



UNIVERSITI PUTRA MALAYSIA

**PREDICTORS OF RECYCLING BEHAVIOUR AMONG RESIDENTS OF
THE KLANG VALLEY, MALAYSIA**

JASMINE ADELA MUTANG

FEM 2008 6



**PREDICTORS OF RECYCLING BEHAVIOUR AMONG RESIDENTS OF
THE KLANG VALLEY, MALAYSIA**

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By

JASMINE ADELA MUTANG

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,
in Fulfilment of the Requirements for the Degree of Master of Science

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May 2008



DEDICATION

To:

**MY LORD AND BEST FRIEND:
LORD JESUS CHRIST**

The LORD is my shepherd; I shall not want.

2 He makes me lie down in green pastures.

He leads me beside still waters.

3 He restores my soul.

He leads me in paths of righteousness
for his name's sake.

4 Even though I walk through the valley of the shadow of death,

I will fear no evil,

for you are with me;

your rod and your staff,

they comfort me.

5 You prepare a table before me

in the presence of my enemies;

you anoint my head with oil;

my cup overflows.

6 Surely goodness and mercy shall follow me

all the days of my life,

and I shall dwell in the house of the LORD

forever. (*Psalms 23*)

**DADDY, MUMMY, ABOY, ANDES, ODEL and LIAN, my prayers are may the
Lord:**

24 The LORD bless you and keep you;

25 the LORD make his face to shine upon you and be gracious to you;

26 the LORD lift up his countenance upon you and give you peace. (*Numbers 6:24-26*)

Abstract of thesis presented to the senate of Universiti Putra Malaysia in fulfilment of
the requirement for the degree of Master of Science



PREDICTORS OF RECYCLING BEHAVIOUR AMONG RESIDENTS OF THE KLANG VALLEY, MALAYSIA

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JASMINE ADELA MUTANG

May 2008

Chairman: Sharifah Azizah Haron, PhD

Faculty : Human Ecology

Malaysia is facing a crisis in solid waste management due to rapid urbanization and high concentration of population. It was reported that public participation in recycling is still very low despite rigorous campaigns conducted by the government. Three to five percent of solid waste generated in Malaysia is recycled a number that is far below the rate of 15 to 40 percent in developed countries. This study examines the recycling behaviour among urban households within the Klang Valley area. Specifically, the purpose of the study is to identify reported recycling behaviour, to examine socio-demographic and psychological characteristics of recyclers and non-recyclers, to identify why individuals involve in recycling or otherwise, and to determine predictors that increase the probability of recycling behaviour among households.

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A total of 500 respondents were targeted to involve in this study. However, only 342 respondents were successfully interviewed with a response rate of 68.4%. The sampling technique utilized in the data set was multistage sampling. Data analysis technique used consisted of bivariate analysis and logistic regression.

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Results of this study indicated that, of the 342 respondents, 62% were of non-recyclers and the remaining 38% are recyclers. No significant socio-demographic differences were found between recyclers and non-recyclers except for ethnicity [Pearson χ^2 (2, N=342) =11.716, $p=.001$], marital status [Pearson χ^2 (2, N=342) =23.204, $p=.001$] and education. . There was significant difference in the mean age [$M=3.291$, $SD=.992$; $t(340)=3.317$, $p=.001$], household size [$M=0.797$, $SD=0.200$, $t(340)=3.994$, $p=.000$], values towards the environment [$M=4.305$, $SD=.246$, $t(340)=-7.063$, $p=.000$] and attitudes towards recycling [$M=7.002$, $SD=.862$, $t(340)=-8.119$, $p=.000$] for recyclers and non-recyclers.

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Generally, results for intrinsic and extrinsic motives among recyclers are not clear as respondent tended to be clustered around the middle of the scale with both motives indicating high percentages. The same goes for hindrances to recycling among the non-recyclers. The findings indicated that recycling efforts in Malaysia were mostly driven by intrinsic motivation which is a good indicator that might facilitate sustainable practices. Individuals appear to be well aware of the need to recycle and will generally do so if given the means. The hindrances to recycling among the non-recyclers were personal situations and inconvenience. However, the non-recyclers were willing to recycle if given the certain opportunities and special recycling services. Thus, the data show that recycling was well accepted by the public as an activity that is worth undertaking so long as the means exist.

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The results of logistics regression testing for socio-demographic, knowledge and psychological characteristics showed partial significance at a probability level of .050. The result of Hosmer and Lamershow Goodness-of-fit shows total significance at .050. The logistic model that utilizes study data drawn from the 342 samples and the results

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of the Binomial Logistic Regression indicate that recycling increased among respondents who were single, possess better values towards the environment and better attitudes towards recycling. However, gender, education attainment, different types of employment status, types of accommodation, house ownership, and knowledge of recycling were not found significant.

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The findings of the study could be used for designing recycling schemes although it is clear that a one-size-fits-all approach is not acceptable. The information from this study will benefit relevant agencies, business corporations, non-governmental organizations, local governments and others to find out more about social and economic instruments and, where appropriate, use them to deal with recycling-related issues (waste management) that fall within their scope of responsibility when considering the format of new recycling programmes.

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Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

**PREDIKTOR PERLAKUAN KITAR SEMULA DALAM KALANGAN
PENDUDUK LEMBAH KLANG, MALAYSIA**

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Malaysia sedang menghadapi krisis pengurusan sisa pepejal yang disebabkan oleh perkembangan perbandaran yang pesat dan kepadatan populasi yang kian meningkat.

Dilaporkan bahawa tahap penglibatan orang ramai dalam aktiviti kitar semula masih berada pada tahap yang sangat rendah walaupun terdapat banyak usaha dalam bentuk kempen telah dilaksanakan oleh kerajaan. Tiga hingga lima peratus sisa pepejal di Malaysia dikitar semula, jauh, lebih rendah berbanding 15 hingga 40, peratus negara membangun yang lain. Tujuan utama kajian ini adalah untuk mengenalpasti perlakuan kitar semula dalam kalangan isirumah di sekitar Lembah Klang. Objektif kajian ini adalah untuk mengkaji perlakuan kitar semula responden untuk mengenalpasti ciri socio-demografi dan psikologikal individu yang mengitar semula atau sebaliknya, untuk mengetahui mengapa individu terlibat dalam perlakuan kitar semula dan untuk mengetahui prediktor yang meningkatkan kebarangkalian perlakuan kitar semula dalam kalangan isirumah.

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Seramai 500 responden telah disasarkan untuk terlibat dalam kajian ini, namun hanya 342 orang responden berjaya ditemuramah dengan kadar respon sebanyak 68.4%.

Teknik persampelan yang digunakan adalah teknik persampelan berperingkat. Analisis data adalah menggunakan analisis bivariat dan regresi logistik.

Hasil kajian menunjukkan bahawa 62% daripada 342 responden yang terlibat adalah terdiri daripada golongan yang tidak mengitar semula, manakala selebihnya (38%) adalah responden yang mengitar semula. Didapati bahawa tidak terdapat perbezaan yang signifikan di antara pengitar semula dan yang bukan pengitar semula dari aspek socio-demografi kecuali bangsa [Pearson χ^2 (2, N=342) =11.716, $p=.001$], status perkahwinan [Pearson χ^2 (2, N=342) =23.204, $p=.001$], dan tahap pendidikan [Pearson χ^2 (2, N=342) =5.897, $p=.015$]. Terdapat perbezaan min yang signifikan bagi umur [M=-3.291, SD=.992, $t(340)=3.317$, $p=.001$], saiz isirumah [M=0.797, SD=0.200, $t(340)=3.994$, $p=.000$], nilai terhadap alam sekitar [M=4.305, SD=.246, $t(340)=-7.063$, $p=.000$] dan sikap terhadap kitar semula [M=7.002, SD=.862, $t(340)=-8.119$, $p=.000$] bagi responden yang mengitar semula dan tidak mengitar semula.

Umumnya hasil kajian terhadap motivasi intrinsik dan ekstrinsik dalam kalangan responden yang mengitar semula tidak jelas memandangkan rata-rata kluster responden terkumpul di bahagian tengah skala, dengan kedua-dua jenis motivasi menunjukkan peratusan yang tinggi. Keadaan yang sama berlaku dengan kajian berkaitan faktor-faktor yang menjadi penghalang di kalangan individu yang tidak mengitar semula. Bagaimanapun kajian ini juga mendapati bahawa usaha untuk mengitar semula di Malaysia kebanyakannya didorong oleh motivasi intrinsik. Ini merupakan indikator yang positif bagi menggalakkan amalan lestari. Individu juga didapati mempunyai kesedaran yang tinggi tentang keperluan untuk mengitar semula dan secara umumnya akan terlibat sama sekiranya diberi peluang tertentu. Faktor penghalang untuk mengitar semula di kalangan responden yang tidak mengitar semula adalah disebabkan oleh situasi

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dan aktiviti kitar semula adalah sesuatu yang menyusahkan. Golongan yang tidak mengitar semula ini bagaimana pun sanggup untuk mengitar semula sekiranya diberi peluang tertentu dan disediakan perkhidmatan kitar semula yang tertentu. Dengan demikian, data menunjukkan bahawa kitar semula diterima baik oleh umum sebagai aktiviti yang bermanfaat selagi wujudnya peluang.

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Hasil ujian regresi logistik untuk sosio-demografi, pengetahuan, dan faktor psikologikal menunjukkan tahap signifikan pada nilai kebarangkalian .050 dan hasil ujian Hosmer dan Lamershow Goodness-of-Fit menunjukkan nilai signifikan .050. Model logistik yang diperolehi dari 342 responden dan hasil kajian Regresi Logistik Binomial menunjukkan bahawa perlakuan kitar semula dipengaruhi oleh faktor-faktor berikut: bujang, nilai yang positif terhadap alam sekitar dan sikap yang positif terhadap kitar semula. Walau bagaimanapun, jantina, jenis pekerjaan, jenis kediaman, tahap pendidikan, pemilikan rumah dan pengetahuan tentang kitar semula merupakan faktor-faktor yang didapati tidak signifikan.

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Hasil kajian ini boleh digunakan bagi membantu perancangan program kitar semula pada masa hadapan. Diharapkan kajian ini dapat memberi manfaat kepada agensi-agensi yang berkenaan termasuklah badan-badan korporat, agensi-agensi bukan kerajaan, pihak kerajaan tempatan dan pihak-pihak lain dengan mengambil kira aspek-aspek seperti sosial dan ekonomi serta aspek-aspek lain yang berkaitan. Ini bertujuan untuk menangani isu berkaitan kitar semula (pengurusan sisa pepejal) yang bersangkutan-paut dengan skop dan tanggungjawab mereka. Selain itu, ini adalah sebagai persediaan untuk membentuk dan merancang format program kitar semula yang berkesan.

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Recognizing that this work would never have been accomplished without the contributions of many, the author expresses her sincere appreciation and many thanks to the following people:

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My deepest thank you to SIB Serdang (especially MG's and prayer partners –Kak Rani, Aideline, Julie, and Peterus) who have supported me always. My sincere appreciation to Pastor Ding and Dr. Lesley for their love, support, prayers and most of all for being a family to me during my ups and downs. God bless us all.

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Last but not least, my heartfelt appreciation to my beloved family: daddy, mummy (Mr. & Mrs. Raja Paran), Maximillian, Fernandez and Hazel and my special someone, Lian for their unfailing love, sacrifices, support, consistent prayers. They have shared much of my joy and sorrow as well as being my source of inspiration in my study. I love you all dearly.

I certify that an Examination Committee met on 15th May 2008 to conduct the final examination of Jasmine Adela Mutang on her Master of Science thesis entitled "Predictors of Recycling Behaviour of the Klang Valley Residents, Malaysia" in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the candidate be rewarded the relevant degree. Members of the Examination Committee are as follows:

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This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfillment of the requirement for the degree of Master of Science. The members of the Supervisory Committee were as follows:

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DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledge. I also declare that it has not been previously submitted for only other degree at UPM or other institutions.

JASMINE ADELA MUTANG

Date: 16th July 2008

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LIST OF ABBREVIATIONS

NGO	Non-governmental Organizations
ABC	Action Plan for Beautiful and Clean Malaysia
NIMBY	Not In My Backyard
MPPJ	Majlis Perbandaran Petaling Jaya / Petaling Jaya Municipality
ADB	Asian Development Bank
OECD	Organization of Economic Cooperation and Development
TPB	Theory of Planned Behaviour
SDT	Self-determination Theory

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CHAPTER 1

INTRODUCTION

1.1 Background

Malaysia is facing a crisis in solid waste management due to rapid urbanization and high concentrations of population (Reme, 2003). In the year 2005 the total volume of waste generated was estimated at 9.5 million tonnes per day, an increase from 5.6 million tonnes per day in 2001 (Theng, 2003). According to Agamuthu (2001), of this amount, 80% was domestic waste and the rest were commercial and institutional waste. Daily, a total of 5,500 tonnes of waste is produced by Klang Valley alone or that each of its residents generates approximately 1.5 kg of solid waste daily (Reme, 2003).

The most common method of handling solid waste is through landfill and incineration but with shortcomings (Read, 1999). Landfills, for example, have limited lifespans. At the current rate of waste generation in Klang Valley, existing disposal sites will be filled up in less than two years (Alam Flora, 2003). Worse, suitable landfill sites have become more difficult to find. In addition, both landfills and incinerators have severe implications for the environment and human health. The use of landfills has been increasingly criticized as a viable disposal option because they produce toxic leachates which can contaminate water supplies and also produce combustible landfill gas from the anaerobic decomposition of waste (Gandy, 1994). Landfill gases, once they have entered the atmosphere, act as greenhouse agents. Specifically, landfills are major producers of methane and pollute water tables (Khiew, 2003). One kilogram of methane is believed to be up to 60 times more powerful than carbon dioxide in its contribution

to global warming (Gandy, 1994). Incineration, on the other hand, is a controversial technology as it is associated with air pollution. The concern over incineration is that the burning of chlorine-containing compounds such as plastics and bleached paper produce dioxins. Dioxins are among the most toxic molecules yet identified. Research has indicated alarming levels of these carcinogens in mothers' milk in the vicinity of incineration plants (Gandy, 1994). Incinerators also produce greenhouse gases and are a source of heavy metals, particulates, and cancer causing dioxins, even the ones that have pollution control devices. Both landfill and incineration could poison the air, soil and water (Khiew, 2003).

On the other hand, an effective and efficient system of waste management is needed to cope with the mounting waste produced. Many researches suggested that a more environmental-friendly-alternative to waste management is recycling (Ho, 2002). According to United States Environmental Protection Agency (2005), recycling refers to a series of activities by which products or other materials are recovered from or otherwise diverted from the solid waste stream for use in the form of raw materials in the manufacturing of new products. In the short run, recycling saves money while reducing excessive waste. In the long run, it extends the life span of the landfills, preserving earth's precious resources and conserving the environment (Sumiani, 2003).

1.2 Statement of the Problem

The total waste generation against a total Malaysian population of 26 million as projected in the Eighth Malaysian Plan (2001-2005) in the year 2005 is estimated to reach 9.5 million tonnes a year with a per capita generation rate of 1.2kg/day. This

figure is expected to increase year by year along with the increase in the per capita generation rate (Theng, 2003). Currently, waste is either land-filled or incinerated but with severe implications for the environment and human health. As for recycling, sadly a mere two percent of solid waste generated in Malaysia was recycled with the remainder ending up at landfills. This rate is far below than that of in developed countries such as Switzerland (22%), Denmark (19%), Germany (16%), Netherlands (16%), and Finland (15%) as reported by Warner (1995). Even in comparison with our neighbouring country, Singapore their recycling rate is higher, i.e. at 40 percent with a 50 percent target by 2010 (Reme, 2003).

International trends reflect incineration and recycling being particularly popular in densely populated countries such as Japan and the Netherlands (Agamuthu, 2001). Incinerators have been proposed for Kuala Lumpur and Labuan though their use has stirred some controversy from non-governmental organizations (NGO's). Incinerators with state-of-the-art pollution control equipment are formidably expensive. Once the authorities invest in incineration, they often do not have enough money to invest in waste reduction. The cost of construction, procurement and operation of an incinerator is exorbitant. The initial stages of procurement of equipment and construction would run to more than RM1.5 billion and may cost another RM50 million a year to maintain although the life-span of such incinerators is only about 21 years (Khiew, 2003).

Therefore, it's vital for Malaysia to consider adopting a more sustainable approach to the waste problem that is safer and more cost effective without destroying the environment. The Minister of Housing and Local Government, Datuk Seri Ong Ka Ting, said that if Malaysians can recycle five per cent of the 15,000 tonnes of solid waste produced daily, 750 tonnes of solid waste produced in the country need not be dumped

at landfills. He added that if one lorry can transport up to five tonnes on each trip to a landfill, recycling can reduce the number of the 150 trips made (Roziara, 2003).

However, without public participation and contributions, recycling domestic waste would not be possible. It is reported that over 80 percent of the 2400 recycling bins nationwide have been misused. Consumers are chucking things regardless of what the bins are meant to hold and whether items are recyclable or not (Elizabeth & Chelvi, 2003). Thus, increasing public awareness for conserving the environment through recycling activities is one major step to be achieved to make recycling a lifestyle in choice in Malaysia. This is especially true as public participation in recycling is still very low despite rigorous campaigns conducted by the government.

In order to develop relevant programmes to increase the awareness and participation in recycling activities, it is important to understand public current recycling behaviours. Thus, this study attempted to answer the following questions:

1. What is the level of participation of households in recycling activities in the Klang Valley area?
2. What are the demographic, knowledge and psychological profiles of the recycler and non recycler?
3. What are the motivations of and hindrances to recycling activities?
4. What are the factors that increase the probability of recycling behaviour among households?

1.3 Purpose of Study

The general purpose of this study is to examine the recycling behaviour among urban dwellers within the Klang Valley area.

The specific purposes of the present study are:

1. To identify recyclers' reported recycling behaviour.
2. To examine the socio-demographic, knowledge and psychological characteristics of recyclers and non-recyclers.
3. To identify resident motivations of and hindrances to recycling.
4. To determine factors that increases the probability of recycling behaviour among households.

1.4 Significance of the Study

This study is an extension of the existing study on recycling behaviour by providing understanding of recycling motivations among households in the Klang Valley area. In addition, it is also conducted with the hope of making a significant contribution to the academic literature on recycling behaviour. Waste management is becoming a major concern at local and national levels. The authorities are faced with massive tasks like combating illegal dumping, burning of waste and the scarcity of land for new landfills as the existing landfills have reached maximum capacity. Worst still, recycling campaigns have been ineffective. The National Recycling Policy, implemented in 1993 to extend the life span of landfills by reducing waste generation through recycling, has not been popular despite several re-launches of the campaign (Chubashini, 2005). In order to