

Contribution of the Waste Management on Job Creation and Anthropo-Social Circular Economy

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Waste management remains a global challenge, particularly in Rwanda's rural areas, where inadequate systems lead to environmental degradation, health risks, and economic losses. This study focused on improving waste management in Byumba through Gicumbi Agriculture Production Market (GAPM) Ltd. Data was collected from 14 GAPM staff and beneficiaries using questionnaires and analyzed both quantitatively and qualitatively. Findings revealed that GAPM Ltd employs various waste management techniques, including landfill (100%), re-use (100%), recycling (100%), disposal (71.2%), composting (64.3%), and recovery (57.1%). These methods contribute to a circular economy by creating jobs (100%), protecting the environment (100%), conserving resources (85.7%), improving social well-being and health (78.6%), generating economic benefits (71.4%), and fostering community engagement (57.1%). The study confirms that GAPM Ltd's waste management strategies significantly enhance sustainability. It recommends that the government strengthen awareness campaigns to educate communities on proper waste management and its crucial role in socio-economic development, ensuring long-term environmental protection and economic growth in rural areas.

Keywords: waste management, GAPM Ltd, anthropo-social, circular economy, job creation

INTRODUCTION

Waste management is collecting, transporting, processing, recycling, and disposing of waste materials to minimize their impact on the environment and public health. The management of waste is key for sustainable development and reducing the negative effects on the environment. Waste can come from various sources such as households, industries, construction sites, hospitals, and other institutions. Improper handling and disposal of waste can lead to pollution, environmental degradation, health hazards, and resource depletion (Ntuli, & Mbohwa, 2019).

The following hypothesis guided this study: Waste management can contribute to Job Creation and Anthropo-Social Circular Economy. The study was guided by three specific questions: What waste

management techniques are used for anthropo-social development? Does waste management contribute to the circular economy? Does waste management contribute to job creation?

This study involved a sample of 14 respondents composed of staff members of GAPM Ltd and their stakeholders. In order to collect the data from the field, a questionnaire, a research instrument consisting of a series of questions to gather information from respondents (Richard, 2014), has been used. In this research, the questionnaire has been addressed to randomly selected respondents. The questionnaire comprised both close questions where the respondents used the tick to choose correct answer and open questions where they were free to explain the answers in their own words.

Narrative method has been used with the purpose of exploring and conceptualizing the respondents' experience. As JW Creswell states, this method helps to explore in-depth the meanings people assign to their experiences (Creswell, 1994). In this research, narrative method was used to analyze data where it was necessary to report what the respondents said on a certain issue. The data collected from respondents and the secondary data collected from the technique of documentation have been processed with analytical method and then interpreted.

CIRCULAR ECONOMY AND ANTHROPO-SOCIAL FINDINGS

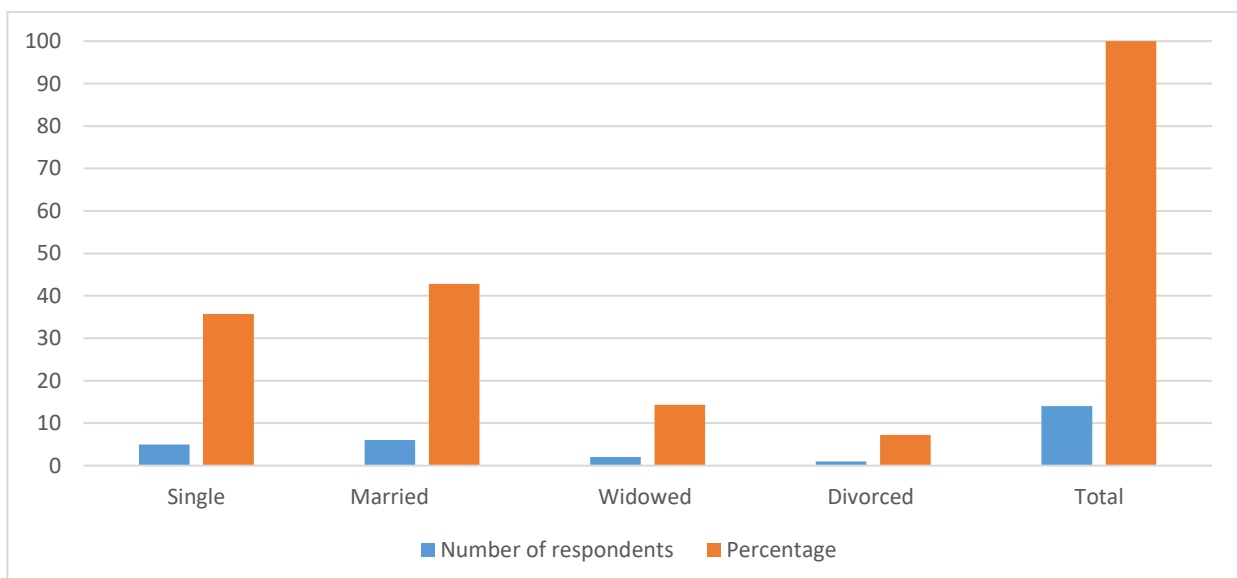
Items about respondents' demographic characteristics were established to obtain enough information on them. The main items were gender and marital status. These items were judged very important as they allowed knowing the respondents' anthropological status and their involvement in circular economy.

Demographic Findings

The results show that in GAPM Ltd, males are more involved in waste collection (57.1%) than females (42.9%), which is due to the fact that males are the first one to take responsibilities especially in households where they prefer to invest in waste collection for earning money to fulfill their responsibilities. The most important information here was not this inequality, but the involvement of both genders in waste collection activities. However, these statistics also show how males are more involved in the Rwandan economy than females.

About the marital status of people, the findings show that 35.7% of respondents were single; 42.8% were married; 14.3% were widowed and 7.2% were divorced (figure 1).

FIGURE 1
MARITAL STATUS OF RESPONDENTS



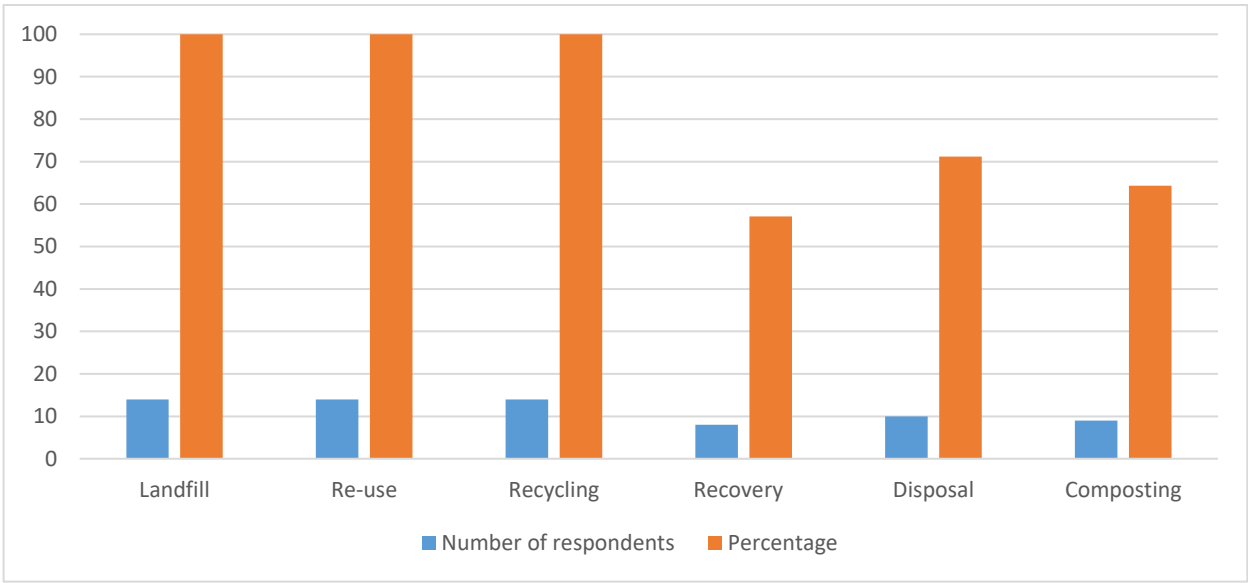
The information clarifies that the most employed in GAPM Ltd were married people. This also ensured the effectiveness of waste collection in GAPM Ltd because married people are always conscious of what they do. However, this shows as well the marital status which is more involved in the Rwandan economy.

Techniques of Waste Management in GAPM Ltd and Circular Economy

There are several waste management techniques that are used to manage and dispose of waste in a safe and efficient manner (Giusti, 2019). Among them we can list landfill, incineration, waste compaction, composting and vermicomposting.

The results show that waste management techniques used in GAPM Ltd are landfill (100%); re-use (100%); suggestion of recycling (100%); recovery (57.2%); disposal (71.2%) and composting (64.3%). The results obtained are summarized in figure 2 below:

FIGURE 2
TECHNIQUES OF WASTE MANAGEMENT



The first technique is landfill. This is the most common method of waste disposal in Byumba, where waste is buried in designated landfill sites. According to this technique, as said Weaver, the waste is compacted and covered with soil to reduce its volume and prevent odor (Weaver, 2016).

The second technique used in Byumba is incineration which involves burning waste to convert it into ash. In Byumba, it is commonly used for organic waste in countryside. In addition, it is used hazardous waste and medical waste (Lohri, & Diener, 2017). GAPM Ltd manager pointed out another technique called “recycling”. This later involves collecting and processing waste materials to create new products. According to Giusti, recycling is one of the most effective and useful methods that has gained popularity as a result of the introduction of environmentally friendly policies on governmental levels. In many areas, the local authorities are responsible for the collection of recyclable waste material. In some Rwandan cities, there is a proper system designed for setting up separate receptacles for each type of material that greatly reduces the risk of them mixing with those waste types that need to be discarded away. Once the materials are sorted out, they are transported to the sites where they are required (Giusti, 2019). In this way, the recycling is essentially the first procedure that waste materials undergo after which it is decided what will happen to the other waste product.

Another technique is composting, which involves decomposing organic waste materials such as food and yard waste to create a nutrient-rich soil amendment (Weaver, 2016). This technique is common in Byumba. Composting is a popular waste management method for household in rural areas. In this method

people who own a garden use their food waste as compost instead of discarding it. Organic materials are collected in a suitable container and the material is left to decompose (Weaver, 2016). In general, each household in Byumba uses this technique of waste management. Once this task is completed, it is added to the soil to provide natural nutrients, which assists in growing the plants, fruits and vegetables. Small farmers in Byumba use this technique for making fertilizers.

In last decades, Rwanda embarked in converting waste into energy through processes such as incineration, gasification. In Byumba, the conversion of waste in energy consist of transforming it in biogas or biomass. This is a very useful waste management method that basically calls for the conversion of non-recyclable waste items into usable ones. This process often results in the production of energy and can be used as a sustainable power source (United Nations Environment Programme, 2016). However, in Byumba, the rate of the conversion of the waste in biogas is still low.

In the line of Deveci and Sahin, local government and GAPM Ltd sensitize the households to reduce the amount of waste generated in the first place by using products and materials that are designed to last longer, and by reusing items instead of throwing them away (Deveci, & Sahin, 2019).

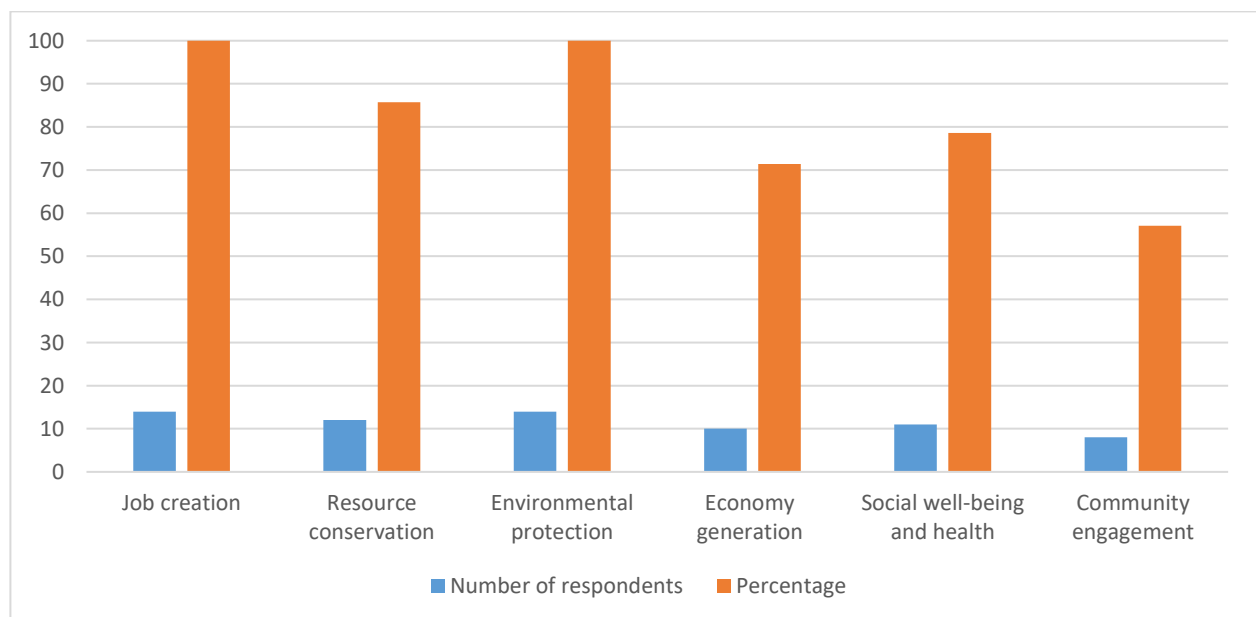
According to Liddle, another important way of converting waste material into something useful is by converting it into animal feed (Liddle, 2017). This waste management method is effective mostly on domestic levels in Byumba but it is also applicable to farms. Household waste for example vegetable peels and food scraps are fed to small animals. Similarly, meat bones are given to dogs. Other animals like pigs are indiscriminate when it comes to their diet and it is safe for them to eat most domestic waste type.

Another significant waste management method is in producing firewood (United Nations, 2015). Some people, mainly in rural areas, collect discarded furniture, cut up it into pieces that are more manageable and then are used as firewood.

Strategies of Improving the Circular Economy

The findings from the primary data show that waste management contribute to socio-economic sustainability in the following ways: job creation (100%); resource conservation (85.7%); environmental protection (100%); economy generation (71.4%); social well-being and health (78.6%), as well as community engagement (57.1%). The results obtained are summarized in figure as follow:

FIGURE 3
CONTRIBUTION OF WASTE MANAGEMENT ON SOCIO-ECONOMIC



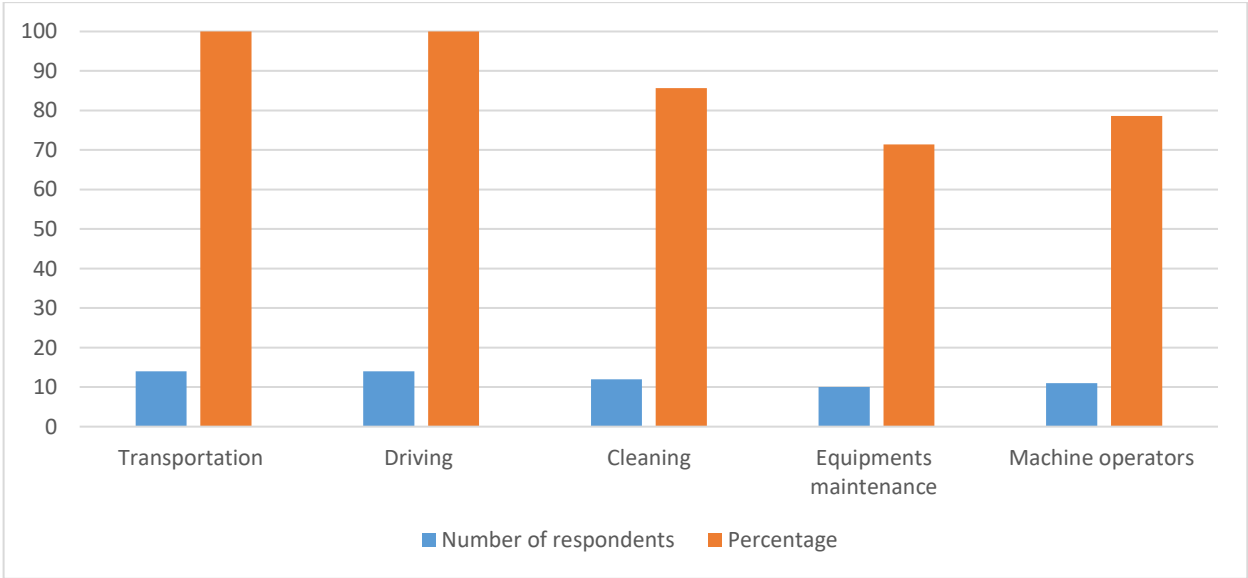
The strategies of improving the circular economy in GAPM Ltd, corroborating with Bob, is the investments in human capital. Human capital, in the form of trainings, is more determinant of economic growth than physical capital (Bob, 2011).

From Waste Management to Job Creation

Even though unemployment exists all over the world, states and governments are trying to put in place different mechanisms to create jobs for jobless people. Among those mechanisms, we can mention public works, privatization and self-employment mobilization (Johann, 2017).

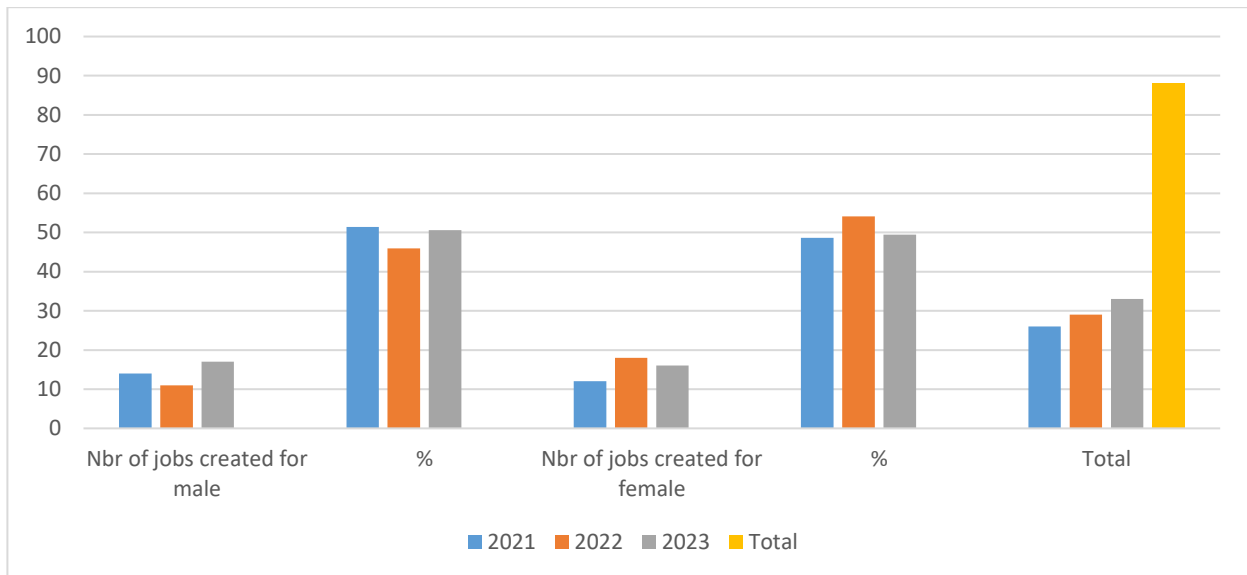
In Byumba city, the informal sector plays a significant role in waste management. The results showed that the jobs created through waste collection in GAPM Ltd are transportation (100%); cleaning (85.7%); driving (100%); equipment maintenance (71.4%) and machine operators (78.6%). Waste management is a critical component of anthropo-social circular economy and job creation. By adopting sustainable waste management practices, progressively, the environment is protected, natural resources conserved, economic benefits generated, and communities are engaged in sustainable behaviors (Bhide, & Narayana, 2018).

FIGURE 4
JOBS CREATED THROUGH WASTE COLLECTION



Concerning “transportation, driving and cleaning”, it was stated that waste management involves the collection and transportation of waste materials from homes, businesses, and public areas to treatment facilities or disposal sites and then this process requires a workforce for packing the vehicles, which is also followed by driving the cars to the disposal sites. According to Andreas, the better qualified people are, the easier it is to find a job since the demand for well-qualified people is quite high (Andreas, 2016). The proper waste management creates employment opportunities in various fields.

FIGURE 5
NUMBER OF JOBS CREATED BY GENDER



The findings show that in 2021, GAPM Ltd created 14 jobs for males and 12 jobs for females, making 26 jobs created in this year; in 2022, 11 jobs were created for males and 18 jobs for females, making 29 jobs. In 2023, GAPM Ltd created 17 jobs for males and 16 jobs for females, and therefore 33 jobs were created. From the above results, it is deduced that through waste management, GAPM Ltd created jobs in the period 2021-2023. The most interesting thing from the above results is that both genders (male and female) are involved in jobs created by GAPM Ltd, contributing considerably to socio-economic sustainability. The unemployment problem can be addressed through strategies established by the governments and states (International Labor Office, 2014). In the context of Byumba city, the solutions to unemployment proposed by GAPM Ltd is playing a vital role in social and economic sustainability.

CONCLUSION

This research was conducted on the contribution of the Waste Management on Job Creation and Anthro-Social Circular Economy. The number of respondents was 14 composed of staff members of GAPM Ltd and their stakeholders. We distributed the questionnaire to those respondents who in turn provided data. The data were processed quantitatively and qualitatively, and the analysis and interpretation of the results helped us to arrive at the reliable results.

Effective waste management has the potential to contribute significantly to socio-economic sustainability and job creation. However, there is a need to address the challenges to effective waste management, including inadequate infrastructure, limited financial resources, and low levels of public awareness. Promoting proper waste management practices makes it possible to create new economic opportunities, conserve natural resources, and mitigate the negative impacts of waste on the environment and human health.

The waste management of GAPM Ltd contributes to socio-economic sustainability in different ways, such as job creation, resource conservation, environmental protection, economy generation, social well-being and health, and community engagement. From 2021 to 2023, there was an increase in jobs created through waste management for both men and women; therefore, our hypothesis has been confirmed. However, the present study was not exhaustive in matters of waste management, job creation and anthropo-social circular economy; future research could be conducted on the challenges to effective waste management and impact of waste on the environment, human health, and sustainable development.

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