

**The Republic of the Union of Myanmar
Ministry of Natural Resources and Environmental Conservation
Environmental Conservation Department**



**Assessing the Role of the Recycling Shops in the Municipal Solid Waste
Management System: A Case Study in the North District of Yangon City**



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Abstract

The significant role of the recycling shops in the municipal solid waste management system (MSWM) of Yangon city were analyzed in the study. The data was gathered from the owners of 123 informal and 78 formal recycling shops in the North District via a structured interviewer-administered questionnaire. This research observes that these recycling shops are significant in MSWM in providing job creation and minimizing the waste generation by recycling the recycling items. Approximately six employments are working and can hire nearly three workers in a shop. The number of males including employees and employers are more working than female ones in the recycling shops. Moreover, each recycling shop can recycle about 0.012% of all waste generated in Yangon City. If the local government recognizes and enhances its role, the city can improve the recycling sector.

Keywords: Formal, Informal, Job creation, Waste generation, Employments, Workers

**မြို့တော်မှ ထွက်ရှိသည့် အစိုင်အခဲစွန့်ပစ်ပစ္စည်းများ စီမံခန့်ခွဲရေးစနစ်တွင် စွန့်ပစ်အမှိုက်
ပြန်လည်အသုံးပြုရေးလုပ်ငန်းများ (Recycling shops) ၏ အခန်းကဏ္ဍအား
လေ့လာဆန်းစစ်ခြင်း**

ဇင်မာဝင်း၊ ဦးစီးအရာရှိ
ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန

စာတမ်းအကျဉ်း

ဤစာတမ်းမှာ ရန်ကုန်မြို့၏ မြို့တော်မှထွက်ရှိသည့် အစိုင်အခဲစွန့်ပစ်ပစ္စည်းများ စီမံခန့်ခွဲရေးစနစ်တွင် စွန့်ပစ်အမှိုက်ပြန်လည်အသုံးပြုရေးလုပ်ငန်းများ (Recycling shops) ၏ အရေးပါသော အခန်းကဏ္ဍအား လေ့လာခဲ့ပါသည်။ မြောက်ပိုင်းခရိုင်အတွင်းရှိ တရားဝင် လိုင်စင်မရှိသေးသည့်စွန့်ပစ်အမှိုက် ပြန်လည်အသုံးပြုရေးလုပ်ငန်း (informal recycling shops) များ၏ ပိုင်ရှင်(၁၂၃) ဦးနှင့် တရားဝင်လိုင်စင်ဖြင့် လုပ်ငန်းဆောင်ရွက်နေသည့် စွန့်ပစ် အမှိုက် ပြန်လည်အသုံးပြုရေးလုပ်ငန်း (formal recycling shops) များ၏ပိုင်ရှင် (၇၈) ဦးတို့အား မေးခွန် လွှာများဖြင့် မေးမြန်းပြီး အချက်အလက်များကို ရယူခဲ့ပါသည်။ ဤစာတမ်းတွင် အဆိုပါ စွန့်ပစ်အမှိုက်ပြန်လည်အသုံးပြုရေးလုပ်ငန်းများသည် အလုပ်အကိုင်အခွင့်အလမ်း ဖန်တီးခြင်း၊ ပြန်လည်အသုံးပြု၍ရသည့် ပစ္စည်းများအား ပြန်လည်အသုံးပြုခြင်းဖြင့် အမှိုက်ထွက်ရှိမှု ပမာဏ လျော့ချခြင်းတို့တွင် အရေးပါဝင်ပါသည်။ အလုပ်အကိုင် ဖန်တီးမှု အနေဖြင့် စွန့်ပစ်အမှိုက် ပြန်လည်အသုံးပြုရေးလုပ်ငန်းတစ်ခုလျှင် ပျမ်းမျှအားဖြင့် လူ(၆)ဦး လုပ်ကိုင်ကြပြီး ပျမ်းမျှ အလုပ်သမား(၃) ဦးခန့် ငှားရမ်းလုပ်ကိုင်နေကြောင်း စိစစ်တွေ့ရှိရပါသည်။ စွန့်ပစ်အမှိုက် ပြန်လည်အသုံးပြုရေး လုပ်ငန်းများတွင် အလုပ်ရှင်များနှင့် အလုပ်သမားများ အပါအဝင် အမျိုးသား အရေအတွက်သည် အမျိုးသမီးအရေအတွက် ပိုမိုအလုပ်လုပ်ကိုင်ကြကြောင်း တွေ့ရှိရပါသည်။ ထို့အပြင် အဆိုပါလုပ်ငန်းတစ်ခုသည် ရန်ကုန်မြို့အမှိုက်ထွက်ရှိမှု စုစုပေါင်း၏ (၀.၀၁၂%)ခန့် အား ပြန်လည်အသုံးပြုနိုင်ပါသည်။ အကယ်၍ အစိုးရအနေဖြင့် အဆိုပါလုပ်ငန်း များ၏ အခန်းကဏ္ဍအား အသိအမှတ်ပြုပြီး မြှင့်တင်ပေးမည်ဆိုပါက မြို့တော်၏ စွန့်ပစ် အမှိုက် ပြန်လည်အသုံးပြုခြင်းကဏ္ဍတွင် ပိုမိုတိုးတက်လာနိုင်ပါမည်။

Assessing the Role of the Recycling Shops in the Municipal Solid Waste Management System: A Case Study in the North District of Yangon City

1. Introduction

The volume of municipal solid waste (MSW) generation is rapidly increasing in developed and developing countries around the world. MSW is a common problem that has considerable impacts on the atmosphere, land, water quality and human health due to the improper solid waste management (SWM) such as open-dumping and lack of popular awareness especially in developing countries (Premakumara et al. 2017). According to the World Bank (2012), in Myanmar, the MSW generation has also been rapidly increasing and is predicted to grow about 21,000 tonnes per day (TPD) (0.85 Kilogram (Kg)/ capita/ day) in 2025 (Hoornweg and Bhada-Tata 2012). Similarly, in 2006, Yangon produced an enormous amount of waste (1981 TPD) in Myanmar (Premakumara et al. 2017). It projected to produce about 2,900 TPD in 2020 (San 2014), 3906 TPD (0.7 Kg/day/ capita) in 2026, and 7444 TPD (1.0 Kg/day/capita) in 2036 (Yangon City Development Committee [YCDC] and the United Nations [UN]- Habitat 2016). Like other countries in the Association of Southeast Asian Nations (ASEAN), in Myanmar, the booming waste generation causes further environmental issues. Moreover, in Myanmar, most local governments are unable to handle waste due to deficiencies in administrative, political, technological, legislative, expertise and public engagement (Ngoc and Schnitzer 2009).

Although the local governments in Myanmar are making efforts on the management of increased waste generation and its challenges, the management system is still weak. These problems are being faced because of the following constraints which include but are not limited to insufficient financing for upgrade of the waste treatment technologies, equipment and infrastructure, weaknesses in public awareness, lack of necessary policies, laws, regulations and an institutional arrangement at the national and local levels, weaknesses in obedience upon existing legislation and an unsuccessful management system. Moreover, the provision of land for launching the waste treatment plants is necessary (Republic of the Union of Myanmar, Ministry of Natural Resources and Environmental Conservation [MONREC] and Environmental Conservation Department [ECD]2017); Premakumara et al. 2017). Moreover, illegal dumping in the street, unused land or into the waterways, and sometimes illegal burning, is frequent in Myanmar including Yangon (Premakumara et al. 2017). Littering all around the city can lead to a direct and daily connection with waste by the citizens: to pollution of drinking water, thus facing health hazards of waterborne diseases; urban floods by blocking of waterways, minimizing the beautiful scene of the city; and flow the waste into the water sources such as rivers, deltas and the sea (Netherlands Enterprises Agency and Ministry of Foreign Affairs (MOFA) 2017; Premakumara et al. 2017; MONREC and ECD 2017). These challenges and gaps of MSW show that the national and local governments should find the ways to implement a sustainable, effective and efficient SWM system in all the cities of Myanmar. Therefore, the federal government launched the National Waste Management Strategy and Action Plan for Myanmar (2017-2030) at the national level to build and employ the holistic and integrated solid waste management (ISWM) system, which can lead to the sustainable waste management (MONREC and ECD 2017).

Waste recycling is one of the crucial tools to implement the ISWM system and to sustain the waste management for the countries. In many cities of Myanmar, including Yangon, waste recycling is mainly done by the informal sector such as waste pickers, waste collectors and waste dealers (MONREC and ECD 2017; Premakumara et al. 2017). Moreover, the remarkable thing in the waste recycling sector in Yangon is that most informal waste recyclers including street and dumpsite scavengers are selling the recycling items to the recycling shops (Building Markets 2019; Friedor 2014). Therefore, recycling shops (formal and informal) are vital for managing waste in the city, and so this study will focus on their role in MSWM in the North District in terms of employment and the minimization waste generation.

2. Objectives

The main objective of the study is to investigate the role of the recycling shops in the MSWM system of Yangon City. Moreover, the study will also determine their contribution to the recycling shops (formal and informal) such as job creation and recycling waste.

3. Materials and Methods

3.1 Study area

The study was observed in North District of Yangon City. There are seven townships in North District: Mingaladon, Shwepyitha, Hlaingthayar, Insein, Mayangon, Hlaing and Kamayut (see Figure 1) There are six landfill sites in Yangon City such as Hteinpin, Dawai Chang, Shwepyithar, Mingaladon, Dala and Seikyikhanaungto (UN-Environment and IGES 2017). Among them, Hlaingthayar/ Hteinpin landfill site in Hlaing tharyar township, Mingaladon dumpsite in Mingaladon township and shwepyithar dumpsite in shwepyithar township are situated in the North District of Yangon city.

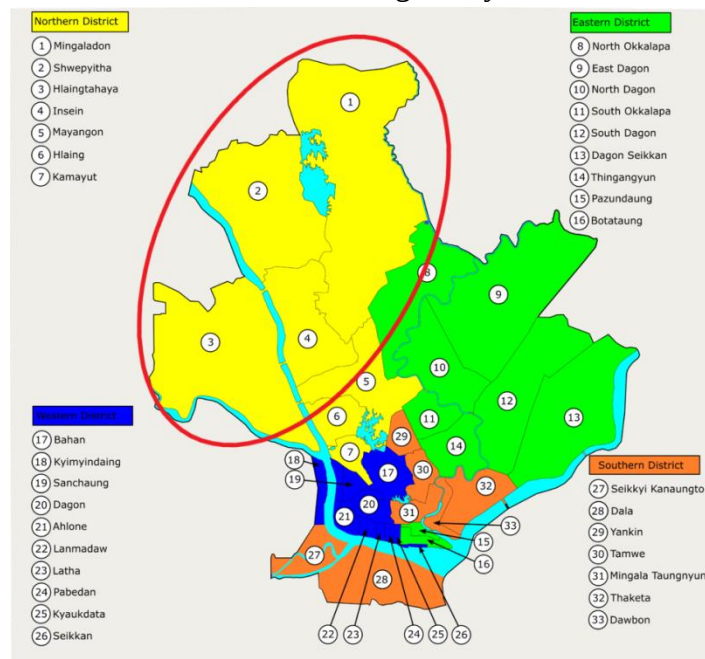


Figure 1. Map of Yangong City

Source: https://commons.wikimedia.org/wiki/File:Yangon_Districts_and_townships.png

3.2 Data collection and analysis

In this study, to apply Random Sampling method for data collection in seven townships of North District, the researcher arranged seven research assistants who have experienced about social survey. To cover the whole North District and to reduce the bias for selecting the sample, the researcher organized these seven research assistants to collect the information of the formal and informal shops before the actual data collection was done. Therefore, they discussed with some municipal staffs, relevant leaders of the wards, owners of the recycling shops, street scavengers, dumpsite scavengers and household members to get the information of the shops as best as they can. Moreover, they searched and looked around the townships of North District. After collecting the information about several recycling shops, they randomly selected from these recycling shops.

The data gathered with survey questionnaires from the owners of the shops. The social survey was applied In-personal mode by interviewing face-to-face with survey questionnaires. The preliminary pilot survey was made by interviewing two recycling shops from each township under North District to reduce the misunderstanding upon the survey questionnaire by the survey participants and my research assistants. After getting the feedbacks from the pilot survey, the research questions were modified. The research assistants collected the data mostly at the weekend but often on weekdays. The time length of data collection was from 1st March to 10th April 2020.

The data obtained from survey questionnaires were analyzed by using Microsoft Excel and Statistical Package for Social Science 24 (SPSS, version 24). The descriptive statistical analysis was analyzed to illustrate the nominal and ordinal data obtained from the survey questionnaires such as analyzing the job creation. To calculate the amount of recycling rates and the related formulas were used in the calculation.

3.3 Limitations

There are a few limitations for the calculation of the recycling rates in the recycling shops. Mostly, there is an absence of systematic database for the recycling amount in the selected recycling shops. Therefore, the owners of the shops responded the estimated amount of recycled items for their shops. Moreover, in the field, the measurement units of the recycled waste are different (plastics, papers, tins and tins, and metals are measured in Viss but only glasses in bottles). Moreover, the owners are trading various types of glasses. In this study, the result of the recycling rates was mainly based on the responses of the owners of the recycling shops because the published previous papers which estimated the recycling rates in North District of Yangon are rare to make cross-check with my results. Therefore, as the result, the estimation in this research might be over or under-estimate upon the response of owners.

4. Results and Discussion

4.1 Basic information of the recycling shops

The owners that answered were 79.6 % (male) and 20.4 % (female) (see Table 1). Overall, male ownerships are about four times higher than female ownership. Therefore, this study finds that male ownerships are more dominant than female ones in the recycling shops.

The results regarding the owners' age interval are that 4.5% of the participants are 18-25 years old, 41.3% are 26-35 years old, 35.3% are 36-45 years old, 17.9% are 46-60 years old, and 1% are above 60 years old (see Table 1). Overall, more than 90% are between 25 years and 60 years old. Therefore, this study finds that most of the young, active and hard-working owners are recycling the waste. Any person over the age of 18 who meets the recruiting businesses specified criteria can perform the position of a manager or owner of an enterprise (Thean-ngarm et al. 2020). No owner is less than 18 years old in this study (see Table 1). Therefore, all surveyed owners are acceptable as owners of their businesses in terms of age.

There is a cultural component to the marriage status of Myanmar including Yangon. During the pilot survey, the research assistants found that some owners did not like to comment on their marital status in cases such as divorce or widow; hence, the question was framed as, "once married but now single." The results are 15 % (single), 91% (married) and 1.5 % (once married but now single) (see Table 1). Overall, this study finds that 91% of the owners are married. This occurrence might be related to family-run businesses for providing the income generation and livelihoods for both the owners and their family members.

The results regarding their education level are 2% (did not join the school), 16.4% (finished primary school), 50.7% (completed middle school), 23.9% (accomplished high school) and 7% (graduated from university/college) (see Table 1). Overall, this study indicates that more than 90% are non-graduated persons. Therefore, the recycling shops provide a good chance for engaging in businesses for non-graduated owners.

The owners replied that 15.9 % of their shops are operating in Mingaladon Township, 28.9% in Hlaing Thar Yar Township, 17.9% in Shewpyitha Township, 20.9% in Insein Township, 3.5% in Mayangone Township, 9% in Hlaing Township and 4% in Kamayut Township (see Table 1). Overall, more than 80% are operating in Mingaladon, Hlaing Thar Yar, Shwe Pyi Thar and Insein Townships. The industrial zones and landfills are also located in Mingaladon, Shwe Pyi Thar and Hlaing Thar Yar townships (Polsaram and Htwe 2010). Additionally, the recycling wholesale markets (about 100) are in Insein township (Friedor 2014). Therefore, it can be concluded that most recycling shops are operating in the areas which exist industrial zones, landfill sites and recycling wholesales markets.

Table 1. Basic information of the recycling shops

Basic Information	Category	Results (All Shops)
Gender	Female	20.4%
	Male	79.6%
Age Interval	Less than 18	0%
	18-25 years	4.5%
	26-35 years	41.3%
	36-45 years	35.3%
	46-60 years	17.9%
	Above 60 years	1%
Marital Status	Single	7%
	Married	91.5%

	Once married but now single	1.5%
Education Level	None	2%
	Primary school	16.4%
	Secondary school	50.7%
	High school	23.9%
	University/ college	7%
Location	Mingaladon	15.9%
	Hlaing Thar Yar	28.9%
	Shwe Pyi Thar	17.9%
	Insein	20.9%
	Mayangone	3.5%
	Hlaing	9%
	Kamayut	4%

4.2 Roles and Contributions of the Recycling Shops

4.2.1 Job creation

The owners responded that 63.2 % of their shops hire paid workers, but 36.8% do not (see Table 2). Therefore, it can be concluded that about one-third of the shops are running businesses with their family members. Moreover, the results of the size of the employment are that 92.5 % of shops can contribute 1-9 employees while 7.5 % provide 10-50 employees (see Table 4.1). Overall, more than 90% of the enterprises are running with 1-9 employees. Rand et al. (2019) defined 1-9 employees as micro-enterprises; 10-49 employees as small enterprises; 50-299 employees as medium-sized enterprises, and 300 employees and above as large enterprises. Therefore, more than 90% of these businesses are micro-sized enterprises.

The selected 201 recycling shops can offer about 1113 jobs (469 female and 644 male) including family members (see Table 2). Therefore, on the average, about 6 people are working in a recycling shop. Moreover, the recycling shops can hire 489 workers (199 females and 290 males). On the other hand, 334 daily workers and 260 salaried workers are included (see Table 2). Therefore, the selected 201 recycling shops can hire three workers on average. This study also finds that the number of male employees is higher than female ones. Therefore, male employees are dominant in the shops. Additionally, this study also finds that recycling shops prefer to hire more daily workers than salaried workers.

Shore (1994) also found that recycling can create over 8,700 jobs in North Carolina, and it is a network of job creation for this state. Alvarado (2004) also researched that recycling creates 14,000 employees or 0.35% of the workforce in North Carolina. Therefore, waste recycling provides a job market for waste dealers not only in Myanmar but also in other countries.

Table 2. Job creation of the recycling shops

Variables	Categories	Results (All Shops)
Hiring Workers	Yes	63.2%
	No	36.8%
Size of Employment	1- 9 employees	92.5%
	10-49 employees	7.5 %
	50-299 employees	0%

Total Employment	Female	469 employees
	Male	644 employees
Total Hired Workers	Female	199 workers
	Male	290 workers
	Daily workers	332 workers
	Salaried workers	157 workers

4.2.2 Minimizing the waste generation

As mentioned before, the recycling items are measured with different units and different types of glasses are trading. Moreover, there is no official data to cite the exact weight of the glasses in Kg or tons in North District of Yangon. To apply the relevant weight of the glasses for the study, the research assistants interviewed with some owners of the recycling shops, “they answered that the most common trading for the glasses are beer bottles”, Therefore, they measured the weight of beer bottles in the field during the interview. In this study, the average weight of the glasses (beer bottles) will be assumed 0.3 Viss per bottles in the calculation.

In the survey, waste recycling amount per week in Viss or bottles was collected; and so, the data was divided by 7 to determine the recycling amount per day; for glass, it was multiplied by 0.3 to exchange bottles for Viss; all recycled items were then multiplied by 1.6333 to convert Viss to Kg (one Viss is equivalent to 1.633 Kg). Then, they were expressed in metric tons by dividing by 1000. The estimated percentage of waste recycled in the recycling shops was evaluated as follows:

The average amount of waste recycled in the shops in Viss in a day

$$\begin{aligned}
 &= (\text{the average amount of recycled plastic} + \text{the average amount of recycled paper} + \text{the average amount of recycled metal} + \text{the average amount of tins and cans} + \text{the average amount of recycled glass}) \\
 &= (47.03 + 23.34 + 9.46 + 20.12 + 115.33) \text{ in Viss} \\
 &= 215.28 \text{ Viss.}
 \end{aligned}$$

Then, the average amount of waste recycled in the shops in Kg (1Viss= 1.6333 Kg) in a day
 $= 215.28 * 1.6333 = 351.62 \text{ Kg}$
 $= 351.62 \text{ Kg} = 0.352 \text{ Tons per Day (TPD)}$ (if 1 metric ton= 1000 Kg).

For selected 201 recycling shops = 70.752 tons

Total waste generated in Yangon City= 2900 TPD

Hence, the percentage of waste recycled in the North District = $70.752 \text{ TPD} / 2900 \text{ TPD} * 100 = 2.44\%$ (for selected 201 recycling shops). Therefore, each recycling shop can recycle 0.012% of the whole waste generated in Yangon City. The waste recycling is vital for reducing the amount of waste generation in landfill sites, for minimizing the cost of municipalities in terms of transportation and collection, for protecting the discharge of hazardous waste by recycling items such as plastics and some heavy metals. Therefore, recycling shops can protect the environment and save the economy for the city.

5. Conclusion

Generally, most of the young, hardworking, and married male owners of the recycling shops are actively engaged in their businesses. The investigation of this research has discovered that most of the recycling shops are operating in Hlaing Thar Yar, Shwe Pyi Thar, Insein and Mingaladon townships which have industrial zones, wholesale markets and disposal sites. They provide an excellent chance to operate businesses for non-graduated owners. They play a critical role in providing jobs and in minimizing the waste generation. The recycling can provide job opportunities for the waste dealers including employers and employees. About six people are working in a recycling shop and each shop can hire three workers on the average. In the recycling shops, males are more working than the female. The recycling shops are important for recycling the waste to reduce the environmental and social impacts regarding increasing waste generation. Therefore, the local government should strengthen and promote the existing recycling shops by enhancing their roles in MSWM such as enhancing the quality of the recycling items until they can trade their items not only locally but also internationally.

6. Acknowledgement

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