

# Developing a Strategic Action Plan for Managing Municipal Solid Waste in Mubi Metropolis, Nigeria

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**Abstract** – One of the foremost reasons why there is a setback regarding solid waste management in Mubi metropolis is the inability to quantify waste being generated in order to plan for its management on one hand, and the lack of a strategic action plan for managing the waste on the other hand. The study consequently dwelt on the latter having established the rate of waste generation by household, and cottage industries. The development of this action plan largely relied on the collection of qualitative data from secondary sources, and quantitative data generated by a study on municipal solid waste management practices, where an average of 2.9 kilograms of solid waste is generated by a household per day and between 10 kilograms to 79 kilograms by cottage firms on daily basis in the area. Municipal solid waste management issues can vary considerably among societies, and the developmental approach of a local solid waste action plan can as well vary from society to society. As such, a strategic action plan for Mubi metropolis covers; the scale, definitions, action plan development, implementation, enforcement and citizen participation, which establishes requirements for the management of municipal solid waste, where the household, and cottage firm's generates bulk of the wastes in the area. The municipal solid waste management agency, Adamawa State Environmental Protection Agency's (ADSEPA) roles were clearly spelt out regarding enforcement of the action plan.

**Keywords** – Action Plan, Management, Solid Waste, Strategic.

## I. INTRODUCTION

### *Needs for a Strategic Action Plan*

According to Mshelia (2015a), Mubi metropolis generates an average of 2.9 kilograms of municipal solid wastes by a household per day, and between 10 to 79 kilograms per day is generated by various cottage industries on daily basis. All these wastes at varying periods uncontrollably find their ways to open waste dumps in the metropolis.

The types of waste generated from these residential land uses are ashes, garbage, domestic rubbish (paper and cartons), leave, metallic containers, plastics and polythene bags generated from residents day to day consumption and usage of commodities as well as household chores (Mshelia, 2015b) while cottage or industrial waste varies from grain husks, saw dust, charcoal and ashes generated from grain mills, carpentry and bakeries respectively (Mshelia, 2013).

According to Mshelia (2013), municipal solid wastes in the area are disposed before they are collected at all sorts of dumpsites within the neighborhood (backyard, drainage/gutter, government designated site, open field

etc) for disposal by the Adamawa State Environmental Protection Agency (ADSEPA). Wastes generated, collected and disposed are mixed up as no form of processing such as segregation or sorting is done. There are no good designated waste dump sites or management facilities. Very few rectangular wall-shaped solid waste collection points are provided by ADSEPA within some neighborhoods. Wastes are not frequently evacuated and in most cases they accumulate and spill over the walls (Mshelia 2013).

Mubi metropolis which lies between latitude  $10^{\circ} 14'$  and  $10^{\circ} 18'$  north of the equator and longitude  $13^{\circ} 14'$  and  $13^{\circ} 19'$  east of the Greenwich meridian (Adebayo, 2004), second largest urban centre in Adamawa State, lacks a strategic action plan for municipal solid waste management. This paper attempts to develop as such, a comprehensive action plan or strategies for tackling the waste management problems which has become a myth defying solution in the metropolis.

## II. METHODOLOGY

Data for this study were largely qualitative, collected from secondary sources, particularly data from codes developed for municipal solid waste management by the United States Environmental Protection Agency (2011), State of Alaska Department of Environmental Conservation (2011), National Solid Waste Association of India (2010), and quantitative data generated by a study on Municipal Solid Waste Management Practices in Mubi, Nigeria (Mshelia, 2013). A strategic action plan for municipal solid waste (MSW) management is developed in that light where the overall sequence covering scope, definition of terms, action plan development applicability for various waste categories and sources, applicability for cottage firm proprietors, applicability for Adamawa State Environmental Protection Agency (ADSEPA), applicability regarding strategic neighborhood waste collection depots and trucks required for waste evacuation from the designated waste collection depots, implementation, enforcement and citizen participation were brought to the fore.

## III. EXTENT

Solid waste management issues can vary significantly among communities. Thus, the developmental approach of a local solid waste action plan can differ from community to community (State of Alaska Department of Environmental Conservation 2011). Consequently this

strategic action plan attempt to establish requirements for the management of municipal solid waste in Mubi Metropolis to encompass:

- (1) Management of Municipal solid waste e.g. household, cottage firm's waste management;
- (2) Municipal solid waste management agency e.g. Adamawa State Environmental Protection Agency (ADSEPA).

#### IV. DEFINITIONS

This aspect of the action plan describes the terms that are important in understanding and executing the action plan guiding municipal solid waste management practices in Mubi Metropolis:

- i) Households -members of a residential unit.
- ii) Proprietor - owner(s) of a processing firm.
- iii) Cottage firm - small scale processing firm.
- iv) Strategic action plan- a set of guidelines or procedures carefully designed and describes how agencies or people in an institution or country would follow to achieve a set goal or objective.
- v) Enforcement - ensure a law or rule is obeyed.
- vi) Solid waste management - is the collection, storage, transportation and disposal of waste
- vii) Open dumping - the disposal of waste in an open space.
- viii) Open burning - the incineration of refused in an open dump.
- ix) Landfill - an area of land where large amount of waste material are buried under the earth
- x) Prohibition - forbid
- xi) Recycling -conversion of waste into the usable forms.
- xii) Reuse - the utilization of material from waste
- xiii) Composting - decayed organic waste material use as fertilizer.

#### V. ACTION PLAN DEVELOPMENT

*Plan A.* Applicability: This section categorizes municipal solid wastes of the study area accordingly:

- (i) Garbage
- (ii) Rubbish (paper, carton, and cardboard)
- (iii) Wood and leaves
- (iv) Leather and textile fabrics
- (v) Metallic objects
- (vi) Polythene, rubber and plastic materials
- (vii) Ceramics and glass
- (viii) Ashes and charcoal
- (ix) Saw dust, grain husk or offal
- (x) Un chewable bones
- (xi) Others (sand, stones, brick rubbles, dirt,)

*Plan B.* Applicability: The action plan in this section applies to all forms of municipal solid waste management practices of households, and cottage industries. The following solid waste management practices are prohibited in the metropolis:

- (i) Prohibitions on open dumping- To protect land, air and water resources of Mubi metropolis from municipal solid waste pollution and to protect the health, safety and

wellbeing of residence, disposal of solid waste on any open space, dumping of waste into drainage channels and erosion sites is out rightly prohibited.

- (ii) No person shall generate, store, transfer, treat, and dispose of municipal solid waste through the conduct of any business in the community.
- (iii) No person shall dump solid waste on land at the out skirt of the metropolis any garbage or rubbish, metallic objects, bottles, paper, polythene bag, rubber and plastic materials, ceramics, used batteries and all forms of toxic solid waste.
- (iv) No person shall openly burn refuse, leather, polythene bags, saw dust, wood, textile fabrics, plastics and their likes within and outside the metropolis.
- (v) All residents shall partake in the clean up and closure of existing open dumps within in their neighborhood.
- (vi) All residents shall collect and store their solid waste in a waste collection bin with cover or large black polythene waste receptacle.
- (vii) No residents shall transport solid waste in an open container or vehicle to waste collection depots.
- (viii) All residents shall use multiple waste collection receptacles to segregate or sort waste to promote the reuse, recycling and composting of waste to reduce the waste stream destined for final disposal.
- (ix) All forms of solid waste disposal shall be done at ADSEPA approved sites in the neighborhood.
- (x) Any vehicle (motorized or none motorized) that is transporting waste shall be properly covered.
- (xi) No residential unit shall be located within the range of twenty meters (20m) to waste collection depots.
- (xii) Consumption patterns of residence that generates high amount of wastes particularly items packaged in none biodegradable or none environmentally friendly substances shall be discouraged or minimized while the community shall be encouraged to use recycled materials.

*Plan C.* Applicability: The action plan in this section applies to proprietors and employees of cottage firms that generate solid waste in their production processes.

Prohibitions on cottage firms waste management:

- (i) Indiscriminate disposal of cottage industrial solid waste on land, drainage channels, and erosion sites is prohibited.
- (ii) Open burning of cottage industrial waste is prohibited.
- (iii) Open container collection of cottage industrial waste is prohibited. Waste shall be collected in bags/sacks or containers with covers.
- (iv) Transportation of cottage industrial waste shall be done in a vehicle with cover.
- (v) Waste deposal by cottage industries shall be at government approved designated site.
- (vi) Cottage industries shall device mean of waste reduction at source
- (vii) Non regularly programs in solid waste management such as reuse, recycling, composting shall be imbibed by proprietors of cottage industries
- (viii) Cottage industries such as pure water packaging shall incorporate cleanup charges in their product sales and funds realized are given to waste management agencies for waste management.

(ix) The use of biodegradable or any environmental friendly packaging materials shall be promoted i.e. the use of reusable or recyclable containers.

**Plan D. Applicability:** The action plan in this section applies to those mandated for solid waste management (cleanup) in the metropolis, the Adamawa state Environmental protection agency (ADSEPA), and other waste management agencies.

ADSEPA and any waste management agency shall possess/initiate the following:

- (i) Personnel: skilled manpower (engineers, community health inspectors, environmentalist, drivers)
- (ii) Waste collection facilities: tippers/trucks, graders, shovel loaders, hand shovels, hand gloves, pail, waste receptacle (waste bins, polythene bags).
- (iii) Waste transportation facilities (trucks with tarpaulin cover, large black polythene waste receptacle), accessible road to waste collection depots and waste disposal sites.
- (iv) Waste disposal facilities (shovel, sanitary landfill, incinerator).
- (v) Built waste collection depots strategically located and linked by accessible road for easy evacuation within the various wards.
- (vi) Facilitate community participation in waste management in the metropolis so that volunteers can keep neighborhood watch on waste management.
- (vii) Develop public-private partnership leading to privatization of some aspects of garbage collection, recovery and disposal.
- (viii) Regular monitoring of sanitary landfills by the community and waste management authority.
- (ix) Garbage tax shall be levied against large and small generators for the disposal of wastes.
- (x) Constitution of citizen forum in each ward involving the community, NGO's and concerned authority to ensure close monitoring and supervision of waste management practices.
- (xi) Carry out periodic environmental education to sensitize the community on environmental health related activities.

**Plan E: Applicability.** The action plan in this section summarized in Table 1 shows an estimated number of waste collection depots and truck/tipper vehicles required for the effective removal of municipal solid waste that is generated for sanitary land filling from residential wards of Mubi Metropolis. The estimates were done bearing in mind the depth of contribution of each ward to the waste stream in the area.

## VI. IMPLEMENTATION

This aspect involves the implementation of the action plan. First and foremost residents in Mubi metropolis shall be acquainted with the various requirements enshrined in the action plan and the need to adhere to aspects that concerns them. The benefits of adherence and the consequences of none adherence in need justification must be well understood by residents. This will help in making residents comply to the plan.

The two aspects of action plan programs of implementation here are:

(i) The support and sustenance of the program through financial support, technical support, public support and government support.

The coordination of the program with other non regulatory waste management program such as recycling, reuse, energy

(ii) conversion, composting, source reduction and hazardous waste collection from residences in the metropolis.

Consequently, Mubi residents shall be educated by the officials of the waste management agency, ADSEPA on the various public requirement of the action plan implementation. This can be achieved through public awareness programs using posters to be pasted in the various wards, places of worship, and the use of public address systems for sensitization of residents. Traditional rulers shall also be involved in educating their subjects on the provisions of the action plan, which shall be translated into the commonly used language, *Hausa* for easy comprehension.

Table 1: Estimated Number of Waste Collection Depots and Trucks for Mubi Metropolis.

Wards	Average Daily Waste Generation/Household/Week (kg)	Estimated No. of Waste Collection Trucks/ Tippers	Estimated No. of Waste Collection Depots
Wuro Gude	4.9	1	6
Federal Lowcost	5.7	1	6
Sabon Gari	5.0	1	6
Dazala	4.4	1	6
Gipalma	5.1	1	6
Shuware	7.0	1	10
Lokuwa	11.1	2	12
Barama	7.6	1	10
Sabon Layi	3.0	1	6
Wuro Alkali	2.9	1	6
Wuro Jibir	4.7	1	6
Wuro Bulude	4.0	1	6
Kolere	5.3	1	6
Kochifa	8.9	1	10

Yelwa	3.4	1	6
Mundang	2.5	1	6
Tudun Wada	8.9	1	10
Matakam	5.9	1	6
Lamurde	14.3	3	13
Kwacham	6.4	1	10
Gima	7.7	1	10
Kabang	3.3	1	6
Wuro Patuji	3.9	1	6
Nassarawo	3.6	1	6
Gaya	3.4	1	10
Sebore	6.9	1	10
Sabon Pegi	8.2	1	10
Ungwan Kara	4.8	1	6
Va'atita	3.9	1	6
Arhan Kunu	3.3	1	6
<b>Total</b>	<b>171</b>	<b>30</b>	<b>226</b>

Source: Mshelia, 2013.

## VII. ENFORCEMENT AND CITIZEN PARTICIPATION

The action plan program needs to be enforced so that it becomes more effective. The enforcement will be more effective if citizens are involved in identifying highest priority issues for enforcement. The enforcement can be done by sanitary inspectors from the ADSEPA in conjunction with ward heads and appropriate law enforcement agency. The violation of the action plan adherence shall attract some punitive measures. The punishments for non adherence are:

- (i) Fines (To be determined by ADSEPA) and funds collected shall be used for waste management.
- (ii) Community service (To be determined by ADSEPA)
- (iii) Paying for cleanup of dump sites or spill or helping with solid waste management activities (To be determined by ADSEPA).
- (iv) Jail terms and fine with respect to hazardous solid waste management violation.
- (v) Sanctions (To be determined by the ADSEPA).

A strategic action plan for the management of household solid waste designed for Mubi Metropolis cannot be over emphasized. Consequently, the template if implemented and enforced to the latter shall greatly shrink the waste stream.

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## AUTHOR'S PROFILE



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