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The profiles of household solid waste recyclers and non-recyclers in Kuala Lumpur, Malaysia

Irina Safitri Zen [a,*], Zainura Zainon Noor [b], Rafiu Olasunkanmi Yusuf [c]

[a] Centre for Innovative Planning & Development, Sustainability Research Alliance, Universiti Teknologi Malaysia, Johor Bahru, 81310 Johor, Malaysia
[b] Institute of Environmental and Water Resources Management, Water Research Alliance, Universiti Teknologi Malaysia, Johor Bahru, Johor, Malaysia
[c] Department of Chemical Engineering, Faculty of Engineering and Technology, University of Ilorin, Ilorin, Kwara State, Nigeria

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A B S T R A C T

Malaysia has twice launched nationwide recycling campaign in 1993 and 2000. The result of the campaign to encourage household participation in recycling is inconclusive as the programs were concentrated only in urban areas. This study is an effort to conduct a comprehensive study on the effects of the recycling campaign and awareness on household recycling participation. A standard questionnaire survey was conducted on 460 households in selected residential areas that have active recycling programs in Kuala Lumpur Federal Territory (KLFT). The study identified the socio-economic characteristics of household recyclers and non-recyclers and their levels of knowledge on recycling by applying discriminant analysis. In addition, evaluation of the barriers and motivations of households performing recycling was investigated using factor analysis. The information was combined to form a profile of household recyclers and non-recyclers in urban Malaysia. Formulation was conducted on different recycling strategies and awareness campaigns at the household level to improve the existing recycling programs and facilities for the improvement of household participation. The study succeeded in forming a profile of household recyclers dominated by higher income earners with higher educational backgrounds, who owned houses and had deeper appreciation of recycling as a social norm. The non-recyclers had lower education and income, were tenants in one-storey houses, with little knowledge of recycling and its challenges. The study summarized the urgency for more strategic and targeted approach to recycling campaigns at the local level, taking into account the socio-economic backgrounds of the community, for more active participation in recycling at all levels.

Introduction

Rapid urbanization and high commercial and industrial activities have resulted in the generation of large amounts of waste (Rockson, Kemausuor, Seassey, & Yanful, 2013) the composition of which is influenced by the nature of the economy (Othman, Noor, Abba, Yusuf, & Hassan, 2013). Improper solid waste management in Asia and Africa is a major challenge to governments in these continents (Calò & Parise, 2009; Zia & Devadas, 2008). The growing urban population in developing countries and the poor response of the authorities to the increasing demand for proper waste management services have been the twin dilemma facing cities in these countries (Ahmed & Ali, 2006; Gellynck, Jacobsen, & Verhelst, 2011; Owusu, Oteng-Ababio, & Afutu-Kotey, 2012). The consequences of improper waste disposal include surface and groundwater contamination, air and soil pollution, spread of disease, aesthetics and odour problems, emission of methane that is a fire hazard and blockage of drains (Othman et al., 2013). Hence, there is the need for proper waste management (Kassim & Ali, 2006) as it is very essential in terms of safety, good environment and public health (Bhuiyan, 2010). The barriers to inclusive waste management include unhygienic waste collection methods, low quality and quantity of secondary materials, repressive policies and lack of evidence to support activity (Oguntoyinbo, 2012).

In proper solid waste management, the first step is a public awareness campaign to convince the populace of the benefits of recycling, followed by recycling and transportation plans (de Oliveira Simonetto & Borenstein, 2007). Recycling is the separation of domestic waste, glass, plastic, paper and other materials with the aim of returning them to the industry for benefit (de Oliveira & Borenctein, 2007). For a realistic recycling program, the national composition of the waste must be known (Burnley, 2007). As an option in the waste management hierarchy,

* Corresponding author. Tel.: +60 173777400; fax: +60 75530575.
E-mail addresses: irinasafitri@utm.my, irinasafitri@gmail.com (I.S. Zen), zainurazn@utm.my (Z.Z. Noor), yusuf.ro@unilorin.edu.ng (R.O. Yusuf).

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recycling is regarded as sustainable (Bolaane, 2006; Nzeadibe, 2009). It is divided into formal and informal with households at the centre of each type. Municipal authorities play vital roles in formal recycling through the initiation and implementation of recycling schemes (Bolaane, 2006). It is further divided into making recyclables ready for reprocessing (the collection system), turning the materials into primary material substitute (reprocessing) classified as a pro-social behaviour with a moral domain (Thøgersen, 1996). Recycling reduces total disposed waste quantity, conserves natural resources, reduces demand for virgin materials, consumes less manufacturing energy, reduces environmental and economic costs, and health and environmental risks (Bolaane, 2006; Kinnaman, 2006; Martin, Williams, & Clark, 2006; Van den Bergh, 2008) and is a source of livelihood for scavengers (Wilson, Velis, & Cheeseman, 2006).

To be successful, recycling programs require active and sustained participation of people (Ittiravivongs, 2012). As part of these efforts, households are being encouraged in several countries to start recycling through the separate collection of different materials (Dahlén, Åberg, Lagerkvist, & Berg, 2009). Household wastes are defined as wastes that normal households generate (Dahlén & Lagerkvist, 2010). They are further subdivided into property-close (curbside) collection and drop-off points (bring systems) collection. There have been investigations on the behavioural elements of waste management as indices for understanding how to positively change such behaviours (Martin et al., 2006). Based on these investigations, a correlation of recycling behaviour was found between memberships of non-profit organizations, newspaper reading, religious activities, and politics. Other big impacts included age, education level, gender, and household income (Fiorillo, 2012).

Several studies on household participation in recycling/buy-back at designated centres show low participation. A study by Balqis (2009) on the recycling program in Pandan Indah residential area in KLFT showed inconsistency in the operational schedule of the recycling/buy-back centre due to the high operational costs. The buy-back centre was managed by Alam Flora Sdn Bhd (AFSB), a private solid waste concessionaire with the responsibility to manage, collect and dispose solid waste. Another problem identified was difficulty in locating recycling bins in a study of residential areas in Selangor, Ampang Jaya and Subang Jaya (Octania, 2005).

A statistical study on factors affecting recycling activities in a Malaysian middle-class municipality in Subang Jaya, Selangor, identified that awareness creation should be given high consideration (Chenayah, Agamuthu, & Takeda, 2007). The study suggested an increase in recycling facilities. Another study also suggested monetary incentives approach to boost recycling activities at the household level (Agamuthu, Fauziah, Khidzir, & Noorzamimah Aiza, 2007). None of the various studies conducted locally, investigated in detail the problems of the households carrying out recycling activities, considering the various recycling methods and socio-economic background and demography of such households.

This investigation set out to analyse the impacts of the nation-wide recycling campaign on Malaysian households and to identify the underlying factors involved in recycling and those that are not categorized as recyclers and non-recyclers. For these latter groups, the reasons for non-involvement will be analysed and possible remedies will be identified. Specifically, the study will identify the characteristics of Malaysian recyclers and non-recyclers from their socio-economic backgrounds and their knowledge of recycling so as to obtain their profiles. The outcome of the study will be used to improve the existing recycling program and modify the applied strategy where necessary at the local level and specifically at the household level.

Background of the study

The first attempt in Malaysia to encourage household recycling activity was initiated in January 1993 through the National Recycling Campaign. The second nationwide recycling and awareness campaign was launched on the 2nd of December 2000 with the involvement of several stakeholders including local authorities, business enterprises, commercial centres, educational institutions and the private solid waste concessionaires with a view to enhancing community-based participation. The targeted household recycling participation rate by 2020 as spelt out in the 8th Malaysia Plan was 25% (Malaysia, 2001).

The past 10 years had seen a gradual increase in households performing recycling in Malaysia. This ranged from the old tradition of door-to-door itinerant buyers of old newspapers to the introduction of various recycling methods such as recycle bins, recycling centres or buy-back centres. These are in addition to the continuous educational and awareness recycling campaigns. There is still a lack of research to assess the impact of the recycling program on the society comprehensively by considering the various methods of recycling in this country.

The great potential of recycling is shown in the composition of MSW with about 45% food waste (or wet waste) and 24% plastics, 7% paper, 6% iron and glass and other types of waste (Noor, Yusuf, Abba, Hassan, & Din, 2013). Of this composition, 37% are potentially recyclable items that can be realized through source separation, fully dependent on the household's ability to undertake recycling.

The launching of the Solid Waste Management and Public Cleansing Act 2007 (Act 672) placed emphasis on source separation activities by households. As part of the strategic thrust of the Third Outline Perspective of Malaysia Solid Waste Plan, the government will not only consider the installation of incinerators for safe and efficient disposal of waste but will also formulate strategies for waste reduction, reuse and recycling as part of a comprehensive waste management policy (Yahaya, 2008). Recycling has been emphasized in the National Policy of Solid Waste Management in Malaysia that is conceptualized using the 3R (Reduce, Reuse and Recycle) approach.

Method

Three middle–high income residential areas in KLFT were selected: Bangsar, Taman Tun Dr. Ismail (TTDI) and Wangsa Maju. Besides the limited number of public recycling facilities, the three areas have been selected from the AFSB list of recycling/buy-back centres consisting of two fixed and eight mobile centres (Alam Flora, 2008). Other types of recycling facilities such as recycling centres and mobile recycling/buy-back centres provided by charity bodies and non-government organizations (NGOs) are also included. The conventional recycling collection by the formal sector and door-to-door itinerant buyers were also part of the study. A detailed recycling scenario in Malaysia is shown in Fig. 1. Two methods of recycling services to the households are door-to-door itinerant buyers and collection (workers collecting separated recyclable items in plastic bags put side by side with the residential garbage bins) (Zen, 2007).

The demography and socio-economic information of the research areas were as follows: The number of male and female residents was 64,005 (49%) and 66,618 (51%) respectively. The racial composition of the area is 38% Malay (*Bumiputra*), 43% Chinese, 10% Indian and 9% other races (Annual Malaysian Statistical Book, 2004). The age distribution of the residents showed that 27% of the residents are between 0 and 14 years old, 46% of the residents are between 15 and 39 years old, 23% are 40–64 years old and 4% are more than 65 years old. The monthly gross income of