Tefera Damtew, Y., and Negussie Desta, B.

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Micro and Small Enterprises in Solid Waste Management: Experience of Selected Cities and Towns in Ethiopia: A Review

Tefera Damtew, Y.[*] and Negussie Desta, B.

Department of Environmental Health Science, College of Health and Medical Sciences, Haramaya University, Ethiopia, P.O.BOX 235, Harar, Ethiopia

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ABSTRACT: Municipalities in developing countries spend the highest proportion of their annual budget on unsatisfactory solid waste management service. Until recently, solid waste management services in Ethiopia were mainly the responsibilities of municipalities, which culminated in inadequate service provision. Thus, the integration of Micro and Small Enterprises (MSEs) by the government has recently being considered as an option. Participation of MSEs in SWM started in 2003/04 in Addis Ababa, the capital city of Ethiopia and expanded to other cities following the proclamation of a National Solid Waste program in 2007. This review is aimed at identifying the role of MSEs in solid waste management in selected cities, including the opportunities and challenges for future directions. Limited resources and lack of support, perception and awareness of the community, inadequate training, unorganized fee collection strategy and limited revenue were among the challenges identified. The benefits and potential opportunities include organized and quality service delivery, environmental protection and safety, job opportunity, willingness to pay and social equity. In conclusion, the findings in this review show the importance of MSEs in solving solid waste management problems. However, the challenges need due considerations and appropriate interventions such as legalization of the informal sector, clear working guidelines and regulations, close support and monitoring, and transparent system in general.

Keywords: challenges, micro and small enterprises, opportunities, solid waste management.

INTRODUCTION

Solid waste management is regarded among the toughest tasks for municipality managers. The situation is more prominent in middle and low-income countries where there is rapid population growth and urbanization. Even though the problem is more pronounced in mega cities, it is also noticeable in all urban areas (Minghua et al., 2009; Scheinberg et al., 2010; Wilson, 2013).

Most of the municipalities in developing countries spend the highest proportion of their annual budget on solid waste management, but provide services only for a small segment of cities in the region. The study by World Bank and USAID estimated that municipalities in developing countries spend 20–50% of their budget on SWM, which covers less than 50% of the total population (Henry et al., 2006; Memon, 2010).

Solid waste management elements such as collection, transfer and transportation were reported to be affected by many factors. Unorganized collection systems, lack of awareness about the impact of solid waste, non-fixed collection schedule or

route and poor stakeholders' integration are some of the identified factors (Tadesse et al., 2008; Manaf et al., 2009; Shekdar, 2009; Abarca et al., 2012).

Different approaches are used by countries to manage solid waste. Until recently, solid waste management (SWM) services in Ethiopia were mainly the responsibilities of municipalities, which resulted in inadequate service provision (Tadesse, 2004, Tadesse and Hadgu, 2009; Tessema, 2010; Hagos et al., 2012; Bewuket, 2013). The inadequate service provision forced the general public to choose the informal waste collection system in accordance with their need (Tadesse and Hadgu, 2009; Tadesse, 2004; Bewuket, 2013). In developing countries like Ethiopia the role of informal actors in the business sector is imperative and evident (Wilson et al., 2006).The informal actors carry out more than one activity and make a shift from one market to another according to the market situation, the demand and market factors. But solid waste management is an activity which needs special attention daily. Thus, the engagement of informal actors in different activities makes the service delivery inconsistent. Therefore, there is need to integrate the formal sectors on legal basis to ensure continuous service delivery. These can include integration of existing informal actors or newly established groups (ORAAMP, 2002; Tadesse, 2004; Fanta, 2006; Baudouin et al., 2010; Bewuket, 2013).

Recently, the government integrated Micro and Small Enterprises (MSEs) as an option to alleviating the pressing solid waste management challenges (Baudouin et al., 2010; Tadesse and Hadgu, 2009). Studies have been conducted on MSEs in solid waste management at different cities and towns in Ethiopia. But the experiences are not shared among those practicing or with those not practicing. This makes it difficult to have clear information about the status of MSEs in solid waste management at country level. This review will provide an insight into the current status, opportunities and challenges of MSEs involved in solid waste management. It can be used by policy makers and planners at the national level as an input to solving the challenges, and to enhance opportunities for future development. The review is exclusively based on secondary data. Due to limited availability of quantitative secondary data, the discussion is more of qualitative data.

Organization of Micro and Small Enterprises in Ethiopia

Ethiopian government acknowledged the role of micro and small enterprises in creating job opportunities for the young and unemployed, thereby playing a part in poverty reduction and private sector development (Kefale, 2012, Solomon, 2007). Thus, the Ethiopian Council of Ministers established a Federal Micro and Small-Scale Enterprises Development Agency (FMSEDA) and Regional Micro and Small-Scale Enterprises Development Agencies (RMSEDAs) in 1998 by regulation No.33/1998 (FDRE MoUDC, 2013).

Inception of Micro and Small Enterprises in Solid waste Management

Although public authorities are responsible for safeguarding and providing adequate waste management service, the private sector's role is recommended as crucial in assisting the quest to solve the problem (Wilson et al., 2006; UN-HABITAT, 2014).

In Ethiopia, micro and small enterprises involvement in solid waste management as a formal sector started in 2003/2004 at Addis Ababa (Fanta, 2006; Baudouin et al., 2010; Pieter and Tilay 2013). The service was expanded to other cities with the formulation of a national solid waste proclamation in 2007 (Fig. 1). The proclamation states the advantages of linking the community in solid waste management in order to prevent

adverse effects, and to enhance the benefits resulting from solid wastes, thereby promoting it as a source of investment. Thus anyone who wants to be engaged in solid waste management should get legal permission from the respective urban administration (Ethiopian SWM Proclamation 513/2007, 2007).

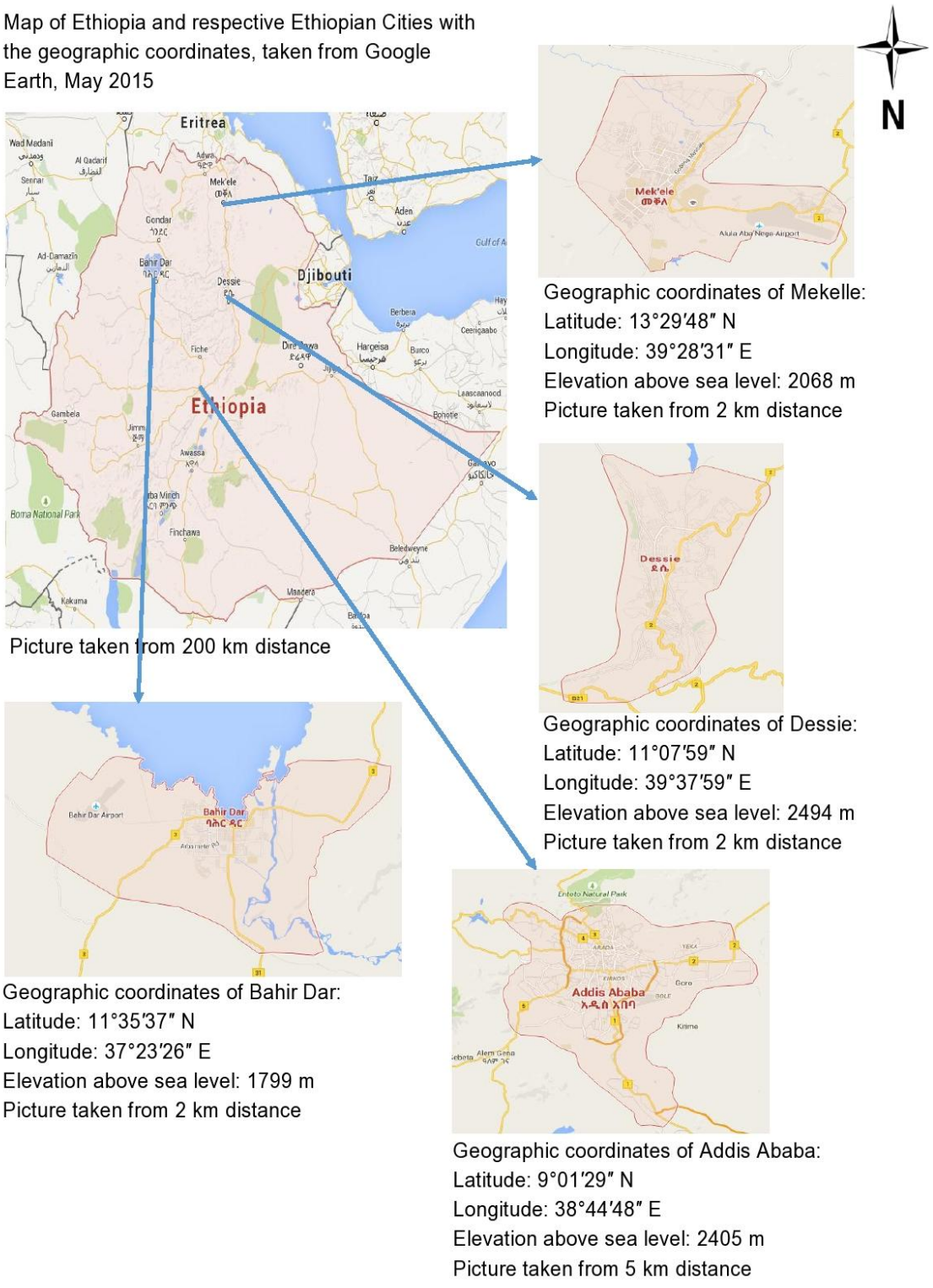

Fig. 1. Map of selected Ethiopian Cities Showing the Integration of MSEs in SWM Challenges in the Sector: The Future from Current Perspective

The Experience of Selected Cities and Towns in Ethiopia

Case of Addis Ababa

Addis Ababa, the capital city of Ethiopia has an area of 530km^2 and population of 3.5 million with 2.1% growth rate. Currently, it is divided into 10 sub-cities which are subdivided into 116 districts (ECSA, 2007; Desta et al., 2014). Daily per capita solid waste generation rate of the city is estimated to be 0.221kg/c/day. Residential households contribute 76% of the total waste, 18% comes from institutions and 6% from streets. The amount of waste collected is estimated to be 1834.64 m^3 per day and 47,501.25 m^3/day of waste dumped illegally (CMA, 2009).

To solve the problem, the city administration integrated MSEs into solid waste management before a proclamation was formulated at the national level (Fanta, 2006; Baudouin, 2010). After the formulation of solid waste management program, the municipality divided into 549 collection zones comprising of 800–1000 households, with one micro and small enterprise assigned to each zone. There were more than 524 organized enterprises working on solid waste management in the city. They were engaged in door to door collection and transportation to collection sites, transporting solid wastes to or from communal collection sites to disposal site and material recovery to a limited extent. This made it possible for solid wastes to be collected from additional 600, 000 households in the city, and collection rate is estimated to increase from 60% to 80% (Tessema, 2010; PPIAF, 2011).

Case of Bahir Dar

Bahir Dar, the capital city of Amhara regional state with a total population of 220,000 and an annual growth rate of 6.6% is one of the fastest growing cities in the country (UNEP, 2010a). The average daily solid waste generation rate of the city is 0.25kg/c/day and 53% of the total waste generated is from households. The remaining 27, 17 and 3% are from the commercial sector, institutions and street sweeping respectively. Thus, the need for adequate solid waste management was unquestionable and well acknowledged by the municipality which pioneered the idea of introducing MSEs in the sector (Mekete et al., 2009; Bewuket, 2013).

There was no MSE engaged in solid waste management until 2008/2009 and the municipality was solely responsible for solid waste management. The involvement of the private sector in solid waste management started after 2008/2009 by a private limited company called Dream light (Riuji, 2014; Bewuket, 2013).Since the involvement of the private company, the collection coverage increased from roughly 50% in 2005 to 67% in 2010 which shows a substantial improvement in the cleanliness of the city (UNEP, 2010a; UNEP, 2010b). However, it has been reported that after some years of service, the company increased the monthly charges and quality deteriorated due to the absence of competitors. Thus, the municipality is forced to organize additional MSEs who can work on solid waste management. Currently, there are 4 MSEs working in 9 urban sub-districts (Bewuket, 2013; Mekete et al., 2009).

Case of Dessie

According to the national census conducted by Central Statistical Agency of Ethiopia (ECSA, 2007), Dessie has a total population of 151,174 with a growth rate of 3.38% per annum. The daily solid waste generation rate is 0.231 kg/person/day and mainly produced from households which account for 60% of the total generated waste. Commercial areas account for 19%, street sweeping 11%, institutions 8%, while small scale industry contribute the rest (2%). Generally 136.11m^{3}of waste is generated per day in the town and only 32 m^3 (23.51%) is collected. The fast

population growth combined with expansion of the town precipitates an increase in the volume of solid waste. This in turn results in greater infrastructural demand, institutional setup and community participation in its management (SBPDD, 2009; Cheru, 2011).

Organization of micro and small enterprises in solid waste management started in 2007 through the establishment of one enterprise. Until 2010, there were only two MSEs in the town, but in 2010 the micro and small enterprise agency of the town had organized MSEs in 10 sub-districts (SBPDD, 2010; SBPDD, 2009).

According to Cheru (2011), only 5 of them were active in 2011. The other 5 were not working due to material and financial constraints. They were engaged only in door to door solid waste collection from individual house, commercial areas and institutions to transfer stations. While sorting, recycling and composting was not part of their task.

Case of Mekelle

Mekelle, the capital city of Tigray state which has a total population of 215,546 and an annual growth rate of 5.4% is among the fastest growing cities in Ethiopia (ECSA, 2007). The daily solid waste generation rate is 0.22 kg/c/d. Like other cities mentioned above solid waste collection and disposal was limited in the city. The municipality was able to collect only 33.4% of the total waste generated until recently. There was no involvement of organized enterprises in waste collection until 2009. Currently, there are 14 waste micro and small enterprises engaged in solid waste management. Of these, 11 MSEs handle house-to-house collection, 2 are street sweepers (only asphalt streets), and 1 gathers waste dumped in open spaces near the communal containers (Hagos, et al., 2012; Tadesse and Hadgu 2009; Tesfay, 2004).

There are various problems which prevent prospective entrepreneurs from joining the MSEs' sector, and prevent the graduation of MSEs into medium size firms (Mulu, 2009; FDRE MoUD, 2013). According to Mulugeta (2008), advancement of MSEs in Ethiopia is hindered by noncompliance with legal and regulatory frameworks, immature infrastructure, poor business development service, limited access to finance credit, ineffective and poorly coordinated institution. This review identified the following as challenges affecting the performance of MSEs involved in solid waste management (Fig. 2).

Resource Support

Organization of MSEs in solid waste management is not easy because it needs more support from local governments and stakeholders. The support needed ranges from simple hand tools to vehicles (Haan et al., 1998; Bewuket, 2013). But studies have revealed a lack of technical and moral support from the local governments which hinders the development of MSEs in solid waste management. The support of the local governments in facilitating access to credit is very limited. Long procedural rules of financial institution did not allow them to get credit to purchase the necessary equipment. The support in equipping the MSEs with equipment and technologies necessary for collecting solid wastes is inadequate. In general, from the review it was observed that there are limitations on the provision of necessary support starting from simple hand tools to credit accessibility (Cheru, 2011; Hagos et al., 2012; Bewuket, 2013).

Perception of the Community

Awareness and attitudes of the public towards waste can impact the entire solid waste management system. Community awareness and participation in decision making is vital in solid waste management (Sharholy et al., 2008; Moghadam et al., 2009). Organizational and functional systems of solid waste management

originated from behavioral patterns and underlying attitudes of local cultural and social perception (Schübeler, 1996; Zhuang, et al., 2008). This is seen mainly in rapidly expanding cities characterized by considerable mixture of social and ethnic groups (Schübeler, 1996).

Public perception and awareness affects storage, sorting, waste reduction, recycling, collection services, and willingness to pay for the service and ultimately the success or failure of the whole system (Henry et al., 2006). Wilson (2007) described how opportunities to strengthen waste institutions were hampered by the consideration of waste management as a filthy thing.

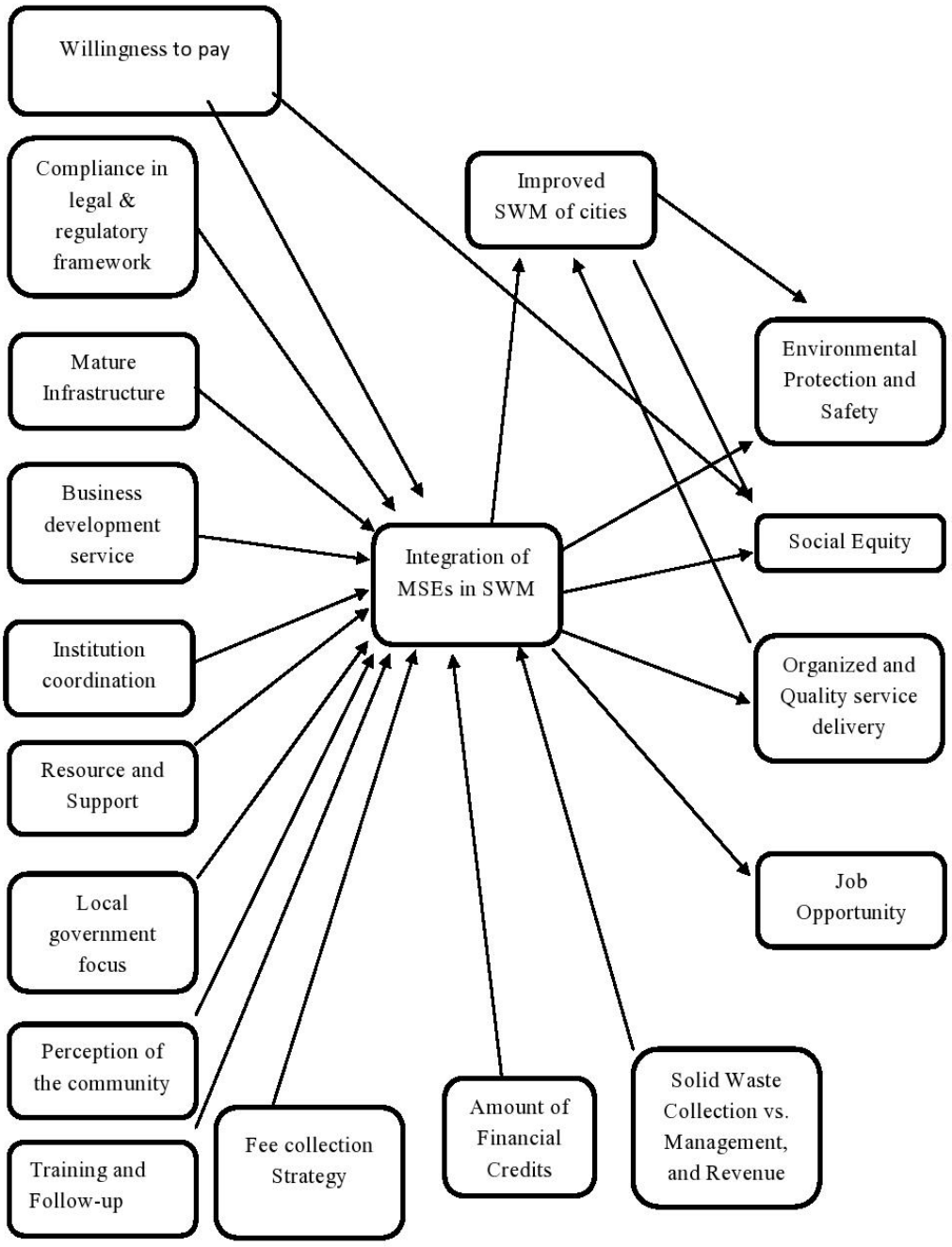

Fig. 2. Conceptual framework showing factors influencing integration of MSEs for SWM in Ethiopian Cities

Studies included in this review reveal lack of awareness on solid waste management and contribution of MSEs. For example, more than 50% of Addis Ababa residents are less concerned about waste quantity generated in the city. Above 70% of them don't practice reuse and recycling activities (UNEP, 2009).A study in Mekelle (Hagos et al., 2012) indicated that 44 percent of respondents believed that it is the responsibility of the city administration to deal with solid waste management issues. (Hardeep et al., 2013) indicated that 73 percent of respondents in Dessie town believed that it is the responsibility of females to manage wastes at the household level. This poor awareness and lack of knowledge caused lack of respect for MSEs and unwillingness to pay for the service. The community is not aware of the advantages of MSEs' contribution in solid waste management. Therefore, there is still a preference for the use of the pre-existing informal waste collection system over MSEs (Solomon, 2011; Bewuket, 2013; Hardeep et al., 2013; Desta et al., 2014).

Supervision and Training

Municipalities have the responsibility of supervising solid waste management services delivered by MSEs (Moreno et al., 1999). According to Fanta (2006), the integration of the informal solid waste collectors into the formal sector was an initiative of Addis Ababa city administration based on two major objectives. Firstly, it will provide a decentralized approach for efficient and cost effective collection of solid waste. On the other hand, it will create job opportunity for the unemployed. Similar to Addis Ababa, it was the idea of city administrations to involve MSEs in solid waste management. This indicated that municipalities were saddled with the responsibility of supervising the service provision by MSEs. But experience of selected cities showed the absence of strong supervision, control and follow up mechanisms by municipalities and respective city administrations (Nigatu, 2011; Bewuket, 2013).

In addition to supervision, solid waste management service is affected by skill and practice of MSEs in the sector. Solid waste management is not about collecting waste from households and dumping at disposal site. There are different elements in between like material recovery and processing. Therefore, enterprises should get the necessary skill update trainings for each element (Klunder, 1999; Coffey, 1996). But from the studies, it is clearly presented that there was limited training and follow up by the concerned bodies. Thus, it will be difficult to measure whether the objectives were met or not (Fanta, 2006; Konteh, 2009; Baudouin *et al.*, 2010; Bewuket, 2010).

Fee Collection Strategy

Service charges for collection of solid waste is among those factors which challenge the involvement of MSEs in solid waste management (USAID, 2009; Riuji et al., 2014).There is willingness to pay for solid waste collection service as mentioned in the studies included. But fee collection was not consistent among cities. In some of the cities, it was collected with water charges but in other cities the enterprises themselves collect it monthly. During such an activity, they faced challenges from some individuals who did not want to pay after getting the service. This discouraged MSEs and left the sustainability of the service under question (Cheru, 2011; Riuji et al., 2014).

Solid Waste Collection, Recycle and Revenue generation

Solid waste management is a process that encompasses all activities ranging from waste generation at source to the point of disposal. Solid waste collection is a single element in the process. Municipalities

spend majority of their annual budget on different elements of solid waste management. There must be a way to recover the budget; otherwise expenditures will be greater than revenue each time, which will deteriorate the service (Brown et al., 2011; Abarca et al., 2013; Riuji et al., 2014).

To recover the expenditure there are four revenue generation mechanisms in solid waste management: by-product revenue, service revenues, assessed revenues and transfer revenues. By-product revenues are generated from the sale of marketable products such as recycled materials, compost and energy generated. Service revenues are fees collected from individuals according to service received for solid waste management. Assessed revenues are not direct fees charged for service rendered; rather these are taxes or fees assessed when property taxes or flat fees are used to fund solid waste management activities. The fourth type of revenue is transfer revenues which are funds provided by the state or federal government (EPA, 1997).

According to Wilson et al. (2006) cities with formal waste collection system apply four different mechanisms to achieving by-product revenues through collection of recyclable materials from waste. In the first approach, individuals who engage in collecting recyclables buy sorted dry materials through door to door visiting. In the second approach, recovered useful materials from mixed discarded waste on the streets or from communal bins are collected by waste scavengers. The third group collects recyclables during transportation from vehicles. The fourth group commonly referred to as waste scavengers sort recyclables before the dumped waste is covered.

Currently, the annual budget for solid waste management in Ethiopian cities is mainly from the federal government and limited fees from collection service charges. There is no by-product revenue from recyclables. The experience of the selected cities showed that the involvement of MSEs in material recovery was absent or limited (Tadesse et al., 2009; Hagos et al., 2012; Bewuket, 2013; Riuji et al., 2014). Minghua et al. (2009) stated that in order to increase recycling rates, the government should encourage markets for recycled materials and increase professionalism in recycling companies.

In addition to restricting revenue sources, if recyclables are not sorted it creates burden on waste collection by increasing waste volume and weight. But currently MSEs in Ethiopia are engaged only in waste collection. Therefore, focus on only the collection of solid waste and limited income generation strategies were among the challenges of incorporating MSEs in solid waste management (Tadesse et al., 2009; Hagos et al., 2012; Bewuket, 2013; Riuji et al., 2014,).

Benefits and Opportunities

Organized and Quality Service Delivery

Organization of informal waste collectors into MSEs is very effective for solid waste management (Haan et al., 1998; Sharholy et al., 2008). Unlike the informal sector, micro and small enterprises are registered business sectors with official business licenses, and some degree of capital investment. They are regulated and governed by laws. In most of the cities and town, they work by entering into contracts paid by the municipality to perform collection, processing, or cleaning services. As an organized and legal sector, MSEs have schedule for solid waste collection. Their involvement ranges from waste collection to limited resource recovery (very limited) and they are responsible for proper management of the waste from household level to transfer station and/or disposal site, so illegal dumping and litter spillage are not problems which surfaced in the informal sector (Mekete et al., 2009;

Tessema, 2010; Cheru, 2011; Bewuket, 2013; Desta et al., 2014).

Environmental Protection and Safety

In developing countries, the problem related to solid management starts at the point of collection. In those countries 65 - 50% of the waste generated is not collected (Tadesse and Hadgu, 2009; Coffey and Coad 2010; Ahsan and Zaman, 2014). Collecting waste from the site of generation doesn't mean proper waste management. It needs to be transported and dumped at selected disposal sites. But dumping the collected waste at open fields creates more environmental problems which is a common practice in developing countries (Hoornweg, 2012; Sankoh and Yan, 2013).In Ethiopian cities, inadequate supply of waste containers and longer distance to these containers increase the probability of waste dumping in open areas and roadsides relative to the use of communal containers. Even the use of communal containers by municipalities as temporary collection point constituted a nuisance, odor problem and breeding site for insects and rodents. The informal waste collectors dumped waste illegally which caused water and soil pollution. But, the organization of MSEs has shown an improvement in solid waste collection, transport and disposal thereby contributing to environmental protection and safety (Tadesse et al., 2008; Tadesse et al., 2009; Mazhindu, 2012; Desta et al., 2014).

Job Opportunity

Micro and Small Enterprises (MSEs) have a tremendous potential to generate employment in developing countries. An estimated 90% of all enterprises in the world are MSEs, accounting for 50-60% of employment in developing countries. They are also important sources of income not only for those people who could not find employment in other sectors but also provide an escape route from low wage earning private and government employment (Kefale and Chinnan, 2012; UN-HABITAT, 2014).The importance of micro, small and medium enterprises (MSEs) in waste management has proved to be vital. The amount of waste collected in Ethiopian cities and towns is still below 50%. This indicates the future potential of MSEs' involvement. Thus, it needs more man power and actor who can work in that area. Though the total number of household is different from one sub-district to another, current studies show that an average of 30-50 individuals are involved for a single sub-district. So, it can be a big job opportunity to the jobless young generation in urban areas. Therefore, the establishment of more MSEs on solid waste management can be considered as a sustainable business by protecting the environment (Cheru, 2011; PPIAF, 2011; Bewuket, 2013; Desta et al., 2014).

Willingness to Pay and Social Equity

Willingness to pay for solid waste services shows positive response. A study in Mekelle shows that about 90 percent of the households are willing to pay 8.78 birr per month (0.44 dollar/month) for solid waste collection service. Another study in Dessie indicated willingness to pay 10 - 30 birr per month (0.5-1.5 dollar/month) and 30-300 birr per month (1.5-15 dollar/month) for households and institutions respectively. Thus, monthly price requested by the enterprises is affordable by majority of the society which will create social equity. The monthly charges demanded by the MSEs is fair and consistent, and considers the income of the society (Tadesse and Hadgu, 2009; Cheru, 2011; Hagos et al., 2012).

CONCLUSION

From the review, particularly the lesson learned from the experience of Ethiopian cities, we argue that the burden in relation to solid waste management is the option of integrating MSEs in the sector. Since the country is currently in progressive

development with faster rate of urbanization, the role of MSEs in solid waste management is significant and very demanding. It should be integrated in all cities and towns. In addition, the sector presents a vast job opportunity, which needs more man power, thereby protecting public health and the environment.

However, even if integrating the formal sector in the system is important, a mechanism to bring the informal sector should be devised. Absence of clear working guidelines and regulation, training and follow up are hampering the service. The local government body should provide the necessary skills and resources, technical guidance, occupational health and safety tools to the MSEs. Monitoring and close supervision of physical activities performance, relationships with citizens and overall integrated waste management systems should be carried out regularly by the municipalities. The revenue for the service and the whole system should not be hinged on collection fee and government annual budget, rather the MSEs should engage more on material recovery. Moreover, the door should always be open to welcome new MSEs in order to create a competitive environment and improve the service.

Finally, the sustainability of the enterprises should be studied by considering the challenges highlighted and the future status of the cities. The challenges should be treated accordingly; otherwise the quality of service and sustainability on the long run will come under scrutiny.

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