RESIDENTIAL SOLID WASTE GENERATION IN MANMUNAI NORTH DIVISIONAL SECRETARIAT AREA OF BATTICALOA

280

LIBRARY
07 MAY 2009
Eastern University, Sri Lanka.

BY

KRUSHNAPILLAI SIVAKUMAR

FAG280
Project Report
Library - EUSL

DEPARTMENT OF AGRICULTURAL ENGINEERING

FACULTY OF AGRICULTURE

EASTERN UNIVERSITY

SRI LANKA

2009

PROCESSED
Main Library, EUSL

ABSTRACT

Solid waste management (SWM) is a multidimensional challenge faced by urban authorities, especially in developing countries like Sri Lanka. An essential preliminary step in municipal solid waste management (MSWM) is the accurate determination of the quantities and composition of the wastes. Analysis of the quantity and composition of municipal solid waste (MSW) is fundamental for the planning of municipal waste management services. The household sector is one of the primary sources of solid wastes in Manmunai North D.S area of Batticaloa, accounting for almost 75% of all sectors. The aim of this study was to evaluate residential solid waste generation, its composition and methods of waste disposal adopted in Manmunai North D.S area of Batticaloa. This survey covered 50 houses with different socio- economic levels such as income level and family size. There were six components of solid waste were evaluated in this study namely, food waste, paper, polyethylene, plastic, glass and metal.

The study results show that the monthly waste generation per household was ranging from 10.75 to 89.15kg with an average of 38.66kg. Average waste generation per household and per capita waste generation were 1.29kg/day and 0.30kg/day respectively. The findings show that, approximately 26.85 tons of solid waste generated per day in residential area and household sector contributes more than 38.36% of the total waste generation. Average composition of the household waste measured (by weight) seems to be 87.95% food waste, 3.6% paper, 2.33% glass, 2.14% polyethylene, 2.12% metal and 1.86% plastics. Food waste was the predominant component in entire waste stream whereas compositions of other types of waste were low in residential area. The overall socio-economic condition of the

residential area is very much responsible for higher percentage of organic component.

The correlation study showed that, there is a significant positive correlation ($r = 0.476$, $p<0.01$) between generation of residential solid waste and the family size. Similarly, non significant positive correlation ($r = 0.184$, $p>0.05$) was found in between solid waste generation and monthly income of the households. Burning, municipal collection and family pit are the major disposal methods used in this study area and only small percentage of people (16%) converting biodegradable wastes into organic fertilizer/compost. This study adequately shows that more awareness has to be created among households for the active participation in solid waste management in order to protect the environment.

TABLE OF CONTENTS

	Page No.
ABSTRACT	**I**
ACKNOWLEDGEMENT	**III**
TABLE OF CONTENTS	**IV**
LIST OF TABLES	**VIII**
LIST OF FIGURES	**IX**
LIST OF ABBREVIATIONS	**X**
CHAPTER 01 - INTRODUCTION	**01**
CHAPTER 02 - LITERATURE REVIEW	**06**
2.1 Materials Flow in a Society	06
2.2 Sources of Solid Waste	06
2.3 Categories of Solid Waste	07
2.3.1 Municipal Solid Wastes	07
2.3.2 Agricultural Wastes	08
2.3.3 Industrial Wastes	09
2.3.4 Construction and Demolition Wastes	10
2.3.5 Hazardous Wastes	10
2.3.6 Bio Medical Wastes	10
2.4 Quantity and Characteristics of Solid Waste	11
2.4.1 Characteristics of Solid Waste	12
2.4.1.1 Composition of Waste	13
2.4.1.2 Specific Weight	13
2.4.1.3 Density	14

2.4.1.4 Energy Content 14

2.4.1.5 Heating Value 15

2.4.1.5 Moisture Content 15

2.4.1.5 C: N Ratio 15

2.5 Municipal Solid Waste Management 16

2.5.1 Economics and Solid Waste Generation 17

2.5.2 Solid Waste Management in World 19

2.6 Health and Environmental Impacts of Solid Waste 23

2.7 Functional Elements of Municipal Solid Waste Management 25

2.7.1 Initial Steps in Municipal Solid Waste Management 25

2.7.1.1 Waste Generation 26

2.7.1.2 On-Site Handling, Processing and Storage 27

2.7.1.3 Collection 28

2.7.1.4 Sorting, Processing and Transformation of Solid Wastes 29

2.7.1.5 Transfer and Transport 30

2.7.1.6 Disposal 31

2.8 Strategies for Solid Waste Management 32

2.8.1 Waste Reduction/Source Reduction 32

2.8.2 Recycling 32

2.8.3 Reuse 33

2.8.4 Recovery 33

2.9 Integrated Solid Waste Management 34

2.10 Solid Waste Management in Sri Lanka 35

2.11 Solid Waste Management in Batticaloa 39

CHAPTER 03 – MATERIALS AND METHODS 41

3.1 Location of Study 41

3.2 Methodology 43

CHAPTER 04 - RESULTS AND DISCUSSION 44

4.1 Socio-Economic Factors considered in the Study 45

4.1.1 Income Level 45

4.1.2 Number of Members in a Family 47

4.2 Residential Solid Waste Generation among Fifty Families in Study Area 47

4.2.1 Estimated Residential Solid Waste Generation in Manmunai North D.S Division of Batticaloa 49

4.3 Composition of Residential Solid Waste in Study Area 51

4.4 Relationship between Quantity and Socio-Economic Factors 55

4.4.1 Correlation between Household Waste Generation and Total Monthly Income 56

4.4.2 Correlations between Total Monthly Income and Different Types of Waste Generated 57

4.4.2.1 Food and Paper Waste Generation 57

4.4.2.2 Plastic and Glass Waste Generation 57

4.4.3 Correlation between Household Waste Generation and Number of Members in a Family 58

4.4.4 Correlation between Family size and Different Types of Waste Generated 58

4.5 Existing and Possible Waste Disposal Methods in Study Area 59

4.6 Household Attitudes and Participation on Waste Segregation Process 61