Research article

Towards sustainable consumption: A socio-economic analysis of household waste recycling outcomes in Hong Kong

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ABSTRACT

Many high-density cities struggle to find space for disposing municipal solid waste. Hong Kong is one of these cities, seeking to scale up waste recovery efforts as an alternative to disposal. However, territory-wide recovery initiatives do not account for socio-economic variations across place, leading to mixed outcomes among diverse communities. This study aims to investigate socio-economic effects on recycling behavior in a sample of subsidized rental housing estates. It constitutes an improvement from previous studies by using the entire estate as a unit of analysis and analyzing actual recycling outcomes, which have received limited attention from researchers. The analysis focused on the volume of recyclables collected from 158 public housing estates in Hong Kong, with an average population of 12,285. Results suggest that recycling outcomes vary with a limited set of socio-economic factors. Housing estates managed by a private property management company and populated by better off households collected more recyclables from their residents. Measures of absolute and relative recycling intensity achieved similar results. The findings will be useful for identifying residential communities requiring additional support for promoting waste separation and recycling. Differentiated policies for economically disadvantaged communities are warranted.

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1. Introduction

High-rise and high-density development mode is prevalent in Hong Kong, a Special Administrative Region (SAR) of China. An excess of 7.3 million people inhabit a tiny share of land - residential areas across the city are restricted to approximately 77 km², or 6.9 per cent of total land area (Planning Department, 2015). The city is divided into 18 Districts, each overseen by a District Council. Some of the urban Districts have been filled to over 45,000 persons/km². In the built-up area, the majority of residential developments are estate-based, in which housing blocks are developed by the same developer(s) and managed by the same property management agent (Yau, 2010). A typical housing block is 20–40 stories high and has hundreds of self-contained apartments. Large residential estates consist of dozens of housing blocks. The five largest ones in Hong Kong are populated by more than 36,000 people each (Census and Statistics Department, 2012).

The high-rise and high-density developments in Hong Kong

favor the use of centralized household waste recycling facilities (Chung and Poon, 1994). The most widely used of these are the tricolor recycling bins (or waste separation bins) placed at numerous locations across the city, including thousands of residential sites (Fig. 1). According to the Environment Bureau (2013), over 80 per cent of Hong Kong residents can find recycling bins in close proximity. They can separate out metal cans, plastic products, and newsprint/magazines and paper products (such as packaging) and place them in the proper bins close to their home. Access to these facilities is usually provided at communal areas, such as the ground floor of multi-family housing blocks, podiums, central car-parks, and other open spaces within gated residential communities.

Recycling outcomes crucially hinge upon householders' participation (Ko and Poon, 2009; Pakpour et al., 2014; Perrin and Barton, 2001; Thi et al., 2015). Many studies have sought to ascertain what drive their participation in waste sorting and recycling (Cheung et al., 2017; Chung and Leung, 2007; Chung and Poon, 1994; Ekere et al., 2009; Lee and Paik, 2011; Lo, 2016b; Martin et al., 2006; Miliute-Plepiene et al., 2016; Tucker et al., 1998). Most of them have given consideration to the socio-economic (and demographic) profiles of individual householders, but evidence is mixed and far

Fig. 1. An example of tricolor recycling bin in a public rental housing estate in Hong Kong.
Source: Author

from consistent (Miafodzyeva and Brandt, 2013). Empirical analyses on income effects are particularly enlightening. They can help predict how such a sustainability practice (i.e. waste recycling) will evolve in increasingly affluent societies. Contrary to usual expectations, however, it is far from clear that income or wealth drives such practice (Brechin, 1999; Dunlap and York, 2008). The contested debates warrant the use of a varied methodological strategy in research.

Furthermore, socio-economic analysis of recycling outcomes is highly relevant to policy-making. It can help identify particular communities and groups of people with low participation rates, and assess the cost-effectiveness of waste recycling schemes and justify public spending (da Cruz et al., 2014; Simões and Marques, 2012). The Hong Kong SAR Government was aware, and its Census and Statistics Department (CSD) had conducted an omnibus household survey 16 years ago (Census and Statistics Department, 2002), which included a section on the public's participation in source separation and recycling of domestic waste. Not only has this survey lost currency, its methodology is bound to a self-reporting approach. Chung and Leung (2007) and Yau (2010) have indicated that this methodological limitation could compromise the quality of scholarly studies on waste recycling in Hong Kong. Martin et al. (2006, p. 359) from the UK arrived at the same observation. Citing several UK studies, they noted that actual participation in waste recycling often fell short of expressed commitment. These authors call for an outcome-based approach, which may involve an inquiry into the actual amount of recyclables collected. Gamberini et al. (2013) and Sidique et al. (2010) have made such a pioneering attempt to examine the relationship between the amount of waste collected from selected communities and their characteristics (e.g. population density, per capita income).

The present research constitutes an improvement from previous studies by adopting a community-based and outcome-based approach. The main objective is to investigate socio-economic effects on waste recycling behavior. We address questions about how recycling outcomes vary with socio-economic traits, such as income, age, gender, education, household size, across place. Such an analysis can help identify which type of residential communities require additional support for promoting waste separation and recycling, and inform administrative and funding decisions of local governments and other public institutions. It will also contribute to the scholarly debates on socio-economic effects by using large, subsidized rental housing estates with an average population of 12,285 as a unit of analysis. The new evidence generated will provide an indication on actual community behavior, instead of self-reported individual behavior, creating an alternative empirical basis for re-visiting previous scholarly and official studies.

This research involves an empirical analysis of the volume of recyclables collected from 158 public rental housing estates in Hong Kong against socio-economic and demographic variables derived from population census. The remainder of this paper begins with an outline of the policy context in which the study is situated. A brief review of literature is then presented in Section 3, followed by a detailed explanation on the methods used in Section 4. Results are reported and discussed in Section 5. Conclusions are elaborated in Section 6.

2. Background

Municipal solid waste (MSW) management has been one of the major policy challenges for the Hong Kong SAR Government. In the past three decades, the volume of MSW has increased by nearly 80 per cent, whereas the city's population grew by 36 per cent only (Environment Bureau, 2013). As a driver of production as well as consumption, economic growth contributed to the increase in the amount of waste disposed in the early years (Ko and Poon, 2009). Domestic waste has been the biggest component (61.8%) of MSW,