

Waste a necessary evil for economically impoverished communities in least developed countries (LCDs): a case of Lesotho

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Abstract

The nexus of rapid population growth and improved socio-economic status of a country have been established as having a close correlation to increasing quantities of wastes generated per capita. Various studies show that waste harvesters contribute to the economic growth in certain countries through the informal sector - although this contribution is not usually recognized within current financial models. In this article, we argue that informal sector waste harvesting is an essential societal "evil" for the economically impoverished communities particularly from a Least Developed Country (LCD) perspective. To illustrate the economic contribution of waste harvesters in terms of jobs creation and income generation, we examine a case of Lesotho as a least developed country. In our study, we examined quantities of waste generated per capita, analyzed the driving factors underlying such generation, and evaluated how efficient and effective waste management can potentially uplift the economic status of the waste harvesters. The average income derived from waste harvesting activities was compared to the average income of the lowest paid blue collar-job employees in Lesotho. The results indicated a strong link between the socio-economic upliftment of the welfare of the poor communities and waste harvesting activities. Secondly, the average income of a waste harvester was higher than that of the lowest income level formal sector employee. These findings suggest the urgent necessity for the governments of LCDs to consider formalizing aspects of this currently independent or completely informal economic sector. The highest priorities are to protect the health of the waste harvesters, and develop, the long-term sustainability of this emerging economic sector. Furthermore, findings of the more recent waste generation projection studies as reported in an Integrated Solid Waste Management Plan (ISWMP) document developed in 2006, commissioned by the government of Lesotho with the financial assistance from UNEP/UNDP confirm an increase in quantities of waste being generated in Lesotho.

Keywords: waste, economically impoverished communities, necessary evil, waste harvesters, job creation, least developed countries, Lesotho

1. INTRODUCTION

1.1 Setting the scene

Developing countries are faced with a multitude of inter-related social, economic and environmental problems and challenges. These problems and challenges include unemployment, extreme poverty, excessive population growth, poor living standards, and depletion of natural resources, pollution and environmental degradation, and consequent falling life expectancy.

In Lesotho, the urban influx and the decline in the formal job opportunities have resulted in many entering the informal sector. Between 1998 to 2000, (Mlosy, 2000) the estimated potential work force of Lesotho was about 800,000 of which 225,000 was estimated to be in formal employment and 379,085 were in the informal employment. This indicates that 63% of the economically active population were informally employed in that period. Meanwhile, Mlosy (2000) further estimated that Maseru Town has a 64% informal sector involvement. This information compares well with other developing third-world countries, such as 60-70 % in Kumasi (Ghana) and 69 % in urban areas of Pakistan (Todaro, 1989).

The perception that agriculture could absorb the excess labour force has been accepted by many (citation/s) as a possible solution to unemployment. In Lesotho the country's limited and increasingly degraded natural resources are considered (by authors or institutions) to be main barriers to a broad based agriculture growth strategy for economic poverty reduction to all the population, according to the records of "Pathway out of poverty", Mlosy, 2000. Therefore, other means of creating jobs have to be explored. The rural economy could be absolved from the need to supply more sustainable rural livelihoods if the urban economy was able to generate massive employment opportunities. Alternatively a policy of migrant labour should be negotiated with SADC and the Rand Monetary Area partners. This is increasingly difficult with their high unemployment and socio economic crises in SADC partners.

Therefore, broad-based investment in human capital is one of the most important inputs in the strategy of employment-intensive industry for poverty-reduction economic growth.

1.2 Harvesting of waste

The informal sector of waste management (recovery, recycling and re-use) has proven to present solutions to some of these urban problems (Ali, 1997, Ali, 1999, Agdag, 2008, and Papachristou, et al, 2008). For example, in the developed Western World, the informal sector of waste separation and recovery emerged in numerous cities after industrialisation and provided informal job opportunities. In the case of developing countries, it provides livelihoods for poor individuals and informal groups. According to Furedy (1992) and Pacheco (1992), millions of urban Asians depend on waste harvesting. One good example is the city of Calcutta in India, where in order of forty thousand people in this city rely on waste recovery (Furedy, 1992). Apart from Asia, the same trend is observed elsewhere such as in Bogota. In Bogota (Colombia), between thirty and fifty thousand people earn their living through waste harvesting (Pacheco, 1992; McLean, 1999).

Hence it can be argued that refuse waste harvesting is an important environmental and economic activity. The collection of recyclable waste contributes positively to keeping the environment clean and safe as well as creating income through self-employment. The volume of waste collected along with the emerging local market for waste products has resulted in informal waste collection, segregation, and transport providing an important basis for self-employment.

In Lesotho, economic value from waste is obtained by collecting waste from streets and public refuse storage barrels or drums or from illegal dumpsites. The most important of the latter is the municipal dump site at Ha Tsosane, 5 km from the Maseru City centre. Ranges of reusable and recyclable materials that include paper, plastic, cans, bottles and scrap metal, are being collected and sold to waste recyclers in Lesotho and South Africa. The solid waste management process has both hard and soft issues. Hard issues are collection, transportation and disposal, while soft issues are social aspects of solid waste management, including the informal collection of waste.

1.2 Objectives

The objectives of the research study were as follows:

- to estimate waste generation rate (percapita) from households in Maseru and Maputsoe;
- to obtain if there was significant correlation between per capita income and the monthly waste generation rate; and
- to investigate the benefits that waste harvesting to the welfare of harvesters in Lesotho.

2. THE METHODOLOGY - STUDY AREA AND SAMPLE SIZE

Lesotho is a land – locked mountainous country of 30.335 square kilometers and surrounded by the Republic of South Africa (McLeod, 1989). It has a population of about 2 million people, growing at a rate of 2.6% per year (UNDP, 2001). The economy of Lesotho is largely influenced by the Republic of South Africa (RSA), and to a lesser extent, other SADC countries. Being a member of Southern African Customs Union (SACU), which consists of Botswana, Swaziland, RSA and Namibia, its economy is closely tied to the economies of these countries.

In this study, the stakeholder surveys were limited to agents generating the municipal waste: households, commercial settings and industries. In addition, the primary waste survey also included a sample of waste collected over seven (7) days and these samples were sorted, classified and weighed. Also, structured questionnaires were distributed to waste recycling companies and waste harvesters (scavengers) with the help of six (6) enumerators who were selected according to criteria by Tejam and Ross (1997), and trained

according to the procedure guideline by UNCHS (1995) and Whittington (1998) which is based on confidentiality, reliability, neutrality, accuracy, objectivity and honesty.

The major source of the study was Ha Tsosane dumpsite in Maseru (where 36 harvesters were interviewed) and Maputsoe on the Ficksburg border with South Africa, in addition to the information obtained from the waste recycling companies.

Furthermore, linkage has been made between the findings of this study and the more recent waste generation projection studies as reported in an Integrated Solid Waste Management Plan (ISWMP) document developed in 2006. This ISWMP study was commissioned by the government of Lesotho with the financial assistance from UNEP/UNDP. The University of Cape Town (UCT) was engaged as an executing Consulting organization (GOL, 2006). Section 3.3 of this paper highlights the findings of the ISWMP study.

1.1.1 3. RESULTS and DISCUSSIONS

3.1 Household Waste Generation Rate (per Capita) and Socio-economic factor

In Lesotho, Maseru and Maputsoe are hubs of industrial activities where the concentration of people is also high. In this study, these two towns were selected and the per capita income was considered as a function of socio-economic status of households.

The findings of the sampling exercise were that the average generation rates of household solid waste for different economic categories are a function of the socio-economic levels of those households. For example, the low-income households displayed low per capita income (Maputsoe 0.27 kg/cap/week and Ha-Tsosane 0.40 kg/cap/week) followed by the middle-income (Katllehong 0.69 kg/cap/week). The per capita income was highest in high-income households (Hillsview 1.20 kg/cap/week and Maseru West 1.00 kg/cap/week). See Figure 1 for more details.

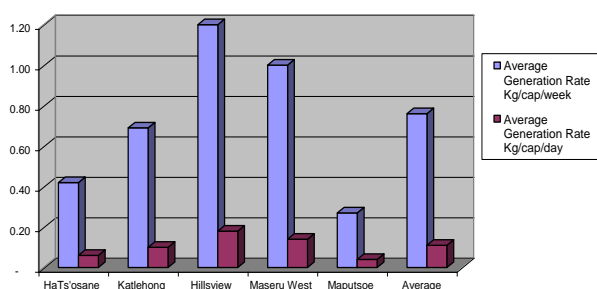


Figure 1. Average waste generation rates per capita per week and per day by source

These results confirmed what was reported by Mvuma (2001), that Lesotho is one of the poorest countries in the world (World Bank 2009). The data also indicates that waste generation rates in Lesotho, are indeed, among the lowest in the world. For example, the Lesotho rates of kg per capita per week range from 0.27 to 1 and compare with 10.57 for Kuwait (developmental classification), 8.05 for Germany, 5.6 for United Kingdom, 2.87 for India, 3.15 for Yemen, and 11.06 for USA (Ward, 1993).

It must be borne in mind that the per capita values are site specific. In this case, these results refer to the towns of Maseru and Maputsoe in Lesotho. As indicated above, Maseru and Maputsoe are the main sources of waste generation in Lesotho, therefore, an estimate of per capita for Lesotho would not diverge much from these values. The information on Lesotho ranking as one of the poorest countries is useful input for development of integrated solid waste management systems for the country. As an under-developed country, the solid waste management systems should not opt for mechanised collection vehicles that would drain financial resources for maintenance, but for appropriate systems, in which communities become involved and derive benefit.

3.2 Influence of Socio-economic Factors

The results of socio-economic status of households in the survey (Mvuma 2002) can be summarized as follows: most low-income households have an average monthly income of below M600, while the middle-income households have between M1,500 and M3,000 and the high-income households have above M3,000 (1 Maluti (M) is equal to 1 Rand (R)).

The influence of socio-economic factors on solid waste generation was evaluated by comparing the average generation rate of solid waste per household with the average monthly household income .Figure 2 shows

the average monthly generation of solid waste for the low, middle and high income households, Figure 3 shows a linear correlation between for all households. In summary that the average generation rates of household solid waste for different socio-economic categories are as follows:

- High-income: 0.16 Kg per capita day⁻¹
- Middle-income: 0.10 Kg per capita day⁻¹
- Low-income: 0.05Kg per capita day⁻¹

The weighted average generation rate for all the households in the surveyed areas is shown below:
 $(0.16 \times 52\%) + (0.10 \times 32\%) + (0.05 \times 16\%) / 100\% = 0.13 \text{ Kg per capita day}^{-1}$

Although households do not feature as major contributors to waste generation in Lesotho in comparison with waste generated by commercial sources, it would be useful to know how the socio-economic factors influence change in waste generation following the economic development. It may also be useful to establish a clear relationship between the income levels and kg per capita per month. This relationship, shown in Figure 2, illustrates the correlation between the household average income per month and waste generation per household per day.

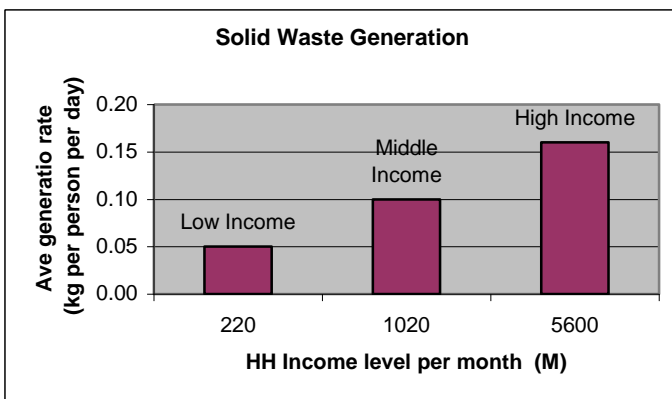


Figure 2. Monthly household income versus per capita waste generation rate of solid waste. Similarly, as shown in Figure 3, the significant correlation between per capita income and the monthly waste generation rate value (r) is given as $r = 0.67$. This demonstrates the influence of income level on the generation of solid waste. Figures 1, 2 and 3 reveal that the generation rate of solid waste increases with an increase in income. It is also shown that the quantities of waste generated increased by 0.5 kg for each increase in income of M2000 per month. In summary, from Figure 3, it can be concluded that there is a relationship between waste generation and the monthly income bracket ($r = 0.67$), which demonstrates the influence of income level on the generation of solid waste.

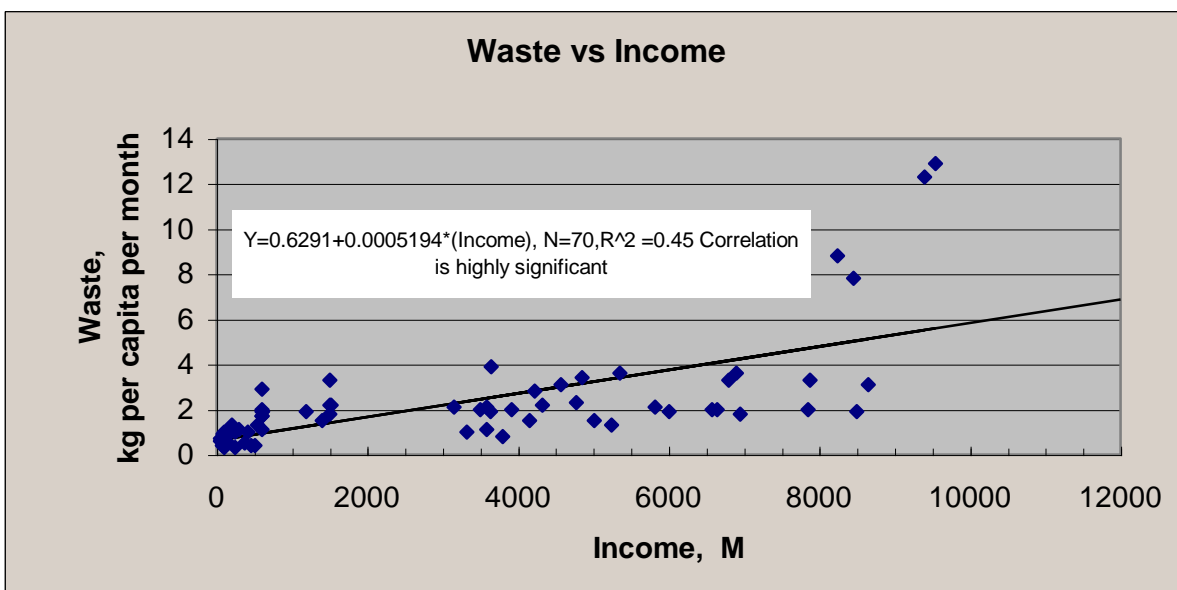


Figure 3

Correlation between Waste generation Rate and Monthly Household Income Levels

SUMMARY
OUTPUT

Regression
Statistics

Multiple R	0.67062217
R Square	0.4497341
Adjusted R Square	0.44164195
Standard Error	1.7266134
Observations	70

	Df	SS	MS	F	Significance F
Regression	1	165.7	165.7	55.58	2.13691E-10
Residual	68	202.7	2.981		
Total	69	368.4			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	0.6291	0.29127	2.160	0.03432	0.04786	1.2103
X Variable 1	0.0005194	6.96719E-05	7.455	2.13691E-10	0.0003804	0.00065

Waste (kg per capita per month) = 0.6291 + 0.0005194 *(Income)

The correlation is significant

This relationship explains 44% of the variation

3.3 Waste Generation projections

The “Maseru Waste Management Principles” include the importance of addressing economic and social added-value of waste management in terms of job creation and income generation and primary focus on the promotion and implementation of the 3R principles (Reduction → Reuse → Recycle) as part of key solutions to addressing integrated solid waste management (ISWM) challenges in Lesotho (GOL, 2006).

According to the GOL (2006), approximately 110,000 t/a of waste were generated in Maseru, with the residential and commercial sector representing the largest waste generation sources with approximately 35,000 t/a each; other, industrial, medical, administrative and educational generation sources make up the remaining 40,000 t/a of waste (Figure 4). This Integrated Solid Waste Management Plan (ISWMP) document as indicated in section 2 of this paper, presents a ‘business-as-usual’ scenario based on growth rates proposed by the baseline study for the different generation sources, and its projections show that the total waste generated in Maseru would almost double by 2020, amounting to 210,000 t/a. This makes it even more of a priority in terms of how the informal waste sector plays a vital role in addressing this “necessary evil” – the “Waste”.

Waste Quantities by Source - Total 2006-2020
Business-As-Usual Scenario

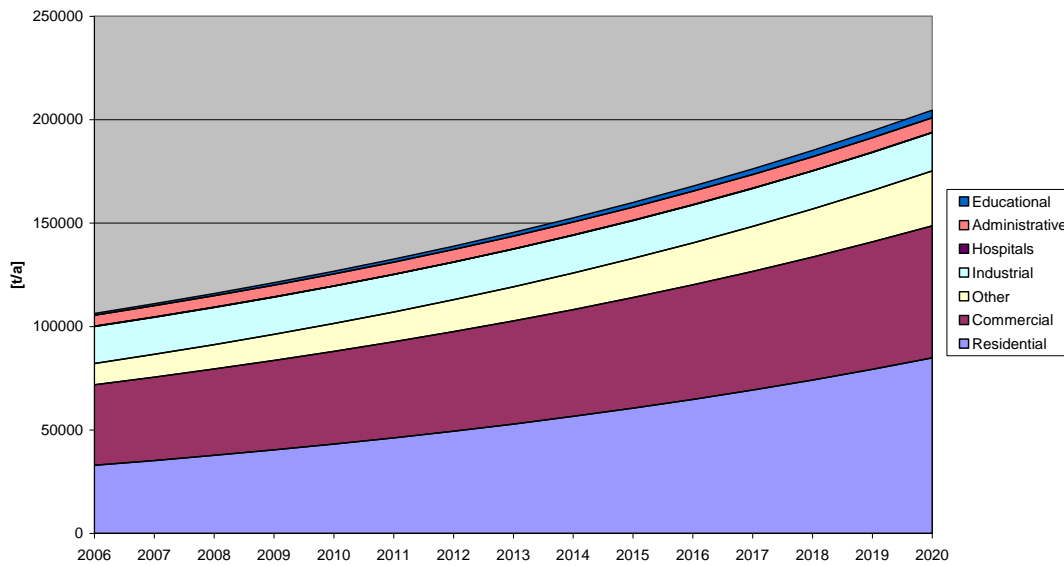


Figure 4: Waste Quantities by Sources, Maseru – Business-as-Usual Scenario (Modified from GOL, 2006)

3.4 “Waste” a Necessary “Evil”

3.4.1 Source of Collectibles and the Hardship experienced by Waste Harvesters

In this paper, it has been established that the waste harvesters collected their commodities from more than one source. The highest percentage (53%) collected their waste from the HaTosane dumpsite and other illegal dumpsites. The other highly patronized places were the city streets, followed by bars and offices.

The survey results show that most of the waste harvesters spent many hours per day searching for the commodities. Figure 5 shows that 84% of the waste harvesters spent between 4 to 8 hours per day, 8% spent between 9 to 12 hours, while the other 8% spent between 1 to 3 hours. Similarly, in terms of days, these waste harvesters spent days searching for their commodities: 62% spent 5 days per week, 25% spent 6 days, 9% spent 7 days, 2% spent 4 days and 2% spent 3 days (Figure 6). Worse still, these waste harvesters also transported these commodities themselves. These points illustrate how strenuous the waste harvesting activities could be and the hardships the waste harvesters endure. This is even the more reason why the Lesotho government should intervene and make this waste harvesting informal sector an enjoyable one.

Several conclusions can be made from these facts. Waste harvesting is a labour-intensive activity with relatively poor returns, this in itself is a hardship. It has been observed that some of the waste harvesters worked abnormally long hours (between 8 and 12 hours) per day and laboured 6 or 7 days per week on end, this also signifies hardship. Working under such conditions may lead to serious negative impacts on human health.

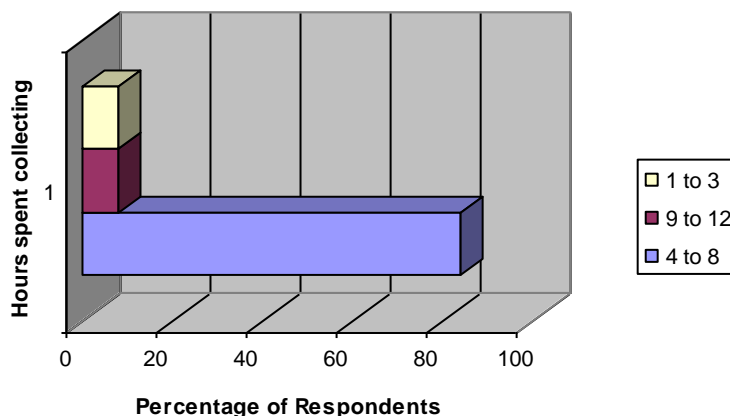


Figure 5. Waste Harvesters: Hours spent on Waste harvesting per day

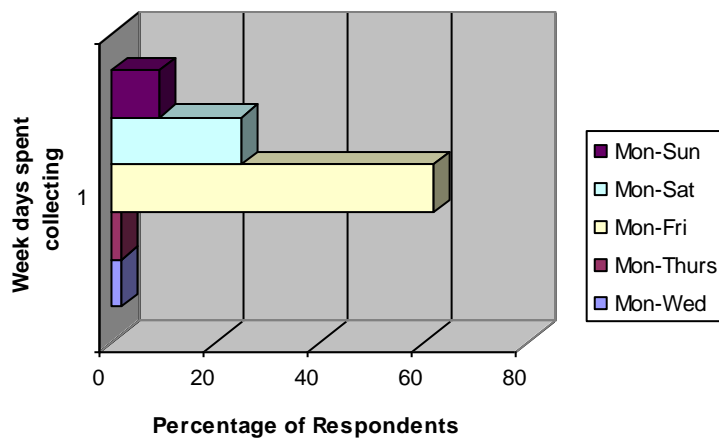


Figure 6. Waste Harvesters: Number of Week Days spent Collecting

3.4.2 Types of Collectibles and Economic Benefits of Waste Harvesting

Results in Figure 7 show the income distribution per week for the waste harvesters. From this figure, 5% earned between R1 to R10 per week (almost nothing, the reason being the category mostly collected combustibles which they used as a source of energy), 72% of the waste harvesters earned between R11 to R50 per week (which is roughly about R200/month), while 14% earned between R51 to R100 per week, (About R450/month) the other 9% earned above R101 per week, (roughly above R450/month). Meanwhile, If these collectors had formed a co-operative, they would have accrued more from their collection, and hence from the data collected on the income it would have given the average income per person per week of R45.00, amounting to R180 per person per month (or R2,160 per annum). The figure of R180 is close to the figure of R210 from Mhlanga and Gulilat (1997) study. These figures may look small but in they are in good comparison with those in lowest paid formal employment, such as house servants and shop workers who earned between R150 to 200 per month (GOL, 2001). Meanwhile during the study, literature survey showed that Mhlanga and Gulilat (1997) estimated there were about 230 waste harvesters in Lesotho. However the actual information obtained from the waste recycling companies through the questionnaire revealed that they received waste from a total of 282, of which 230 were unskilled and 52 skilled. Most of these were in Maseru and some in Maputsoe. This signifies job creation potential of solid waste management in Lesotho

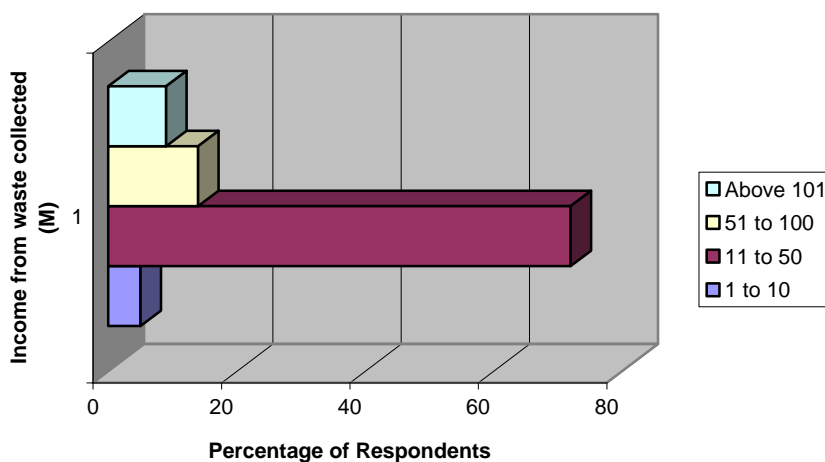


Figure 7 Average Daily Income Range of Waste Harvesters (M)*

The study also revealed that the majority of these waste harvesters in Maseru (78%) went about doing their activities on foot, only 22% use public transport. Those who use public transport spent an average of R3 per person per day. This adds up to R24 per day for the 22% waste harvesters who use public transport. Since it was not known who among the 22% worked for 7 days a week or less than that, it was difficult to make an

accurate estimate of the transport cost. However, if the normal five working days per week was assumed, then the total cost on transport per month for the 22% waste harvesters would be R480. Note that **(M)** is equal to **(R)** (as already indicated in section 3.2 that 1 Maluti is equal to 1 Rand)..

4. CONCLUSIONS

From the study, the first objective of estimating the waste generation rate (percapita) from households in Maseru and Maputsoe was met, as the findings of the study established that the average generation rates of household solid waste for different economic categories were a function of the socio-economic levels of those households. Example are: the low-income households displayed low per capita income (Maputsoe 0.27 kg/cap/week and Ha-Tsosane 0.40 kg/cap/week) followed by the middle-income (Katlhong 0.69 kg/cap/week., while the in high-income households gave highest per capita income gave highest (Hillsview1.20kg/cap/week and Maseru West 1.00kg/cap/week). From Figure1, it has emerged that the average generation rates of household solid waste for different socio-economic categories were found to be:

- High-income: 0.16 Kg per capita day⁻¹
- Middle-income: 0.10 Kg per capita day⁻¹
- Low-income: 0.05Kg per capita day⁻¹

From these results, the weighted average generation rate for all the households in the surveyed areas was calculated and found to be:

$$(0.16 \times 52\%) + (0.10 \times 32\%) + (0.05 \times 16\%) / 100\% = 0.13 \text{ Kg per capita day}^{-1}$$

For the second objective of establishing whether there was a significant correlation between per capita income and the monthly waste generation rate, this was confirmed from Figure 3 that there was significant correlation between per capita income and the monthly waste generation rate and this correlation value was calculated as $r = 0.670$. This finding demonstrates the influence of income level on the generation rate of solid waste. For example, it was shown from Figure 2 that the quantities of waste generated increased by 0.5 kg for each increase of R2000 per month.

For the third objective ,(probably the most important of the three objectives) that of investigating the benefits that waste harvesting bring to the welfare of waste harvesters in Lesotho. It was found to be positive in terms of economic benefits, though there were hardships observed. These findings are further illustrated in more detail below .

In this context, it was established that in Lesotho, refuse harvesting at dumpsites is an open-entry business. This is conducive for the poverty alleviation efforts, because every person in need could enter into this business. The exact number of waste harvesters is not known. But for those interviewed at Ha Tsosane dumpsite, the total number was 36. Some of them also moved to other illegal dumpsites and the streets of Maseru. Meanwhile, as already stated above, the information obtained from the waste recycling companies revealed that they received waste from a total of 282, of which 230 were recorded as unskilled and 52 as skilled. Most of these were in Maseru and some in Maputsoe. These features signify job creation potential of solid waste management in Lesotho.

If it were to be assumed that the average number of waste harvesters at Ha Tsosane dumpsite alone, was 36,then waste harvesting activities generated a total income of M6,480 per month (M77,760 per annum). As indicated before, if these were a cooperative, and that all the identified waste harvesters in the country (282) were part of this cooperative, the total income earned would be about M50,760 per month. This figure would exclude those who operated elsewhere such as other illegal dumpsites, dustbins and other different sources. In terms of transport costs, if a similar assumption was made for the 282 waste harvesters, the estimated transport cost alone would approximately be R16,920. If it was functioning as a Cooperative, it would have made a total profit of R33, 840 per month, excluding food and other expenditures. In turn, such profit would have meant a great investment for the waste harvesters in terms of Lesotho economics, if they operated as a cooperative and that they were properly formalised by the government. These results present enough evidence that the informal waste harvesters could make a valuable contribution to the long-term waste management activities and job creation in Lesotho.

Of interest to this study was the discovery that some of the waste harvesters collected waste, not only for sell, but also for use as a source of biomass energy, Lesotho being hard stricken with shortage of firewood and coal for domestic use.

It would therefore be advisable for both the National Government and local authorities to take advantage of these informal waste harvesting activities, which could contribute much to job creation in the country and thus making "waste" a necessary evil. Indeed, some form of recognition of these waste harvesters by the

Government authorities would be an encouraging development. It has been recorded somewhere else that the perception among waste harvesters that their activities were beneficial to the country or town they serve, goes beyond simply generating income for themselves (McLean, 1999). For many waste harvesters, a sense of identity and belonging make them feel a functional part of the society and community they serve. Therefore, incorporation into an integrated solid waste management of Lesotho would add value to the system. To this effect, identifiable clothing, like simple uniform or dust-coats as practiced in Lagos, Nigeria where uniform labelled “High-way-Manager” was given to the waste harvesters which boosted their morale (Mvuma 2001).

It can be concluded that Lesotho has the potential to generate employment from solid waste management as an informal sector if a sound and integrated waste management system was put in place in Maseru and Maputsoe, and the country as the whole, in which communities would be actively involved and waste harvesters recognized, and recycling activities supported by the government. In this way, the “Waste” becomes a necessary “evil” as jobs are created and the environment is cleaned and this in turn has tangible benefits such as boosting tourism in Lesotho.

5. ACKNOWLEDGEMENTS

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