

WM06

Waste Management at Local Level: A Study on Pak Phli District, Thailand

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Abstract— Pak Phli district is a district in the eastern part of Nakhon Nayok province, eastern Thailand subdivided into one (1) municipality and seven (7) sub-districts. Although this area is considered as an environmentally sound area but some villages are facing solid waste problem without management and treatment or having improper sanitary management and treatment system. This paper analyses the existing solid waste management system of Pak Phli district. Finally, it proposes to involve private sector and community people and conduct an awareness building programme on solid waste management system through local and mass media campaigning for further development.

INTRODUCTION

Pak Phli district is a district in the eastern part of Nakhon Nayok province, eastern Thailand. The district is subdivided into one (1) municipality (Kho Wai municipality) and seven (7) sub-districts (Ko Wai, Ko Pho, Pak Phli, Khok Kruat, The Ruea, Nong saeng and Na Hin Lad) which are further subdivided into fifty one (51) villages [1]. It is blessed with the attraction of natural resources and also, called as provincial heritage site since it is renowned with abundant agricultural products, orchard gardens; beautiful tourist spots and waterfalls; and graceful with green nature and local culture [8]. "Reference [9], however, shows that although this area is considered as an environmentally sound area but some villages are facing solid waste and water pollution problem without management and treatment or having improper sanitary management and treatment system".

This paper makes an attention to analysis the existing solid waste management system of Pak Phli district and attempts to question the municipal governance in waste management at local level. This paper outlines a reader map. Firstly, it discusses the methodology of the study, then it discusses the existing condition of solid waste management system of Pak Phli district, environmental problems associated with solid waste management and finally, it proposes project proposal in order to improve existing solid waste management system at local level.

METHODOLOGY

The study is conducted by a workshop course, Department of Regional and Rural Development Planning, Asian Institute of Technology (AIT), Thailand. The objective of this workshop is to clearly focus on need assessment, problems and potentials analysis, identification of development programmes and projects for the sectoral analysis of Pak Phli district, such as: natural resources and environmental management, infrastructure, agriculture, non-agriculture and social sector. Solid waste management is studied under the sectoral report on natural resources and environmental management. The methodology of

workshop is developed on participatory planning approach, concept of learning while working, group discussion/interviews, discussion with governmental officials through meetings, brain storming, group exercise and presentation. The computerized village level data base, for example, National Rural Development data base (NRD-2C), 2009 and Basic Minimum Need (BMN), 2009 maintained by a central agency in Thailand (Thammasart University Data Processing Centre, Bangkok) are used to know the development status of villages to fulfill basic minimum needs. Apart from these sources of data and information, a primary sample survey is usually conducted by the faculties, staffs and students through a structured questionnaire to provide additional information on particular sectoral analysis. However, equal emphasis is also given to collect first hand information by using participatory rapid rural appraisal and field research methods (rapid district appraisal). This gives the scope to interact directly with people, different groups, local leaders, government officials and thus facilitates participatory planning procedures [10].

WASTE MANAGEMENT AT LOCAL LEVEL

Existing Condition of Solid Waste Management of Pak Phli District, Thailand

Kho Wai municipality is responsible to collect waste from households of every sub districts. Kho Wai uses two vehicles (cab van) for waste collection and the waste storage capacity of these two vehicles is 15 Lb.m. per day. These vehicles go to collect waste one time per day. Every day the total of 39.40 liters fuel is used for garbage collection. To get this facility, every household pays 100 baths per month. Kho Wai has own landfill to disposal the waste collected from every household. Every day 3.5 tons waste is disposable in this landfill. No. of 7 employees are involved to collect waste in every day. Municipality earns 28,000 bath per month from this revenue source [2].

Village level database NRD-2C, 2009 shows that village no. 7 of Khok Kruat, village no. 2 of Na hil nat, Kho Pho, The Ruea are facing no solid waste problem because these villages have very few no. of household and mostly are covered by forest which indicates that the generation of waste is not heavy which create solid waste problem, as in Table 1. However, although the other villages of Khok Kruat and Na Hil Nat have moderate no. of household (Na Hil Nat- 789 household, Khok Kruat -735 household, Ko Pho -823 household, The Ruea -947 household and Khok Kruat- 1434 household) compare to others (Ko Wai 462 household, Nona Saeng- 1050 household, Pak Phli-6738 household), they are very far away from Kho Wai municipality. Municipality collect waste only from those sub-districts which are near about to municipality, for example, Kho Wai, Nona Saeng and Pak Phli which cover

8250 households in total, as in [1], [2], [3]. [4], [5], [6] and [7].

Table 1: Environmental Management Status, NRD-2C, 2009

Environmental Management : Criteria				
<ul style="list-style-type: none"> - Progressive (3): The villages are facing no solid waste and water pollution problem or facing problem and having proper management and treatment system. - Moderate (2): The villages are facing solid waste and water pollution problem and having improper sanitary management and treatment system - Backward (1): The village are facing solid waste and water pollution problem without management and treatment system 				
Name of sub-districts	Total no of villages	(1)	(2)	(3)
Ko wai	6	-	-	-
Ko Pho	7	-	-	-
Pak Phli	7	-	-	-
Khok Kruat	7	-	-	1 (V. no. 7)
Tha Ruea	8	-	-	-
Na Hin Lat	7	-	-	1 (V. no. 2)
Nong Seang	9	-	-	-

“Reference [9], however, shows that municipality does not collect waste regularly. Since municipality does not collect regularly, household throws some parts of the waste carelessly on the road side and the remaining quantities include agricultural waste, household waste, construction and demolition wastes, wastewater sludge are burned or dumped into land by household. This condition is considered a serious and visible environmental problem and public health risk”.

Environmental Problems Associated with Solid Waste Management System

A problem tree is analyzed in order to understand the cause and effect relationship of existing improper waste management system, as in “Fig. 1”. “Reference [9] shows that waste management and illegal household waste disposal system degrade the soil quality. This situation increases soil acidity and ultimately soil become less fertile. Also, it pollutes the water which contaminates crops, consumer and farm workers”.

Proposed Project Proposal

The study proposes a project proposal to improve the existing solid waste management system of Pak Phli district [9]. A partnership model of solid waste management at community level applied by Waste Concern, Bangladesh is sheared to prepare the project proposal for Pak Phli district, Thailand.

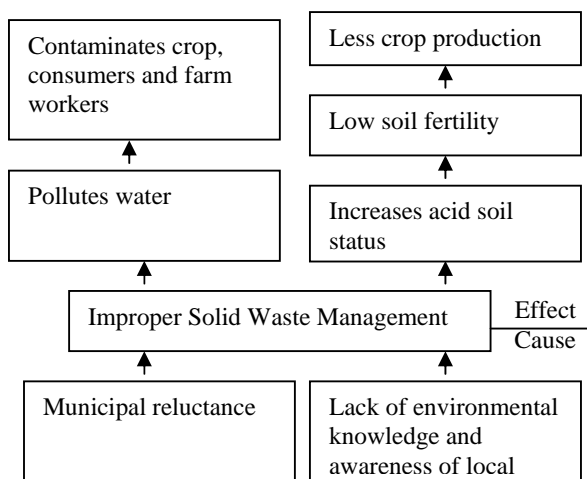


Fig. 1: Problem Tree of Solid Waste Management

Waste Concern, Bangladesh is a research based NGO, which works closely with the local communities and private sector to improve the solid waste situation of the country. In an attempt to recover the value from the organic portion of the waste, Waste Concern, for the first time in Dhaka initiated a Community Based Decentralized Composting Project at Mirpur Section-2, Dhaka. This project is in operation since 1995. The prime goal of this research oriented demonstration project is to explore the technical and commercial feasibility of the labor intensive aerobic composting technique and to promote the principal of 4R’s- Reduce, Re-use, Recycle and Recovery of the waste in Bangladesh. The innovative approach and success of Waste Concern encouraged the Ministry of Environment and Forest (MoEF) of the government of Bangladesh to select the NGO as a sub implementation agency for their project “Community Based Urban Solid Waste Management in Dhaka” which is supported by UNDP [12].

However, for Pak Phli district, Thailand, it is proposed to improve the existing municipal solid waste management system involving private sector and community people. Besides it, it is also proposed to conduct an awareness building programme on solid waste management system at Pak Phli district through local and mass media campaigning. It is found that there is national policy to implement an environment-friendly waste disposal system by increasing the capacity of local administrative authorities regarding waste disposal and wastewater treatment; and raising environmental awareness of local people [11] but still sub-districts administrative offices has no initiative to undertake this programme. Since the study area face environmental problem to manage solid waste and also, there is policy support to reduce that problem, this proposed project can be a good opportunity to implement such programme with necessary supports and inputs. It is expected that the project will able to build up a sustainable solid waste management system through improving the existing solid waste management system by involving the stakeholders of community people, municipality, sub-district administrative office and private sector. At the same time, it will ensure the capacity of community people by raising their awareness on solid waste management. This project will target three sub-districts namely, Nong Saeng,

Pak Phli, Ko Wai sub districts as pilot project covering 8250 household. If this project is succeed, other sub districts will be included extending the project duration [9].

It is clear that due to limited resources and organizational capacity, it is difficult for municipality and also sub-districts offices to ensure efficient and appropriate delivery of solid waste collection and disposal services to the entire area population. Therefore, private sector involvement by contracting out is encouraged to organize and carryout community waste management programs (mainly house to house collection and disposal in bins at waste transferring station). Moreover, as the capacity of landfill area is coming to a saturation point in the near future, the separation of solid waste at sources (house and waste transferring station) will divert a major portion of organic waste for composting and some materials for recycling, thereby relieving the pressure on the landfill.

In the Planning stage, the involvement of private sector will be authorized by the proper legal framework. However, the municipality will be empowered to set tariffs and by-laws. In Implementation stage, a site for waste transferring station will be selected. Municipality will provide this land. The area for waste transferring station can be proposed in KoWai sothat municipality can transfer the waste to municipality's landfill for final disposal covering a short distance. Once this station is selected, the vans then will collect waste from the households and can dispose in different containers & bins at transfer station. This will minimize the scattered nuisance created around the containers & bins will ease the flow of traffic & pedestrians and above all the collected waste can be segregated properly. Once waste is segregated, appropriate measures will have to be taken to achieve the highest waste recycling rates as possible which will practically reduce the pressure on municipality in solid waste management. It will include the organic waste treatment methods like composting and bio-gas production and contamination of ground water by waste materials will be discouraged. To ensure efficient recycling, private sector will initiate a waste treatment pilot project to produce compost commercially in a small scale. But it needs assistance. Municipality can provide land & other administrative support. However, if land is not available as waste transferring and recycling station for proper primary disposal, it can be proposed to well-protected big collection bins if proper fund is disbursed, wherein municipality can effectively remove the waste for final disposal [9]. A concept note is developed for efficient waste management at Pak Phli district, Thailand in "Fig. 2" [9].

For conducting awareness building program through local and mass media campaign, public awareness building programme will be organized for household to understand the importance of proper solid waste management, with reference to health and other environmental impacts of improper solid waste disposal. Health care centers can be included for conducting awareness building program [9].

Planning stage includes preparation of training module for school program, preparation for workshop materials, conduct case study on successful implementation of solid waste management for knowledge shearing, prepare poster, slogan, leaflet and prepare drama on waste management

with detail implementation plan, schedule and as a whole, the budget [9].

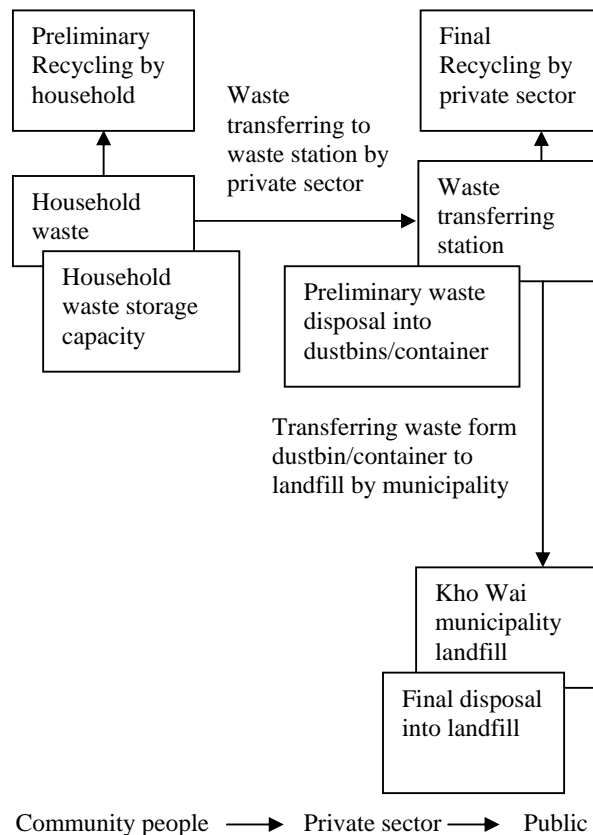


Fig. 2: A Concept Note on Solid Waste Management at Pak Phli District, Thailand

In implementation stage, households will be advised through public rally and leaflet distribution to dispose solid waste properly and not to throw solid waste in the streets, open drains, and nearby areas. House to house campaign will be conducted for orientation /meetings with village heads/ local teacher/community people to introduce the role of the project and encourage them to involve in the project through participation. Households will also be advised to separate solid waste, mainly organic and inorganic, and recyclable materials. And a series of activities will be undertaken for segregation waste and recycling of organic/inorganic materials with financial support. The activities will include workshop and radio programs, and assembly of local people through school program for field level experience. Table 2 summarizes the activities.

Municipality will monitor all activities over the project period including household training on waste management and awareness raising programme. Evaluation will be measured through the peoples' participation (pre and post evaluation survey) and it'll be continued. After successful implementation, sub-district administrative offices will take responsibilities to sustain this project in future through evaluation. However, private sector will be accountable to municipality to ensure strategic accountability.

Table 2: A series of activities for waste segregation and recycling

Activities	Topics Discussion/Content	Performance Indicators
Workshop & Radio Program	<ul style="list-style-type: none"> Type of waste including organic and inorganic Type of recyclable materials Impact of improper waste management on environment and health Process of waste segregation and recycling Demo Project on Solid Waste Management 	Listeners will Participate and be informed about the Demonstration project.
School program	<ul style="list-style-type: none"> Field level training will be provided in which community people will participate in waste segregation and recycling. For reuse, training will be on organic waste treatment like composting and bio-gas production 	Training will be provided to no. of households of selected three villages from project target areas

CONCLUSION

The project expects environmental awareness in general can be improved among community as well as sub-districts administrative officers through their participation and attitude and behavioral change as reduce unnecessary consumption, to purchase green product and reduce some items and materials, and how to sort solid waste before disposal. In another word, the community attitude and behavior change, which offers hope for a future generation of socially responsible citizens. On the other hand, through community participation by well organized garbage and how to keep properly in the bin station make community clean.

Finally, this project has already been presented and submitted to Pak Phli district administrative office. It is hoped that they will take appropriate decision in order to future development of solid waste management system of Pak Phli district, Thailand.

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