

SOLID WASTE MANAGEMENT IN NONTHABURI

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1. Introduction

Thailand is divided into four regions South, North, Northeast and central Thailand. Central Thailand includes 33 provinces, one of which is Nonthaburi. The province is located nearby Bangkok and covers an area of 622.303 km² with 839,029 habitants in the province. There are 37 local administrative organizations in Nonthaburi province, 9 Municipalities, 1 Province Administrative Organization and 37 Tambon Administrative Organizations. One of nine municipality is **Nonthaburi municipality**.

Local administration in Thailand. Presently, 7,951 units of Local Administrative Organizations exist which are composed of, respectively, 76 Provincial Administrative Organizations, 1,129 Municipalities, 6,746 Tambon Administrative Organizations, Pattaya city and Bangkok Metropolitan.

2. Background

Nonthaburi municipality is local self government and juristic person. It was established by the Royal Decree on February 14, 1953. Covering the area 2.5 sq.kms. And expanded the area 38.9 sq.kms. in 1988. Nonthaburi municipality was located on the eastside of Chao Phya Rivers, the total population is 273,172 habitants including 91,702 households. Most of the land uses for residential area, agriculture, commercial and business. It is well known for many tropical fruits. Average income per capita is 11,713 baht per year. Main income is derived from construction industry, service, banking insurance, real-estate and agriculture. The average temperature is 29^oc, 95 % of the people as Buddhism. Nonthaburi city is 20 kms. from Bangkok. It takes only 30 minutes by boat or by bus to Bangkok.

3. Power and duty of Nonthaburi municipality

Subjects to the provision of laws, Nonthaburi municipalities has the power and duties to carry out, within the area of Nonthaburi municipality. One of which is to keep of streets, pavements and public places tidy including refuse and waste disposal. According to the Municipal Act 1953 and Public Health Act 1992,

Nonthaburi municipality has the power to enact ordinances in sofar as they are not contrary to or inconsistent with the laws. The ordinances may prescribe punishment of imprisonment and /or fine for the violation there of but the punishment imposed shall not exceed six months of imprisonment and fine of ten thousand baht.

4. Total Revenue and Expenditure of municipality

The municipality is performed under the concept of the decentralization from the government to local people in order to govern themselves. This is the same concept as the financial administration interms of local finance. The government determines and allocates which types of revenue belong to the municipality by laws and regulations. The total expenditure of solid waste management in 2001 is 70,586,680 baht.(Operation and Maintenance = 50,018,680 baht , Equipments = 20,558,000 baht)

5. Background Of Solid Waste Mmanagement in Nonthaburi Municipality

Formally, Nonthaburi municipality have been responsible for solid waste management, and also incharge of wastewater treatment including of infectious waste. Nonthaburi municipality is the same as cities all around the world which are grappling with the waste problems. In the part, life was simpler and people had less material wealth. Thus, the amount of waste generated was small and people could easily get rid of it by throwing it away near the house, when it decay without affecting people significantly. Other possible ways of disposing the garbage would be canals or rivers, where it is easily disappeared. However, the amount of waste has increased steadily in the whole Kingdom of Thailand throughout the past decades. Waste surveys made by the Ministry of Science and Teleology indicated that the amount of generated waste per capeta will be 0.8-10. kg / day in big city and also in Nonthaburi. Even if people do not generate the

expected amount of waste, it would in an overall perspective increase as a result of the population growth. The escalating amount of waste calls for an improved management, especially, since it is quite common that waste is dumped on streets and other public areas. In addition, the composition of household garbage is changing with a rapid increase in the amounts of paper, plastic and metal. Thus, one of the most noticeable problems with solid waste today is that it does not just disappear. Its disposal opportunities are not reality it tends to accumulate and fill up large areas. Instead, the waste simply remains untreated and will most likely result in a wide range of nuisance affecting people living in immediate vicinity. The unpleasantness will have character of malodorous smell, attract insects and vermin, and besides waste disperses by small animals will probably occur.

Presently, Nonthaburi municipality produces solid waste 292 tons / day, solid waste is being generated in an increasing tempo and is becoming more and more difficult to dispose regularly. The capacity of landfills are almost exhausted and new dump sites are difficult to establish because of comprehensive legislation is agreed over time for the sake of a sustainable environment and because of growing public resistance as a consequence of awareness about related health threats chemical pollution of groundwater and the unwise and wasteful of irrecoverable resource.

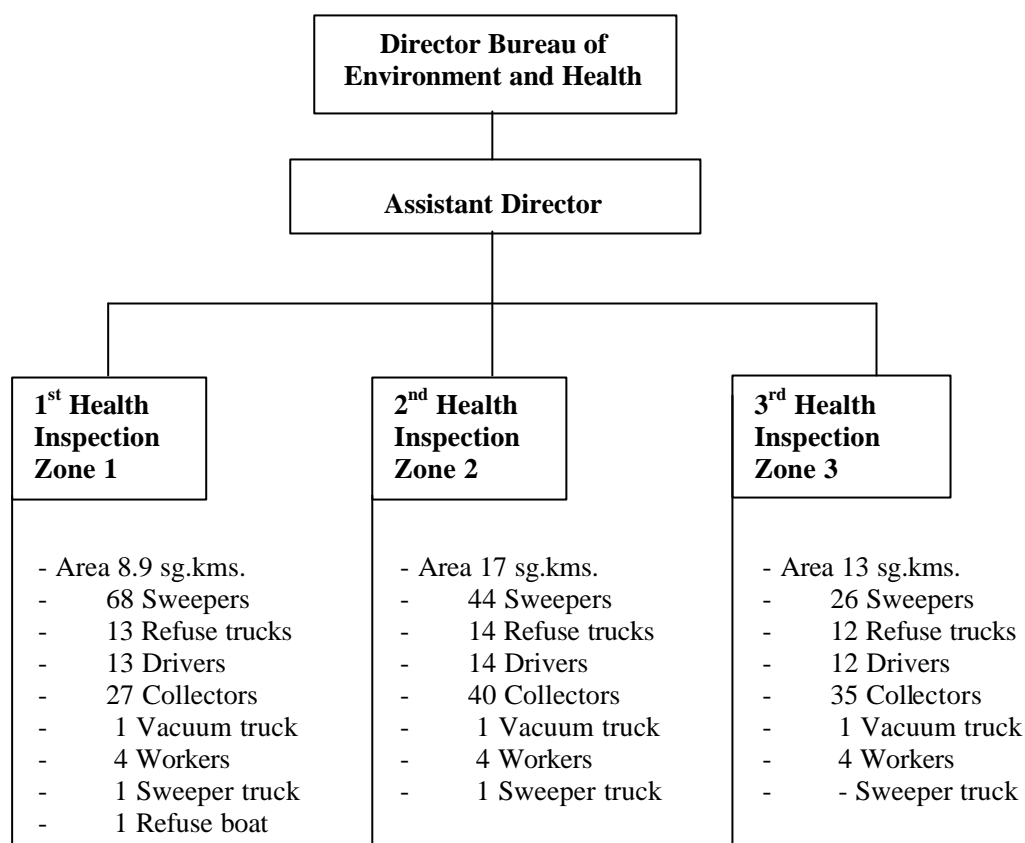
Open dumping accompanied by burning is the most prevalent form of waste disposal in Nonthaburi. The potential to reuse waste materials has to be explored, about 5-10 % of waste was separated by recycling.

6. The Process Of Solid Waste Management

First process is waste collection. More than 130 sweepers collect refuse from streets and public places, then there are 39 refuse trucks collect solid waste from households. Each truck composes of 2 - 3 collect which collect twice trips/household/week. Without transfer station, waste transfer to landfills directly where located 38 kms. far from Nonthaburi Municipality. The landfills belong to Provincial Administration Organization. In addition, refuse collection by boat is provided for the people who live along the Chao Phya River.

The most serious problem in solid waste management is lack of waste disposal site and the increasing of the amount of waste. Furthermore, people do not separate waste. Nowadays, the capacity of waste collection is 292 tons/day although the city generated waste about 320 tons/day or 10% of waste is not collect because of the geography of the city and the narrow size of some roads.

Administration Chart of Solid Waste Management



The trend Of Waste Collection (T/D)

Graph is attached.

Percentage of waste separation

YEAR	Waste Collection(T/D)	Waste To Landfilled (T/D)	Recycle Waste(T/D)	
			Tons	%
1993	165	153	10	6
1994	175	163	12	6.7
1995	195	181	13	6.7
1996	270	250	20	7
1997	300	279	21	7
1998	303	279	24	7.8
1999	292	276	26	8.5
2000	292	264	29	9.3
2001	292	262	30	9.7
2002				
2003	292	242	58	20
2004				
2005	292	215	77	30

7. Successful Activities and Future Direction

On the positive side, in 1997, Nonthaburi started the campaign of reducing waste by public relations and public awareness. The amount of waste is not increased in significant and the trend showed to decreasing of waste by reduce 5 – 10 % of waste but we are not satisfied with this situation. Our goal is to reduce solid waste 20 % by the year 2003 . The strategy to get the goal is to emphasis our public awareness and participation by training, seminar and produce mass media generated to people.

The Pilot Project for Maximizes recycling and Minimizes waste at Phibulsongkram and Suan Klang Muang 3 villages is one the case study in Nonthaburi. This project is supported by the ESCAP, UN and IGES after the first meeting of the Kitakyushu Initiative Network in 2001. After implementation 6 months, the result is satisfied, the people separated material more than 20 % of waste and the second evaluation will be done after 12 months. This project should be the model in reducing waste in Nonthaburi in the future.

Survey and interview information

Village	Households	Populations	Solid waste Kgs/day
Phibulsongkram	539	930	1,008
Suan Glang Muang 3	120	350	214
Total	659	1280	1,222

Weight of solid waste on Phibulsongkram and Suan klang muang 3 Village.

V i l l a g e	Weight of Solid waste (kgs./day)							
	Nov,01	Dec,01	Jan,02	Feb,02	Mar,02	Apr,02	May,02	Jun,02
Phibulsongkram	1008	996	819	776	962	897	968	680
Suan klang muang 3	214	215	139	173	204	150	115	151
T o t a l	1222	1211	958	949	1166	1047	1083	831
Solid waste /capita	0.95	0.94	0.75	0.74	0.91	0.82	0.84	0.65

The weight of solid waste at Phibuldonhktam Village

Month	Solid waste Kgd./day	Recycling material Kgs./day	Recycling (%)	Note
November, 01	1008	54.5	5.4	Preparation and Collection data
December, 01	996	50.1	5.2	
January, 02	819	74	9.04	
February, 02	776	78.4	10.1	
March, 02	926	76.2	8.23	
April, 02	897	105	11.74	
May, 02	968	147	15.18	
June, 02	680	138	20.34	

Composition of recycling materials at Phibulsongkram village

Month	Composition of recycling material (kgs)					Total (kgs.)	Income (Bath)
	Paper	Glass	Plastic	Metal	Other		
November,01	365	373	230	92	575	1635	344
December,01	324	361	199	137	533	1554	438
January,02	427	604	485	154	517	2222	358
Febuary,02	381	664	473	141	571	2196	428
March,02	363	726	546	181	545	2362	788
April,02	475	921	713	236	786	3160	866
May,02	695	1394	1043	346	1080	4558	988
June,02	866	1294	779	192	1016	4147	993



8. Conclusion

When looking at the basic capacities of Nonthaburi Municipality in solid waste management .

- To overcome the goal of reducing solid waste 20 % in 2003. It need the capability to raise public awareness through information and public campaigns related to solid waste.
- Implementation and enforcement capacity, Nonthaburi Municipality are capable of implementing some environmental management activities such as monitoring waste generation and collecting waste however, waste disposal and treatment activities are still rather weak. Enforcement and application of environmental regulation is generally low in Nonthaburi.
- Another weakness lies within the administration where untrained staff often manages the waste area , To deal with this training programs must be initiated .

Nonthaburi wants to speed up the percentage of reducing. Therefore, Nonthaburi need the assistance in the technical know-how, How to reduce waste in macro scale. We hope that there will be any Japanese cities which have the appropriate experience and want to transfer the best practices to Nonthaburi municipality.
