta to fertilize their farmlands, particularly for rice cultivation.

The continuous use of inadequately treated excreta and wastewater in irrigation is likely to contribute to the high rate of enteric pathogenic diseases such as cholera and typhoid (Shuval *et al.*, 1986). Besides, Strauss *et al.*

(2000) pointed out that the untreated human excreta were not caused only human health problems but also environmental nuisances.

## CONCLUSION

According to the study results and discussions, the study concluded that the limited Codes of practices or strategic action plans towards HEM earmarked for the municipalities make them ill-equipped to provide the effective collection, storage, treatment and proper FS disposal sites. As a result of such improper treated human excreta, a principal cause in the transmission of pathogens leading to human health directly or indirectly has dramatically risen. Therefore, it is clear that excreta management systems will have to put in place to tackle the significant public health problems associated with unhygienic management of excreta. All decisions around improving sanitation should be agreed by all related organizations to balancing the sometimes competing needs for planning, design and construction of facilities, as well as monitoring their safe operation of HEM standard solution laying the ground for its wide scale adoption and thereby bring the country within the range of meeting the global goal of full sanitation.

Based on the findings of this study, it seems relevant that the new guidelines and promotional activities for HEM systems should focus on combining the sanitation and health objectives. Important issues to be addressed in the planning and implementation process are recommended as follows.

HEM issue should be assigned as National Agenda and Public Policy to establish National HEM policies, strategic framework, guidelines and regulation documents addressing all such matters.

The Ministry of Public Health is authorized to enter into cooperative agreements with state, provincial and local agencies to develop an integrated program for effective management of human excreta systems with long-term financial sustainability.

Streamlining the business licenses and support the excreta dealing business as an incentive to reduce health related problems. For example, the standards requirements for vacuum trucks, a sanitary service license applications and renewal, as well as a common set of rules and regulations intended to ensure fair pricing and proper handling of emptying and sludge disposal services.

Raising awareness on basic environmental education regarding waste management, safe drinking water, proper sanitation, etc., into the school curriculum. In addition,

encouraging people's participation and responsibility sharing on HEM systems with information and ongoing legal support.

For sanitation programs to be sustainable there must be the political will and financial supports for future researches in a meaningful manner. Future researches should focus on comparative exploratory studies of existing HEM systems on cost-benefit analysis, the full range of costs, design and construction of facilities, monitoring their safe operation, as well as community based study on the attitude that householders would have to their sanitation system.

Challenges exist throughout the entire FS management stream, including managerial, financial, socio-cultural and technical aspects; hence, potential integrated HEM protocol and optimal standards for safe disposal facilities installed, serviced, owned and maintained by local authorities, private operators and individual households should be defined.

Equally important for effective HEM effort, the involvement of all stakeholders playing a role in sanitation development, including users (or customers), community organizations, authorities and entrepreneurs should be encouraged. Public-private partnerships of this nature should be encouraged as a component of a sanitation improvement strategy. In addition, each municipality should provide a policy and regulatory framework for private investment that facilitates the benefits of the facility to be extended to others. In this way, they are able to meet defined public health and environmental objectives. As discussed earlier, effective excreta management programs will reduce disease transmission via drinking water, contact with recreational water and via the food chain. Therefore, the promotion of appropriate solution for this complex environmental problem requires broader assessment and co-operative effort of concerned municipalities and the community.

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