



15th Global Conference on Sustainable Manufacturing

Levers Influencing Sustainable Waste Recovery at Households Level: A Review

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Abstract

Sustainability in domestic solid waste management involves waste recovery and households are a major stakeholder in waste management systems. However, the involvement of households in the recovery of waste for recycling, reuse and energy purposes is influenced by a number of levers. In order to achieve sustainable waste recovery systems, it is cardinal to understand the levers that influence households to recover waste from both developing and developed economies. A literature review was conducted to extensively identify and analyze the levers that influence households' participation in waste recovery programs. The results indicate that; social demographic factors, economic incentives, awareness and knowledge on recycling, waste collection systems and other levers influence households to participate in the recovery of waste. The findings from the review may provide vital indicators to authorities in the waste management sector in Zambia and other nations for future implementation and development of solid waste recovery systems at source level in households and at awareness campaigns which publicly recommend the use of these systems.

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Peer-review under responsibility of the scientific committee of the 15th Global Conference on Sustainable Manufacturing (GCSM).

Keywords: Households, Levers, Resource Recovery, Domestic Solid Waste, Sustainability

1. Introduction

Economic development has continued to contribute to waste management challenges as households are presented with more affordability powers that have resulted in more solid waste generation. Technological innovations have contributed to the rising standards of living, increasing urbanization and growth of population and consequently increasing both the variety and quantity of solid wastes (SWs) generated [1]. As a result, the expected global solid waste to be generated by 2025 is about 19 billion tons [2]. In the developed economies such as the UK, 50% of

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household waste is expected to be recycled by 2020 and a reduction of 35% of 1995 figures of biodegradable municipal waste being landfilled is expected [3]. The reasons for such targets is the fact that household continue to contribute to huge amounts of solid waste generation. In developing economies, similar municipal solid waste (MSW) generations are experienced. As a global community, it is important to develop techno-economic, socio, environmental friendly solutions that can sustain a greener and cleaner environment.

In order to develop sustainable solutions to the management of solid waste, it is of relevant to consider the levers that influence households to participate in these waste management programs. Households play a critical role in managing waste and to this effect; various studies have been conducted on factors or levers that influence their participation in waste management or resource recovery programs. Education and guidance on how to manage solid waste (SW) were indicated as factors influencing the development of recycling programs [4, 5, 6]. [6] indicated storage options while [4] further indicated affordable and convenient transport options for SW to material recovery facilities (MRFs) as factors that influence households to participate in waste recovery programs. [7] affirmed that mandatory programs such as voluntary extended producer responsibility are been seen to be successful in influencing household participation. Even though various have looked at the factors influencing households to participate in waste recovery programs there is still need to understand the factors that have a great impact.

The aim of this review is to identify and analyze the levers that influence households' participation in waste recovery programs in both developed and developing economies. The review is designed to highlight the critical levers that are necessary during the development of recovery programs for end-of-life plastic products. Levers that influence households to recover waste are usually never considered during the development of recovery programmes by both manufacturing companies and local authorities. Therefore, this review will highlight the most critical levers for manufacturing and waste management companies to consider during the development of their waste recovery programs for recycling, reuse, remanufacturing and energy recovery purposes.

The structure of the paper is as follows; section 2 presents the literature review. Section 3 presents the findings and analysis from literature review. Finally section 4 summaries the main conclusions.

2. Literature Review

Low performance in waste management has contributed to sustainability problems and this has resulted in the loss of valuable materials from economies [8]. Promotion of suitable measures can result in the reduction of approximately 24% of material inputs needs (imports and domestic extraction) by 2030 [9]. As a result of the pressure on sustainability, it is important that levers that influence material recovery are tabled out for the benefit of the policy makers, waste management authorities, manufacturing companies as well as households' understanding.

2.1.1 Social demographic factors

The recovery of solid waste from households cannot be overstressed as it contributes to the achievement of sustainability. Globally, the increased urban population, has put pressure on households to occupy more people and hence the increase in the amount of domestic solid waste generated. It is cardinal to note that social demographic factors such as age [10, 11]; income level [12, 13]; gender [14], education [15, 12], and household size [15] have an influence on the participation of households to recover domestic solid waste. In the study by [16], social demographic factors such as household size, education, age and income influence the usage of drop-off recycling sites. [17] indicated that in Korea, waste management and recycling were significantly affected by income and age. [18] identified that, resident's willingness to pay for separate waste collection services was influenced by age. [19] further affirmed that different challenges of waste reduction goals are presented by households with heterogeneous characteristics, such as income, mean building age and education level. [5] suggests that, the rate of recycling is positively caused by higher education. Further a correlation was found to exist among demographic factors such as gender, age, income, education and consumption patterns with recycling behavior [20, 21, 22, 23]. [24] also affirms that the best segmentation tool to determine the characteristics of recyclers and non-recyclers are demographic characteristics. The studies reviewed above have provided insight in the demographic levers or factors that have influenced waste management programs. Despite the studies having used different methodologies to identify these

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