

## **An Appraisal Of Cottage Industrial Solid Waste Management Practices In Mubi Metropolis, Nigeria.**

**Alfred Dika Mshelia**  
Department of Geography  
Adamawa State University  
Mubi, Nigeria.  
[alfredmshelia@yahoo.com](mailto:alfredmshelia@yahoo.com)

### **Abstract**

*The study examines cottage industrial solid waste management practices in Mubi Metropolis where the generation and management were dominantly the focal points. Collection of data was largely based on reconnaissance and questionnaire surveys. The survey administered a set of questionnaire to 124 cottage firms, where data collected were summarized and presented in form of percentages and tables. Consequently, descriptive and quantitative statistical analysis for valid decision making was employed. Analysis however reveals the major types of cottage firms as grain polishing or husk removal, furniture making, bakery, flour mills, water packaging and brick/block industry, where findings shows waste generated by them being peculiar to what they produce, as saw dust, grain husk, charcoal and ashes pure water bags and brick/block rubbles. Some of the waste generated are reusable and are sold as animal feed or given out to people for free which is dumped on farmland as soil amend. Concerted cottage industrial waste reuse or recycling which partly forms the cornerstones to shrinking the overwhelming urban waste problem in the area is ardently recommended.*

**KEY WORDS:** Cottage, Industry, Solid Waste, Management.

### **Introduction**

Generally, there are four ways to get rid of solid waste: dump it, bury it, burn it or compost it (Raven and Raven, 1998). In the rapidly urbanizing cities of the developing world, problem and issue of waste management has become intractable. The rapid rate of urbanization, population growth, industrialization and their consequent waste generation overwhelms the capacity of most municipal authorities to provide sufficient basic management service to handle these wastes. Solid wastes are disposed of in uncontrolled dumpsites and/or burnt, causing pollution (Zurbrugg, 1996).

Municipal solid waste (MSW) is discharged as a result of human activities such as waste produced through domestic and commercial/industrial activities in urban areas. On the other hand, cottage industrial solid waste management practices are the techniques and/or methods employed by cottage entrepreneurs in the collection, storage, transportation and disposal of solid waste generated from day to day productions.

According to Sheehan and Knapp (2000), waste problems are generally due to resource management, as a result of bad design, and ultimately, the result of bad decision making (Lombardi, 2001). However, zero waste is a new way of looking at or managing our waste stream. Instead of seeing used materials as garbage in need of disposal, they are seen as a valuable resource. Piles of trash represent jobs, financial opportunity and raw material for new products (Matsch, 2000). It involves reuse and recycling instead of our throw away norm/ideas (Oyelola and Ojo, (2004). Recovering of resource from waste is a major player in the reduction of our urban waste stream; it conserves our natural resources and more environmentally benign (Botkin and Keller, 1997; and Raven and Raven, 1998).

Metropolitan cities in developing world are the centers of economic growth particularly small scale or cottage firms, where development and implications leading to consequences of such growth and development are bound to happen. These consequences are numerous. For example, land and air pollution, solid and liquid waste disposal, unsanitary conditions, slum, encroachment etc.

Nigeria cities are rapidly growing not only demographically but in areas of economic pursuit such as cottage commodity processing among others, where various forms of waste are produced, posing serious environmental problem that emanates from poor waste collection and disposal (Sada, 1980). Poor urban refuse management has resulted in ever increasing solid waste heaps found on vacant lots and streets. Despite measures taken to address the problem, the sanitary conditions in most cities in Nigeria are still far- fetched (Omuta, 1988).

In Mubi Metropolis, wastes generation is traced not only to household or domestic chores, but equally to the production processes of numerous cottage industries found in the area though they differ at varying degrees of generation. Obviously, cottage industries generate less waste than domestic activities.

The study practically covers some aspects of Municipal Solid Waste (MSW) generation and management practices in Mubi Metropolis that concerns cottage firms because they contributes significantly to the townships waste stream. Consequently, the generation, collection and storage, transportation, and disposal practices of cottage firms in the metropolis were examined.

## **Study Area**

Mubi metropolis cut across Mubi North and Mubi South local government areas, and located in the northern part of Adamawa State (see figure 1. It 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).

## **Methods And Procedures Of Data Collection**

To collect data for the study, a reconnaissance survey identifying the various cottage firms in the area, bearing in mind the objectives of the study. One hundred and twenty four (124) cottage industries were identified, where proprietors or employees of the cottage firms were interviewed with the help of questionnaire survey. Data were collected from these cottage industries with regards to; type of firm, organizational set up, raw material used and their source(s), type and composition of waste generated, reusability of waste generated, management of non-reusable waste (collection/storage, transportation and disposal).

## **Waste Management Practices Of Cottage Industries**

### **Nature of Cottage Industries**

Data was collected regarding the status of respondents as employees or proprietors of the cottage firms, which shows 97% of the respondents as employees while 3% as proprietors. This portends that most respondent are stakeholders and are directly involved in the production process.

Data collected further reveals that of all cottage firms interviewed, only one, the Mubi Burnt Brick (1%) was government owned. The remaining one hundred and twenty three (99%) belongs to private entrepreneurs.

On how long the cottage industries have been in existence, 49% respondents indicates that their cottage firms have been existing for not less than five (5) years, 30% respondents indicated 5 to 9 years and 21% of the respondents indicated their firms have existed for over 10 years.

To be able to determine the extent, types and composition of waste generated by the industries surveyed, data was sought on industry type, whether service or production oriented. The information gathered revealed

that majority, representing (75%), i.e. two third of the cottage firms were productive industries while only a few (25%) were service industries.

The study was also interested in determining the major products manufactured by the industries especially the production industries that are likely to produce waste. This is to assess if there are by products which are generated as waste. Findings shows that majority of the cottage industries, (19%) were furniture making firms, bakery (21%), flour mills/grain offal removal (36%) and water packaging business (6%). Others are the production of red bricks, cement blocks, local drinks, buns/cake, and aluminum utensils (3%), (5%), (4%), (3%), and (3%) in that order.

### **Types and Sources of Raw Materials**

Data was collected on the types or composition of raw materials used in cottage industrial production processes. This is to determine the extent to which wastes could be generated from such industries. Data obtained shows that majority of the types and source of raw materials used by the firm's, rice, corn, wheat, timber/plywood, gravel/clay, fuel wood, generates wastes synonymous with raw materials used; grain husk or offal, polythene bags, saw dust, charcoal, ashes and brick rubbles. The study further sought to know from proprietors of these firms sources of their raw materials and data obtained shows that majority of the firms get raw materials locally (76%), 16% externally and 10% source internally and externally.

### **Waste Generation of Cottage Industries**

In the same vein, information was sought from respondents on wastes generated during production. About 92% of the respondents affirms their cottage firms generates varying types and degree of some kind of wastes, while 8% were non affirmative. Furthermore, summary of data on the composition of wastes generated as it relates to the type of industry, and the raw materials used in the process of production reveals that most of the wastes generated are grain husk (34%) saw dust (32%), charcoal/ashes (17%) polythene bags (12%) and are mainly from the service industries. Only 5% of the waste is made up of brick rubbles from burnt brick industry and block industries.

Data on estimated waste generated per day by the cottage firms were sought and it shows that 29% of respondents generate between 40 – 49kg of waste per day, 24% generate waste between 50 – 59kg, while 10% generate between 70 – 79kg and 30 – 39kg per day. The least, 5% generate between 10-19kg per day respectively. Consequently, it is evident that a substantial amount of waste is generated by the horst generators which are the cottage industries.

### **Uses of Wastes Generated from Cottage Firms**

With regards to re-usability of waste generated, data obtained shows that 80% of proprietors said greater parts of the waste they generate are reusable while 19% said wastes generated are not reusable. The most waste generated and can be used according to respondents is grain husk or offal (48%), accruing from the processing of grain like maize, guinea corn and millet. Others are 23% rice husk, 14% saw dust, 10% charcoal/ashes and 5% brick rubbles generated by rice mills, bakeries and burnt brick industry respectively.

The wastes generated as grain chaff or offal are used as animal feed according to (35%) of respondents while 32% of respondents said rice husk are deposited on farmland and burnt or set ablaze and residues (ashes) serve as soil amend, or husk, deposited to decompose though slowly, to serve as compost manure. According to 8% of respondents, saw dust are used as floor-safeguards for poultry bird litters, charcoal is used for heating, cooking and ironing of clothes (15%) and brick rubbles used as pot-hole filler on bad road (10%). data

The reusable wastes according to 96% of respondents are collected and sold out to other users whereas 4% of respondents say wastes generated are used up by their organization. Data collected also showed that animal breeders and farmers purchase the bulk of the reusable wastes for animal feeds, and for compost manure, (42% and 26% respectively), while poultry farmers that use the reusable waste account for 25% respondents and 5% respondents says they are purchased and utilized by households.

The wastes according to respondents (94%) are sold out for varying amount of cash ranging between N1000 to N1500 (\$6 to \$9) depending on the size of the bag while 6% of the respondent gives the bye product out for free.

However, the researcher’s personal observation in this regard shows that other reusable waste generated such as excess brick rubbles, saw dust and ashes are mainly disposed off outside the factory or within the neighborhood of workshops or bakeries, which are hence collected by final users if they so wished for free. The red bricks are used for erosion control, pothole filler, filler for marshy compounds and streets. Equally, saw dusts are used for protection of poultry floor against fowl litters, and ashes are used for pests and herbicides control especially insects that feed on foliage of plants and for the control of strigger weed (wuta-wuta), on farmlands (Table 1).

**Table 1: Types of Cottage Industries in Mubi Metropolis showing Source of Raw Materials, Product Types, Waste Generated and Uses.**

Cottage Industries	Type/Source of Raw Materials	Products	Waste Generated	Use of Waste Generated
Rice mill	Rice	Polished rice	Rice Husks	Little amount is utilized as soil amend (manure) by some residents as it takes long time to decompose in soil. Others dump on farm and burn them to produce ashes which infuse in the soil as soil amends.
Corn mills	Corn e.g. maize, guinea-corn, millet	Polished corn	Corn husks or offal	Animal feed/for fattening animals
Bakeries	Wheat flour, sugar, water, butter, baking powder, yeast, flavour, vegetable oil, fuel wood, aluminum, packaging, labels	Bread, buns, meat pie	Charcoal, ashes, waste- water, disused metals, polythene packages, paper	Charcoal used by tailors, dry cleaning services and washmen services, domestic heating and cooking. Ashes used to control aphid pest and strigger (wuta-wuta weeds).

Carpentry/ furniture	Timber or plants, plywood, nails vanish, paints, sand paper, tools, adhesives, foam, cloth and leather upholstery	Chairs, tables, cushions sets, side stools, doors, windows, cupboard, wardrobes, drawers etc	Saw dust, pieces of cloth, and leather, wood chips.	Saw dust is used as protection of poultry floor against bird litter.
Brick/block	Clay, sand, cement, water	Red bricks, blocks	Brick and block rubbles, waste water	Filling pot holes, erosion site, reclamation, marshy compounds.

Source: Reconnaissance Survey (2010)

### **Waste Collection and Storage by Cottage Firms**

Data summary on collection period of waste indicates that majority of respondents (80%) collect waste from their firms twice a week, 12% collect accumulated waste on weekly basis while 8% of respondent’s sweeps and collect their waste daily.

Waste collection from the cottage firms is commercialized. Waste collection fare ranges between one thousand to three thousand naira per collection (six to eighteen dollars). Observation by the researcher shows waste that cannot be reused are collected and subsequently disposed off into erosion sites and bad roads especially wastes from burnt bricks and block manufacturing industries.

### **Waste Disposal Processes by Cottage Firms**

However, cottage proprietors that do not utilize the above disposal method transport waste to disposal sites mainly within the vicinity, open dumps and drainage channels. However, some wastes are given out to people that re-uses them (6%) or at worst burnt (84%), where it is done without due consideration of effects it may have on the environment (94%). Only 6% respondents are aware of the impact of open air waste incineration but still burn them openly.

### **Discussion**

Almost all cottage industries in the study area are privately owned, and this can be attributed to the dividends of the prevailing democratic dispensation Nigerians are experiencing with respect to the recapitalization of lending institutions. The banking and finance sector after the major reforms were strengthened. Depositors and creditors gained confidence once more and there seems to be a lot of capital where investors could pull from. Equally, government policy on poverty eradication has turned many unemployed Nigerians into small scale entrepreneurs. All this and other factors culminated into many residents in Mubi gaining the necessary assistants and consequently, became proprietors of small and medium scale industries. Most of the small scale industries are productive and not service industries, and engaged mainly in furniture making, bakeries; flour mills/grain husks removals and water packaging. Others are brick/block industries, local drinks processing and local production of aluminum utensils, each contributing to varying degree and types of waste generated.

Among the major waste types generated are grain husks from rice, maize, guinea corn, produced abundantly as the staple food of the community. Others are saw dust from numerous carpentry and furniture

workshops, charcoal and ashes, and brick rubbles from bakeries and red brick/block industries respectively. However, some of the waste generated are sold and utilized animal feeds (grain processing) excluding rice husks which are dumped with impunity. Saw dust is used by poultry farmers as floor protection from chicken droppings, ashes as well are used by farmers to control weeds (wuta-wuta), and brick rubbles are utilized for erosion control and filling of pot holes on the intra township road accordingly.

## Conclusion

This study was able to appraise the practices of a significant solid waste contributor, the cottage industry. Cottage industries such as furniture making, bakeries, flour mills/grain husk, block/brick industries and so on generate significant amount of solid waste in the area but the concerted reuse and recycling of these cottage wastes as recommended will go a long way in reducing the townships waste level.

## Recommendations

- 1) Public education/enlightenment to sensitize and mobilize cottage industrial proprietors towards a better attitude for the maintenance of environmental quality as “health is wealth” and “cleanness is next to godliness” will go a long way in addressing the waste problem.
- 2) Government in conjunction with private sectors should create waste recycling plants, and encourage or strengthen existing local recycling outfits in the area such as blacksmiths, spare part fabrications, household utensils manufacturing etc. This will generate employment and at the same time address the waste problem.
- 3) The production of organic fertilizer and biogas/bio-fuel from waste generated in the study area by acquiring the technology to do so will turn waste to wealth.

## References

- Adebayo, A. A. (2004). *Mubi Region: A Geographic Synthesis*. Paracelete, Yola, Nigeria
- Adefemi, S.O. and Awokunmi, E.E. (2009). The Impact of Municipal Solid Waste Disposal in Ado-Ekiti Metropolis, Ekiti State, Nigeria. *African Journal of Environmental Science and Technology*. 3(8): 186-189.
- Botkin, D.B. and Keller, D. (1997). *Environmental Science, Earth as a Living Planet*, John Wiley and Sons New York.
- Lombardi, E. (2001). Beyond Recycling: Zero waste. Eco-Cycle, inc. Boulder Counting Recycling Professionals, Grass root recycling Network 1996-2003, Georgia U.S.A: 54.
- Matsch, M. (2002). Zero Waste: A New System Approach Gaining Ground. Eco-Cycle Inc. Boulder Country's Recycling Professionals. Grass root Recycling Network, 1996 – 2003: 4.
- Omuta, G.E.D. (1988). Urban Solid Waste Generation and Management in Sada P.O and Odemerlio, F.O Eds. *Environmental Issues and Management in Nigerian Development* Evans Brothers, Ibadan.
- Oyelola, O.T. and Ojo, L.O. (2001). Waste Management-towards Zero Waste for Wealth Generation, in Adeofun, C.O Oguntake, O and Akegbojo S.Y Eds. *Environment, Culture and Wealth Generation*. Proceeding of the 10<sup>th</sup> Annual Conference of Environment and Behavior Association of Nigeria (EBAN) Held at University of Agriculture, Abeokuta 24<sup>th</sup> -26<sup>th</sup> November 2004. EBAN Publishers.
- Raven, P. and Raven, C. (1998). *Environment*. Emilly Barrose, U.S.A
- Sada, P.O. (1980). Growth and Decay in Nigeria Cities The Nineth Inaugural lectures, University of Benin May, 1980.



- Sheehan, B. and Knapp, D. (2000). *Zeroing on zero Waste*. Eco-cycle Inc. Boulder Country's Recycling Professionals. Grassroot Recycling Network 1996-2003, Georgia, U.S.A.
- Zrubberg, O. (1996). Solid Waste Management in Developing Countries. Proceeding of the 7<sup>th</sup> Annual Solid Waste Association of North America (SWANA) on Waste Reduction, Prevention, Recycling and Composting, Washville, Tennessee: 39-149.