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Solid Waste Management: Plan of Action for the Healthy Environment

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ABSTRACT: The quantity of solid waste produced in city/town depends on the type of the city, its population, living standards of the residents and degree of commercialization, industrialization and various activities prevailing in the city. Due to rapid growth of population in Ambo municipal corporation area and changing life styles has resulted in increased waste generation. Consequently, waste management has become a key issue needing to be addressed. On average, waste generation from households is estimated at 3.92 kg per household per day (about 0.49 kg per person per day) according to City Administration Sanitation and Beautification Agency. The various Solid waste streams in Ambo city include municipal solid waste (households, commercial establishments), biomedical waste (hospitals, dispensaries) and industrial waste (industries). Therefore, it is required nowadays that sustainable SWM system aim at protecting and improving public health, the environment and energy gains through promotion of environmental quality and productivity. This paper is based on the study carried out on Solid Waste Management Practice in Ambo city. The outline of existing situation of solid waste management system, problems associated with the system and the future requirement to handle the up growing situation will be studied for the environmental management system. The general objective of this study is assessing the existing solid waste management service and proposing potential improvement areas to the waste management system for Ambo town.

KEYWORDS: Environmental Implications, Landfill, Solid waste, Qualitative Techniques.

I. INTRODUCTION

[1] Municipal Solid Waste (SW) is composed of different wastes generated by households, commercial and industrial premises, institutions such as schools, hospitals, care homes and prisons, and from public spaces such as streets, markets, slaughter houses, public toilets, bus stops, parks, and gardens (Coffey and Coad,2010). [2] Developing countries have undergone a rapid urbanization during the past many years and the number of residents is expected to double between 1987 and 2015 (Achankeng,2003).

[3, 4] Most human activities certainly result in the generation of waste which tends to increase with rapid urbanization, improved living standards and changing consumption patterns (Guerrero et al.,2013, Marshall and Farahbakhsh, 2013). In addition, the diverse sources of SW generation and the complex nature of its composition make it difficult to manage. As a result, governments and municipalities are facing considerable difficulties to provide adequate solid waste management (SWM) services.

[5] SWM is, therefore, a critical component within urban sanitation and it is also one of the most important and resource intensive services provided by municipalities (UN-HABITAT, 2010). [6] Studies also show that municipalities in developing countries spend 20- 50% of their available budget on SWM and serve less than average inhabitants (Memon, 2010). [7] They collect and manage only 30-50% of the waste generated while the rest is either burned or left to decompose in open space or is dumped in unregulated landfills-impacting the environment negatively (Lemma, 2010). [8] This implies that SWM is of a growing concern facing the developing countries because of its social, economic and environmental implications (Krause & Townsend, 2014).

[9, 10] It is the way the waste generated is handled, stored, collected and disposed of that can pose risks to the environment and to public health (Zhu et al., 2008.). Wilson, (2007) shows, if SW is properly used, it can be a valuable resource; but if it

is not effectively managed, it instigates adverse impacts on environment, public health, aesthetic, land-use, resources and economic concerns.

This necessitates an effective management of SW at the various stages of its generation, storage, collection, transfer and transport, processing, and disposal and recycling in an environmentally sound manner in accordance with the best principles of public health, economics, engineering, conservation, and aesthetics.

[11] Studies in waste management literature reported the drivers for efficient and effective waste management systems leading to sustainable development. The drivers identified in these studies include availability of sufficient finance; infrastructure and facilities such as roads, vehicles, containers, bins, etc.; stakeholders' knowledge and awareness; attitudes and involvement of stakeholders; proper route planning for transportation; information sharing among stakeholder; affordable fee for waste collection and disposal; and implementing regulations related to waste collection, disposal and recycling (Henry et al., 2006). Besides, innovativeness, availability of skilled and flexible workforce and supply chain development among the stakeholders are critical from the city administration side in order to realize the potential contribution of SWM to sustainable development.

Therefore, it is required nowadays that sustainable SWM system aim at protecting and improving public health, the environment and energy gains through promotion of environmental quality and productivity.

In Ethiopia, rapid urban growth has put pressure on land resources within the areas surrounding cities, and has led to increased generation of waste. The problem is aggravated by the open dump nature of disposing waste especially in the slum areas of most towns and cities. Traditionally, administrations in Ethiopian states permitted uncontrolled dumping in abandoned quarry sites with no provision for sanitary landfill, causing huge health problems. A large part of the problem is inadequate financial and data resources for site selection and management.

With the increasing amount of SW in Ambo, the city administration is unable to manage the SW generated from households and different organizations. As a consequence, the waste generated from different sources which is not collected by the city administration is indiscriminately collected without being separated and is disposed of in low-lying areas, in the outskirts of the city, in drainage lines, in vacant spaces, and alongside roads, or is informally burned. Besides, there has not been improvement in SWM practices in Ambo city in the last decade and the challenges continued. The challenges of SWM in Ambo can be characterized by having few facilities to collect and dispose the waste, unavailability of enough number of centralized containers, lack of regular waste picking up schedule, absence of fee structure for waste collection and disposal service. Moreover, landfill sites are also not scientifically designed leading to air, water and soil pollution. The ditches are filled with SW disposed by inhabitants causing flood in the town, and refuse often blocks drainage channels causing pounds often polluted with organic waste because of which domestic flies and mosquitoes are breeding. In addition, SW workers are not provided with appropriate clothing. These problems are expected to become more evident as urbanization continues to expand in future. In general, the current SWM practice in Ambo city couldn't cope with the fast urbanizing needs of the city. There is a need to address the issues. Hence, by assessing the current SWM practice of Ambo city, the present study attempts to describe the feature of the current system and identify major challenges as well as propose measures to be taken and suggest a framework for an improved SWM.

II. STUDY AREA

Ambo is one of the reforming cities of Oromia and it is found in West Shewa Zone of Oromia National Regional State, 114 Kilometers to the west of Addis Ababa along the Addis Ababa-Nekemte highway. According to data from Ambo Structure Plan Studies, Ambo City was founded in 1888 E.C. and it has Municipal Administration Status in 1931. Geographically, the city is situated at $8^0$56'- 59'N, and $37^0$47'- 55'E. The total area of city covered by structural/ master Plan is 85.86 km^2, while the total Built-up area/'Municipal area'/ of the city is 22.14km^2. The average altitude of the city is about 2120 m.a.s.l. The city administration composed of six kebeles namely Keble 01, Kebele 02, Kebele 03, Kisose Oddo Liban(04), Awaro Qora(05) and Sanqale Faris(06) with considerable decision making power in local affairs. TheKebeles are the lowest administrative structure of the city.

Important and Unique Feature of the city includes the availability of the hot springs, the Water Falls within the boundary of the city, the Ambo Stone (colorful wall and floor finishing material at Sankale), the natural bridge over the Huluqa River (just under the highway bridge) in the city commonly termed as the "God's Bridge" and the famous Ambo mineral water which engraved the name of the City even beyond the national border.

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Figure 1 Backdrop High Resolution Satellite Image of Ambo City

III. STEPS TO BE FOLLOWED

Simple random sampling method is used to take samples. The paper highlights the descriptive research method and employs survey in determining the current solid waste management practices and extent accumulation of solid waste. Some sets of questionnaires will be used as tools in data gathering from the waste generators and implementers of the solid waste. In order to collect primary data from the town, the study area will be classified the town in to three kebles. Data gathered from randomly selected individuals in Ambo city by oral interview and questioner to assess the solid waste management in the town. A direct method of solid waste accumulation and the level of solid waste management program assessment will be carried out by visualizing the area and photos will be taken.

All data were generated from the respondents of the town will be analyzed by using simple descriptive statistics such both qualitative and quantitative techniques. Quantitative methods include percentages, graphical maps, and tabular form. Qualitative techniques are the cause and effect relationships, and also the data that collected from direct physical observation or visualization is analyzed by describing the phenomena using personal judgment and supported by photographs.

Figure 2: Different Locations of Unauthorized Dumping across the City

IV. EXPECTED OUTPUT

- Selection of suitable site for the disposal of municipal solid waste (Landfill site) in Ambo town using Arc GIS software.
- Raise awareness on environmental pollution and protection of human health and improve quality of life among people living in in the study areas;
- Development the most suitable model for integrated management of solid waste
- Reduction of waste generation through sustainable waste management practices
- Training in relevant technologies and practices
- Installation of effective and efficient solid waste systems and facilities
- Install garbage containers in residential and public
- Facilitate private sector participation in collection, re-use, recycling and disposal.
- Suitable waste disposal sites construction

V. CONCLUSION

Ambo municipality and the communities are getting the solid waste management strategies. Knowledge on solid waste management helps for having access to door to door solid waste collection As there is a need for enhancing the awareness of solid waste management at the community level, the current study forces the municipality to enhance the accessibility of door to door solid waste collection service.

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