

The Burden and Benefits of Community Wastes

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ABSTRACT:

Burden of waste materials is substantial in places where human population is high and where there is poor handling of the waste materials. Garbage heaps sometimes takes over streets, roads and community recreation grounds. Human intervention in reducing such garbage heaps through burning brings about air pollution with smokes and other toxic gases. This gives people with respiratory problems a hell of a time once exposed to such environment. This paper also looks at characteristics of waste materials and reviews the benefits derivable from community generated wastes. Government agencies, non-governmental organizations and individuals are being encouraged to explore the vast availability of waste materials to the benefit of mankind and the environment.

Keywords: Biodegradable, composting, pollution, recycle and wastes.

INTRODUCTION

Wastes are materials left in a place or thrown away because they are not wanted. Burden of waste materials is often correlated with the existence of high human population. High human population exists in households, schools, markets, motor-parks, busy roads and airports, among other places. Wastes are generated periodically in churches, mosques and some periodical markets.

Our environment will be less polluted as more waste materials are recycled thus boosting our wealth and health. In an attempt to dispose of waste paper materials, individuals resort to burning them thereby bringing about, air pollution. If waste papers, for instance, are sorted out and sent to a paper making industry they can be recycled into toilet rolls and/or packaging materials, and only very little paper materials will remain as community wastes. In abattoirs, blood and bone wastes can be dried and converted to blood meal and bone meal respectively, which are essential components for compounding livestock meals. Also, hair wastes can be used to manufacture fabrics. A system as efficient as this in waste recycling

will have smaller volume of waste materials as a burden in the community.

Global burden of municipal solid waste amounted to 1.3 billion metric tonnes in 1990, or two-thirds of a kilogram of waste per person per day. Industrial countries account for a disproportionately high share of the world's waste relative to their share of world population, while developing countries account for a disproportionately high share of the world's waste relative to their share of world income. Generation of municipal solid wastes per capital does not vary with population size among countries with comparable per capital income (Beede and Bloom, 1995). The prospect of incorporating urban wastes of organic material origin and condensing them into manageable size at the site of collection is being suggested to reduce the envisaged transportation problems.

The objectives of the paper include figuring out the characteristics of community wastes, an understanding which could point to the possible uses of the waste materials; examining the burden of community wastes, including the various forms of pollution and put up ways of minimizing pollution through conversion of

waste to wealth through recycling. Compositing of biodegradable wastes to things like biogas and manure are seen as other derivable benefits.

Characteristics of community wastes

Wastes can be classified into two groups: biodegradable and non-biodegradable wastes. Biodegradable wastes can be decomposed by micro-organisms while the non-biodegradable wastes cannot be decomposed by micro-organisms. The biodegradable wastes include leaves used for wrapping food, various fruits remains, wasted cooked and uncooked foodstuffs and human and animal faeces. Some of the roles the biodegradable wastes can play in agriculture are discussed below under the heading, "The benefits of community wastes".

The non-biodegradable wastes are of no direct importance in agriculture. They include empty cans, plastics, polythene materials, aluminium, cables, iron materials and copper materials. All these could be recycled.

Physical methods of separation are required such as extraction of solids and liquids, and magnetism in order to obtain homogeneity in the final groups such as decomposable organic wastes, scrap materials and rubber separates.

Burden of community wastes

Uncontrolled waste disposal destroys the natural environment. Community wastes constitute a major source of environmental pollution mostly due to poor handling. In some cases, individuals collect household wastes in waste baskets or bins and dump the wastes in unapproved sites. Some wastes are even transported, yet they do not get to an approved wastes site especially where close monitoring of waste disposal is not in place.

In places with high concentration of people, wastes cause problem of litter, open dumps, air and water pollution. The burning of combustible wastes contributes significantly to air pollution. The problem of waste management becomes increasingly pressing as human population, industrial activities and material consumption expand. The industrial wastes are inorganic and mostly chemicals,

acids and oxides. Some are toxic and hazardous to the environment.

Heaps of wastes become so much of a problem that groups and individuals do intervene by carrying out burning of combustible wastes, such action significantly contributes to air pollution. Smoke generated through such intervention create breathing problem to passers-by, some asthmatic and other patients with respiratory problems have encountered health complications by getting exposed to smoky environments. Landlords with houses located in such smoky environments loose the tenancy of their very good and understanding tenants and make do with just any tenant, even people of undesirable characters. Efforts put up by landlords and other individuals and organizations sometimes succeeded in setting up machineries for evacuation of wastes. Vans may be purchased for clearing the wastes. There are open and closed wastes disposal vans. The closed vans are most of the time expensive while the open vans require people to shovel in wastes, workers involved in loading of the open vans are exposed to offensive odours which come from the refuse materials. Also, some of the wastes in open vans spill along the roads as the refuse vans move to the refuse site. Some of these wastes end up in streams and rivers, thereby resulting in water pollution which restricts man's sources of portable water. The ecology for aquatic life like fish and crabs is disturbed. As a result of such problems that are often encountered in waste management. Brad *et al.* (1990) noted that sound municipal solid waste management planning is an integral part of environmental protection. The cost of disposing of municipal solid waste has risen quickly, as landfills approach capacity, and stronger environmental legislation is introduced. The choice of waste treatment and disposal methods is complicated by changing technology, uncertain waste generation rates, and waste stream composition as well as social and political pressures.

Cases abound where a gutter intended to drain waste water to keep the environment clean is itself dirty and smelling as a result of solid wastes hanging in different parts of the gutter

which trap water and debris making the dirty gutter emit offensive and poisonous odour.

The gutter was littered with plenty of non-biodegradable items such as nylon bags and which impede free flow of water. During days set aside for the sanitation of environments, some of the items in the gutters are brought unto the pavement but, unfortunately, the wastes are not dispatched to dumpsites, thereby constituting obstacles to the pedestrians who use the walkways. Such half measures of tackling problems hardly amount to any solution. If the government or an organization sets a period aside for sanitation of the environment, infrastructures should be put in place to evacuate such wastes generated to approved dumpsites.

Uses of community wastes

Improved management of wastes is emerging because of a better understanding of what makes up the wastes and how their constituents can be put to good use. Under good management, community wastes can be collected, separated and recycled for the benefit of mankind.

It is advantageous to collect wastes according to types because some of these wastes like papers, scrap metal, organic waste, plastic and other rubber materials which can be reused. Polythene waste materials could be used in agriculture as plastic mulch, especially if such materials are black in colour whereby they can cut off sunlight supply to emerging weeds; and effect weed management.

Energy is perhaps the easiest resource to extract from solid waste. Energy recovery can be accomplished in several ways. The raw wastes can be incinerated and steam is recovered from the heat and used for heating. Non-combustible materials can also be recovered from the ashes, for example when bits of broken chairs are incinerated, the wood materials on heating generate heat and nails are recovered from the ashes.

The refuse can be shredded into small pieces, and then air-classified by blowing the wastes up in a column, separating out the light materials.

The heavy materials remaining at the bottom of the column contain reclaimable metals and glasses.

By-products from animals such as hairs, blood, bones and other wastes can be very useful. Pig hairs can be made into bristles and brushes.

Woven basket found in the wastes has multiple uses. Amusan (2002) reported that baskets might be used for raising snails in the rural areas. Baskets used for housing snails can last for up to six months. The baskets taken from dump site are virtually free of charge, except the effort put into recovering them. The quality of basket retrieved from the dumpsite may dictate the type of use it may be put. Recovered basket may be used in the farm for transporting seed yams, cassava stem cuttings or other planting materials, and it may be used in the home garden or in the nursery for the movement of bud woods, budding knives and budding tapes. The "TAMPICO" carton shown in plate 2 can be used as a ceiling board in low profile buildings. PVC pipes recovered from the dumpsite can find direct use in the installation of waste pipes from bathrooms, in the use of such pipes, proper inspection of the pipes will guide the re-user in removing locations where there are cracks and holes. Part of the recovered pipes can be cut and used to mend the long pipes before re-use. The best pipes can as well be used as supply pipes which function under pressure without any technical constraints. Blood and bones which are wastes from the processing of livestock can be converted to blood meal and bone meal respectively. Blood meal serves as a source of protein (Agromisa, 1995), while bones can also be used as ornaments.

The usable fuel gas, methane, can be produced from organic waste using anaerobic digestion. Agromisa (1995) similarly reported that a biogas digester can be used to make gas from poultry manure, and that the slurry which is then left over is good as organic fertilizer. Obiazi, *et al.* (2006) reported that the use of sandy soil alone produced less vigorous tomato seedlings compared with when sand was mixed with pig manure. They noted that the inclusion

of pig manure in sandy soil significantly ($p < 0.05$) improved the level of seedling emergence, plant height, and number of leaves per plant and dry biomass of tomato seedlings.

Composting organic wastes helps to keep refuse sizes as small as possible and to reduce ground water pollution (Seifer, 1992). It is beneficial to apply well weathered organic wastes into the soil for improved crop growth. Berryman (1970) observed that in developing countries, organic fertilizers have been widely used and accepted as a major source of improving and maintaining soil fertility. Ugbomeh *et al.* (1998) observed that optimum okra fresh pod yield was obtained when NPK 15-15-15 fertilizer was used at 200kg/ha in addition to poultry manure used at 15,000 kg/ha; the use of NPK 15-15-15 fertilizer at 400 kg/ha alone or poultry manure used at 30,000 kg/ha alone or their mixtures did not produce better fresh okra pod yields. Cook (1982) also reported similar increase when inorganic and organic manures were combined in vegetable production. Obi *et al.* (2005) equally reported that the fresh fruit yield of okra increased significantly with compost rates, resulting in > 300% increase over the control.

Organic substances in a refuse bin represent plant and animal residues. The original source of organic matter is plant tissues, animals are usually considered as secondary source of organic matter. Animals attack and consume plant tissues, the waste products they release and their bodies eventually become organic wastes. Dead animals and their released wastes together with plant remains are in active stages of decay, being worked upon by micro-organisms. The decomposition of the original tissue by micro-organisms finally leads to the formation of humus. Cook (1976) stated that basically, composting involves the conversion of heterogeneous mass of multiple particle size of the original organic materials to homogeneous mass of suitable particle size and suitable content. Moisture needs to be present during composting process to provide the appropriate humidity for decomposition of the organic waste by microbiological decomposers.

Addition of humus to soil helps to improve the physical properties such as water infiltration and holding capacities and increases soil plant nutrients.

Restaurants and some hotels could generate large quantities of left-over foods. The qualities of food scavenged or sourced from restaurants are sometimes very high depending on the status of people who patronize such eating places. The result may be a sustainable source of food for feed supply to livestock. Dogs are equally known to benefit from such arrangements with regular supply of bones. Decomposable food wastes can be put to valuable use as supplementary feed for fowls or goats; they could also be used in the production of compost for garden crops.

Toxic materials need to be avoided in the act of compost making. The entire composting process is natural. Inclusion of millipedes, worms and other invertebrates in the compost heap speeds up the break down of decomposable refuse materials.

In West Indies, scum (filter press waste) from sugar cane factories is left to ferment for 2-3 weeks before being used to promote the growth of several species of the in-cap fungus *Coprimus* sp. The scum is being used when the fungi have disappeared. The same principles can be used to prepare compost from crushed tree bark and sawdust. The process will be slow as *Coprimus* sp. are allowed to develop and disappear before the product is used (Messiaen, 1992).

Compost made from urban household waste need a large composting unit, in addition to the initial separation of plastic and metal trash (Messiaen, 1992). Cointreau-Levine (1994) noted that capital-intensive composting projects in developing countries often fail. Labour-intensive aerobic composting facilities may be more appropriate in developing countries than the high automated anaerobic facilities typical of industrial countries.

Composting of biodegradable waste

The breakdown of compost depends on the action of bacteria. Decay can be encouraged by keeping the compost head moist but not wet.

In preparing compost from community wastes, different approaches are adopted, one of which is to dig three compost pits each of which is 200 x 100 x 50 cm dimension to about 300 x 150 x 80 cm.

To fill the first pit, plant materials are first piled up excluding wood and toxic materials. These are pressed down with feet. Plant and animal remains, to be precise, any biodegradable materials are piled up next. Top of the heap is covered with a thin layer of wood ashes. Water is applied at last to make the materials moist and not wet.

Two weeks later the whole materials in the first pit is turned into pit two. Shovel is an appropriate tool to use for this exercise, however spade could be managed. The first pit is refilled in the same order as was first filled. After another two weeks, contents in pit two are turned to pit three, content in pit one are turned into pit two and pit one refilled with fresh compost waste materials. At the end of another two weeks, composts in pit three are turned into the storage pit, by this time it would have taken six weeks from the time compost making started and it is now ready to be turned out to ornamental plants producers, landscape designers, home gardeners as well as peasant and commercial farmers who value compost manure for improved growth of plants, lawns, shade trees and farm crops.

CONCLUSION

There is room for improvement in the management of waste materials in most communities. Realizing that community wastes are mainly biodegradable and non-biodegradable guides us in the direction of re use of the waste materials. Some of the biodegradable materials can be used directly while most of them become useful after decomposition. Wastes have also been known to impede the free flow of waste and drainage water in gutters. Waste foods can be used directly in feeding livestock like fowls, goats and dogs. Composting will go a long way at utilizing farm wastes to generate inorganic fertilizers. Plants are known to have improved yields due to the incorporation of compost

manure to the soil. Apart from composting of organic wastes, other such wastes can be put into other uses such as the use of blood and bones to make blood and bone meals respectively for animal feed formulation. Non-biodegradable wastes such as plastic and other rubber materials can be re-used; polythene waste materials could be used in agriculture as plastic mulch, while things like metals and glasses can be recycled. It is recommended that individuals and organizations go into this area of service provision of waste management and exploit the enormous availability of waste materials to the benefit of unemployed persons, the communities and the environment at large.

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