

CHAPTER ONE

1. INTRODUCTION

1.1. Solid Waste

Human activities generate waste materials. Normally, solid wastes are often discarded because they are considered useless. Waste is a by-product of human activities. They are materials that are abandoned or discarded because they are of no value to the producer (Urvashi, 2006).

Usually solid waste can be classified as follows:

- Municipal Solid Waste (MSW)
- Hazardous waste
- Agricultural waste
- Industrial waste

Municipal Solid Waste (MSW) is mainly household waste, including commercial waste and institutional waste (Agamuthu, 2001; Gerrard and Joel, 2006). Municipal Solid Waste is commonly known as trash or garbage. This type of waste includes all wastes (except wastewater and sewage) generated by households, businesses and institutions (universities, schools and colleges) located within municipalities (McKenzie, et.al, 2007).

The composition of MSW is highly dependent on factors such as living standards, geographical location, type of housing and seasons (Roberto, 2008). As shown in Figure

1.1 the composition of MSW in developed countries can be classified as: paper, metal, plastic, food scraps, wood, glass, rubber, leather and yard trimmings. However, one- third of solid waste in developed countries is paper (CQ Researcher, 2009).

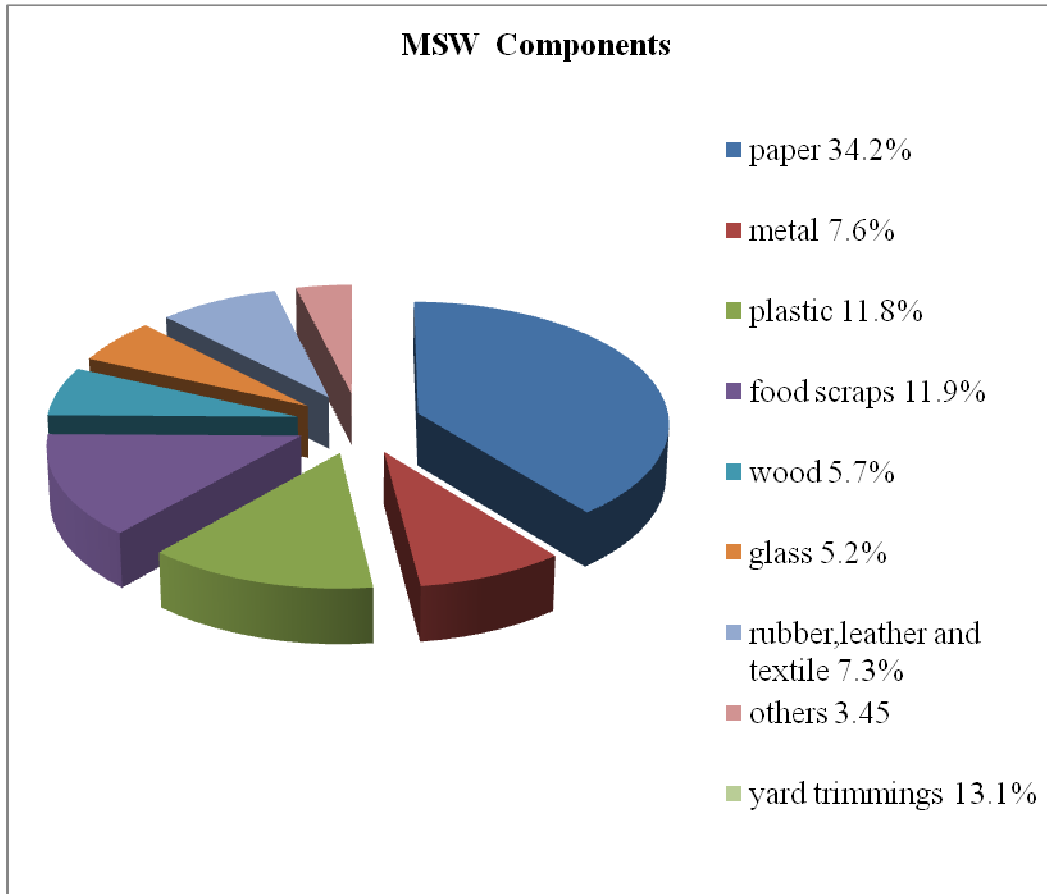


Figure 1.1: Types and Percentage of MSW in developed countries

(Source: McKenzie, et.al, 2007)

Table 1.1 shows, that Thailand generated more paper waste than China, India and Sri-Lanka in 2005. However, in Malaysia paper waste is in the second highest stage in Municipal Solid (MSW) Waste while in Thailand paper waste comes in third stage. In 2008, 18% of MSW in Malaysia was paper. The increase in world's population has

resulted in the amount of solid wastes being generated. In 2000, the estimated global waste generation was 318 million tonnes and it increased to 518 million tonnes in 2008 and is expected reach to 585 million tonnes in 2010 (Agamuthu, et.al, 2009).

Table 1.1: Organic and inorganic components of MSW in selected countries.

Country	Food waste (%)	Miscellaneous	Paper	Plastic	Metal
China	50	30	8	12	-
India	42	48	5	3	2
Sri Lanka	85	3	7	5	-
Thailand	50	17	15	16	2

(Source: Visvanathan and Trankler, 2005)

In Kuala Lumpur, the capital city of Malaysia, the amount of MSW generated was 1.62kg /person/day, when the total population was 2.2 million in 2008. The total MSW generation in Kuala Lumpur for 2008 was 3,560 tonnes/day (Mohamed, et.al, 2008).

In Peninsular Malaysia (West Malaysia), the daily generation of waste was 19,100 tonnes in 2006 and it increased to 23, 000 tonnes per day in 2008. Generation of Municipal Solid Waste (MSW) in Malaysia has increased more than 91% over the past 10 years due to rapid development of urban areas, rural-urban migration, increase in per-capita income and change in the consumption pattern brought about by development (Agamuthu, et.al, 2009) However, all this amount of MSW is disposed in landfills. Only 3-5% of this amount is recycled while the target for MSW recycling is 22% by year 2020 (Ministry of Housing and Local Government, 2008; Rosnani, 2006).

Paper waste makes up the second most composition in MSW in Malaysia (Figure 1.2). The amount of waste paper generation in Malaysia, was 18% of the total MSW in 2008. The composition of MSW reflects the affluence of the society, their way of life, their economic status and their social behavior (Chung and Yamin, 2008).

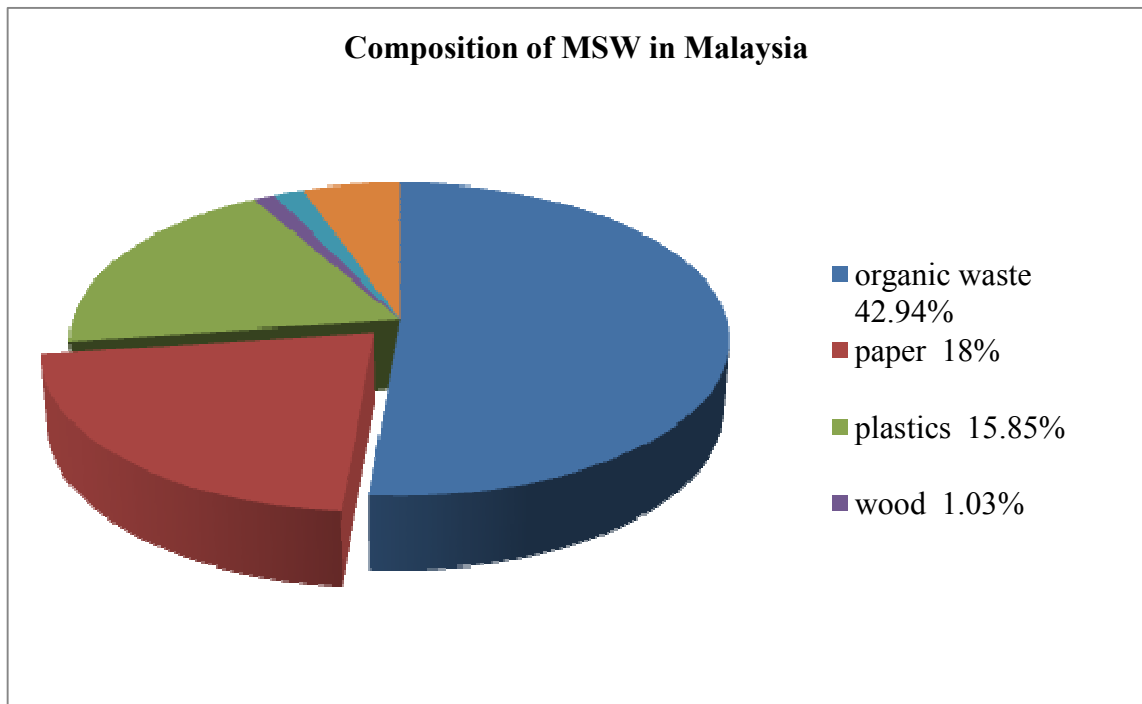


Figure 1.2: Composition of MSW in Malaysia (Source: Chung and Yamin Saad, 2008)

In 2003, the amount of MSW generated in Malaysia was 0.5-0.8 kg/person/day; it has increased to 1.7 kg/person/day in major cities in 2008. By year 2020, the quantity of MSW generated is estimated to increase to 31,000 tonnes (Latifah, et.al, 2009).

1.2. Paper Production / Consumption Scenario in Malaysia

Recycling is a new exercise in Malaysia and is still in the infant stage. Lack of public awareness and lack of facilities are the weaknesses for recycling in Malaysia (Agamuthu,

et. al, 2007). Malaysia spends more than RM 95 million/year for importation of used paper and a significant amount on waste plastic and waste glass. As a result, Malaysia imports almost RM 3billion worth of pulp and paper products annually (Ministry of Housing and Local Government, 2008). The total paper production in the world in 2004 was 360 million tonnes. As shown in Figure 1.3, Asia, North America and Europe consumed over 90% of the paper and paperboard. However, the production of printing and writing paper is the second stage when paper board is in third stage (Mohamed, et.al, 2009). The total production capacity of the entire Malaysian paper mills reaches 1.3 million tonnes /year, the consumption is still more than the production capacity (Mohammad, 2009).

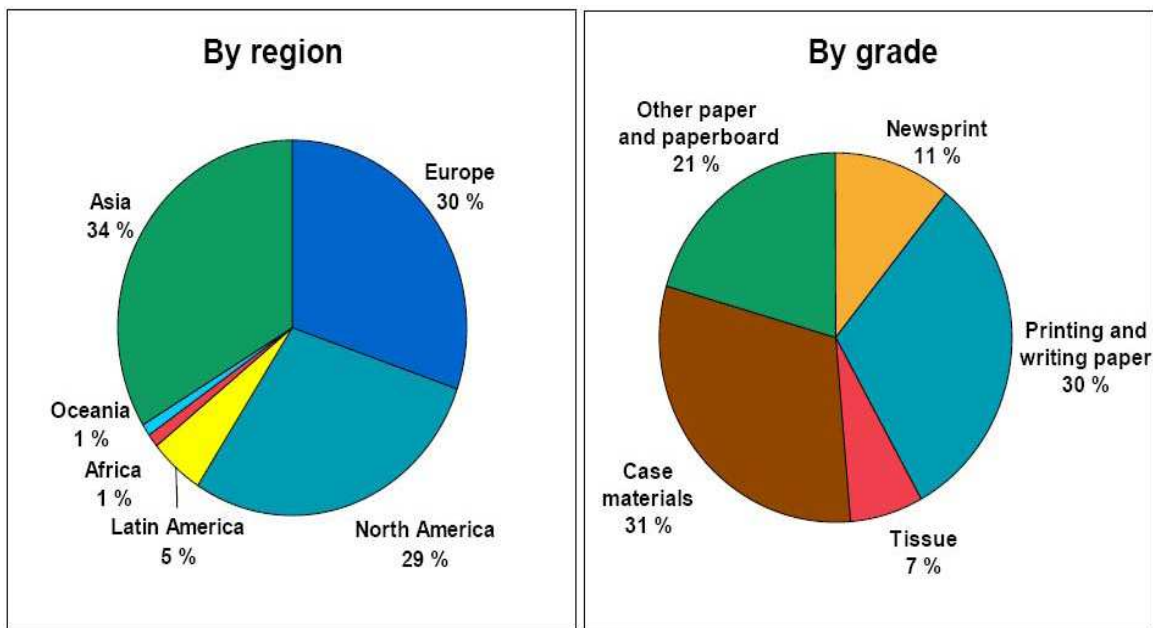


Figure 1.3: Pulp and paper production in the world by regions and by grade (2004)

(Source: Forsstorm, et.al, 2006)

Recycled paper forms an important raw material input in the paper making process. For example, in Europe about 50 % of the paper is recycled. World paper and paperboard demand is expected to grow to about 2.1 % till year 2020 and the growth will be fastest in Eastern Europe, Asia (except Japan) and Latin America (Forsstrom, et.al, 2006). Figure 1.4 shows that, MSW in Kuala Lumpur has good potential for recyclable activity. However, the attention of the authority is not sufficient for this programme. It is alarming that, due to the lack of proper recycling activity, Malaysian Newsprint Industries Sdn. Bhd. is forced to import 50% of its materials (Mohamed, et.al, 2009).

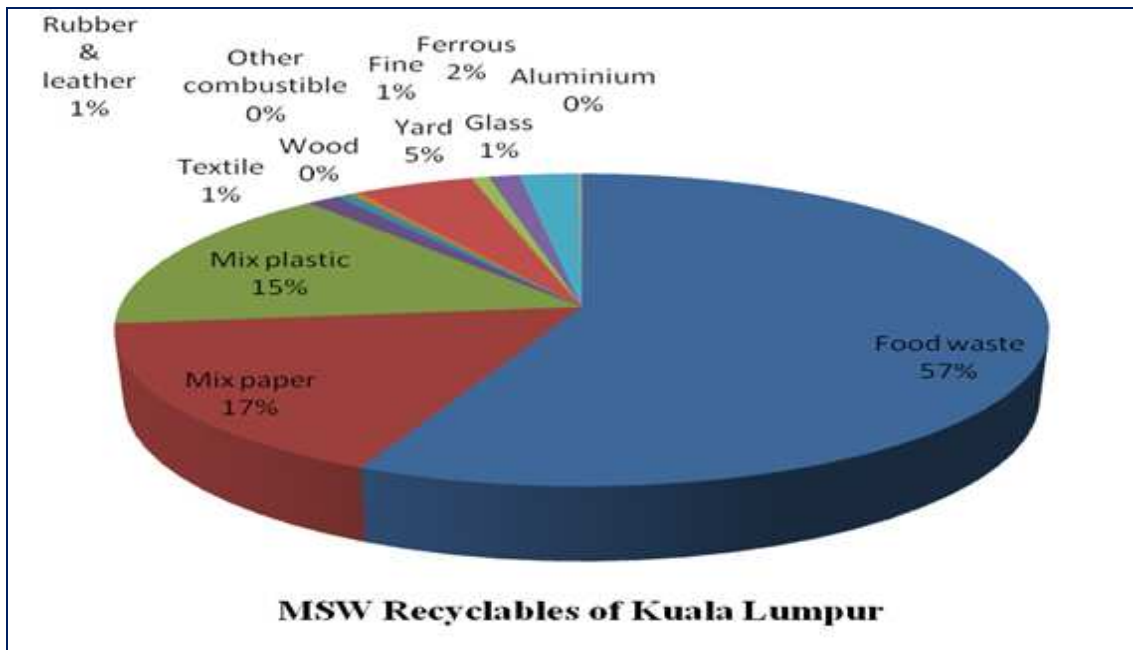


Figure 1.4: MSW Recyclables in Kuala Lumpur

(Source: Mohamed, et.al, 2008)

The Malaysian pulp and paper industry is heavily dependent on imported fiber, particularly virgin pulp and there is also a need to find a new source of fiber to strengthen and retain the quality of secondary fibers (Mohammad, et.al, 2009). Of the 20 paper mills

in Malaysia, only Sabah Forest Industries Sdn. Bhd. is an integrated pulp and paper mill. All the other 19 utilize 95% waste paper as their main raw material except for Kimberly Clark (M) Sdn. Bhd. which used 80% imported virgin pulp (Latifah, et.al, 2009).

If all these mills were to produce at full capacity, Malaysia will still need to import 35% of paper and paperboard to fulfill its domestic requirement. Due to lack of land for planting wood fibers for pulp and paper, the country needs to look for non-wood fibers to offset shortage of wood fibers such as kanaf, bamboo and bagasse. Moreover, Malaysia will benefit from reduced land filling, saving money, eliminating open burning, improving organization's image, diverting material from disposal, conserving natural resources, saving energy and reducing greenhouse gas emissions by means of effective waste paper recycling (Malaysian Newsprint Industries, 2007).

In waste management parlance, the 3Rs stand for “reduce, reuse and recycle”. The “reduction” aspect of the 3Rs can be described as any activity that leads to the prevention or minimization of wastes. The “reuse” aspect of the 3Rs can be described as reutilization of a waste product in its intact state either for its original purpose or a new one. Recycling of wastes involves dismantling waste into its components, which will be used in the production of a new product (Agamuthu, et.al, 2008).

1.3. Limitations and Problems related to Recycling in Malaysia

Consequently, a few conceptual models such as integrated Waste Management and Integrated Sustainable Waste Management have been proposed with the aim of assessing existing waste management system and planning more effective waste management approaches (Klundert and Anushutz, 2001).

The lack of coordination among the relevant agencies often results in duplication of efforts in MSW management, underutilization of resources and un-sustainability of overall waste management programmes. On the management side, however, lack of skilled manpower, irregular collection services, inadequate equipment used for waste collection, inadequate legal provision and resource constrains are the key factors that are challenging the waste recycling scenario in Malaysia today (Latifah, et.al, 2009).

1.4. Problem Statement

Due to the increase in population growth in Malaysia, the total generation of MSW has also increased. As a result of inadequate recycling, approximately 90 percent of these wastes are sent to the landfills. This translates to more space being needed for landfills, loss of natural resources, increased of expenditure, uses energy and increased pollution. Since paper is the second most abundant component in MSW this research explores the waste paper generation in an Academic Institution.

1.5. Objectives of Research

The specific objectives are to:

- To identify and quantify of waste paper generation in UM (Residential colleges, Faculties, Research Center, Institute and Administration offices).
- To identify of waste paper management in University of Malaya.