The Importance of Recycling in Solid Waste Management

Salha Mohammed Kassim

Summary: This paper discusses the importance of recycling in Solid waste Management. Cities in the world are rapidly urbanising and rapid population increase, As world population grows so does the solid waste generation increases as well. This resulted in a relatively large quantity of solid waste remaining poorly managed and challenge to the society, Today society is more concerned about the environment and is much more aware about its activities and the impact resulting from these activities on the environment. Society demands that waste management must be sustainable. The proper management of solid waste needs appropriate technology, which is economically affordable, socially accepted and environmentally friendly. The paper deals with the idea of recycling as a means of solid waste treatment and explores whether such an approach is commendable or not. The purpose of presenting this paper is to share experience with other countries on the needs and importance of the recycling.

Keywords: environment; recycling; solid waste; solid waste management

Introduction

The issue of Solid Waste Management (SWM) is a challenge throughout the world, in both developed and developing countries. People always generate solid waste through their daily activities. As world population grows so does the solid waste generation increases as well, especially in urban areas. The world's urban population reached 2.9 billion in 2000 and is expected to rise to 4.2 billion by 2020 (UN, 2002; [1]), which will lead to a faster generation of solid waste. The managing of this huge volume of waste effectively is a challenging problem.

A large amount of money and technical know-how is needed for the management of solid waste. Poor solid waste management brings with it serious health and environmental problems. Piles of uncollected solid waste accumulated on open spaces and streets are major sources of health problems and environmental degradation. These wastes generally add greatly to water pollution as when it rains, much of this waste ends up being swept into water bodies. According to the World Health Organization, more than five million deaths worldwide are caused each year by water-borne and water-related diseases (UN, 2003). The solid waste needs to be properly managed which means proper storage, collection, transportation, treatment and disposal in a way that minimises risk to the environment and human health.

Today society is more concerned about the environment and is much more aware about its activities and the impact resulting from these activities on the environment. Society demands that waste management must be sustainable. The proper management of solid waste needs appropriate technology, which is economically affordable, socially accepted and environmentally friendly.

However, the problem of solid waste management is a global issue as mentioned earlier but it is different in developed and developing countries. In developed countries

Dar es Salaam Institute of Technology, Civil Engineering Department, P.O. Box 2958 DSM, Tanzania
Fax: + 255 222 152504;
E-mail: kassimsalha@yahoo.com

the reasons for waste collection and disposal are well understood and accepted and workable regulations are now in place. For example, a country like the UK has a range of operational, collection and treatment facilities for solid waste (Thurgood, 2001). But still there are some problems like the increasing quantities of solid waste because of the greater use of packaging, bottles, containers etc. In developing countries solid waste is a big issue, disposal systems are still largely uncontrolled, or with slight to moderate controls, and large quantities of solid waste remain uncollected/untreated.

The other problem facing the developed countries is the shortage of land needed for sanitary landfill. Since the landfill technique is very common and widely used for disposing of municipal solid waste in developed countries this requires a large area for operation and suitable technology for reducing pollution to the environment. As the current society is much more aware of the environment there are an increasing number of environmental regulations which very often challenge the management of solid waste and this makes the recycling as means of reducing waste to the landfill to be very important in the SWM sector.

The Importance of Solid Waste Management

The importance of SWM has been recognised at international, national and community level. The number of conferences dealing with the SWM is increasing every year [2]. This increase reflects the level of interest in the subject matter on a worldwide basis. The Earth Summit of 1992 focused on promotion of the integrated provision of environmental infrastructure including water and solid waste management. Emphasis was placed on an integrated approach to the provision of environmentally sound infrastructure in human settlements, in particular for the urban and the rural poor, as an investment in sustainable development. This can improve the quality of life, increase productivity, improve health and reduce the burden of investment in curative medicine and poverty alleviation (Earth Summit, 1992).

Similarly, the Agenda 21 declaration of the United Nations (UN, 1993) addressed the issues of environmentally sound management of solid waste, with emphasis on the extension of solid waste service coverage to all urban and rural areas. Priorities were assigned as follows:

- The first priority is to minimize wastes, particularly waste destined for final disposal.
- The second priority is to maximize environmentally sound waste reuse and recycling.
- The third priority is to promote environmentally sound waste disposal and treatment.
- The fourth priority is to extend solid waste service coverage to all urban and rural areas (Agenda 21)

Although the universal Agenda is targeted to all countries, both developed and developing, the challenges of SWM are more in developing countries. It is easier to achieve environmentally sound practice in developed countries than in developing countries. Some of developing countries still struggle with the primary solid waste collection service, and it is very difficult to achieve.

In developing countries higher economic growth has caused higher amounts of wastes. Local government authorities in these countries usually fail to provide adequate services to dispose the increasing amounts of waste, resulting in threats for both the population and environment health. There is therefore an urgent need for recycling as a form of waste management in order to stop the devastating effects of solid waste in the World. Recycling should be encouraged and managed properly as also it provides a local source of income and reduces the amount of waste for disposal.

What is Recycling?

Recycling means any recovery operation by which waste materials are reprocessed into

products, materials or substances whether for the original or other purposes. Recycling involves altering the physical form of an object or material and making a new object from the altered material (Rotter V, 2009). It is the process by which waste materials are transformed into new products in such manner that the original products lose their identity.

The following are the examples of recycled materials available within the community;

on disposal resources only. These practices cannot entirely eliminate the need for disposal, but well designed and aggressively promoted waste reduction and recycling programs can significantly reduce the volume of waste in landfill (Contreau Levine, 2000.).

Why Recycling?

Recycling is the most widely known and practiced waste reduction technique, when

Recycling waste

Many communities now worldwide have selected to include recycling and other waste reduction techniques as integral components of their Integrated Solid Waste Management (ISWM) system to help extend the life of existing landfills and to reduce the need for new ones. As discarded materials increases, waste reduction becomes increasingly important. Waste reduction and recycling are the primary means of reducing dependence

properly planned and implemented recycling can divert significant quantities of discarded materials from the waste stream and subsequent disposal. The benefits of recycling go far beyond just saving landfill space; but recycling provides a source of valuable raw materials, multiple market exist for paper, metal, cardboard, glass, plastic and other materials. Collecting and selling these materials likely will not make a profit for the community but in

Recycling waste

Recycling waste

some cases can reduce the community's waste management costs by creating a revenue stream from waste.

Recycling is an integral part of an optimized nationwide integrated waste and resource management strategy. Recycling saves resources. According to Sandra Levinne (2000) findings; recycling 1 ton of newspaper saves the equivalent of 17 trees. Producing a new aluminum can from a recycled aluminum can reduces production energy requirements by 75%. Products from paper and plastics require significantly less energy when recycled materials are used as feedstock. Recycling provides new jobs and economic development.

Recycling programme provide employment for people who have difficulty finding work. Manufacturing products from recycled materials reduces emissions to

The pictures above illustrate the example of recycling waste available both in developing and developed countries. (Source; Author visits Dar es Salaam Tanzania; 2011)

the environment. Residential, Commercial, business and industries have significant recycled portions of their waste. It is important for the government to have organized programs for the collection and recycling of a wide variety wastes from residential and commercial business.

The picture above shows some of the useful things made by using solid waste (baskets made by can) i.e. re-use/recycling of the solid waste and minimization of waste for disposal (Source; Author visits Dar es Salaam Tanzania; 2011).

Planning for Recycling and Needs of Market for Recyclable Materials

As we have seen from the previous section the recycling is an important strategy in the SWM, Therefore there is a need of the national government to promote the waste reduction at the source and the recycling activities should be the continuously approach towards. This needs the planning process for identifying the most appropriate program for collecting, processing and marketing recyclable material at the local level.

The information necessary for the plan:

- Evaluating overall recycling potential within the country/region
- Identifying viable recycling program alternatives
- Selecting the most appropriate alternatives based on selected design criteria.

It is important to keep the big picture in mind when establishing a recycling program. The ultimate goal of any recycling program is to produce materials that, after cleaning and conversion to a secondary usable, will be marketable to an end-user. If local governments plan and implement cost effective recycling programs, manufacturers can realize significant savings by using recycled versus virgin resources.

Willingness of Residents and Bussinesses to Participate in Recycling Programs

Willingness to participate in any Solid Waste Activities (Kassim, 2006) it is essential to any solid waste activities. Be aware of; and understand the attitudes and behavior of citizens and other stakeholders expected to participate in the selected recycling program is very important. This requires asking them questions that will provide a realistic assessment of their

willingness to participate. The planning team should, at a minimum, seek the following feedback from residents and business owners:

- Their knowledge and opinions of waste reduction and recycling.
- Their expectations for the level of service and results.
- Their ability and willingness to co-operate in the planning and implementation
- of expanded or more formal recycling programs.
- Their preferred level of service (i.e., user requirements regarding material separation, set-out requirements, collection frequency, etc.)

The efficient recovery of large volumes of high-quality recyclable materials depends on citizen involvement. Although there is typically dormant support for recycling, not all residents and businesses can be expected to support it. If ambivalent attitudes or objections to recycling can be identified and characterized, planners can design programs that can overcome them.

One way to gauge public interest in and support for recycling is to survey residents and businesses about their attitudes toward waste disposal and recycling. Another way to assess local attitudes toward recycling is to conduct focus group research. This survey approach enables moderators to gather qualitative data.

Conclusion

It is concluded that there is an urgent need for recycling as an integral form of waste management in order to stop the devastating effects of solid waste in the world. Hence, Recycling should be encouraged and managed properly. The support and participation of the government, residents and businesses in the recycling program is critical to its success.

The support and participation can include local authorities and business leaders (and others who have influence) as well as local technical experts. Advisory committees can serve as valuable through the program planning process through the;

- Building Consensus
- Involving stakeholders in the decision-making process.
- Soliciting public input and ties together with the local authorities.

- Educating public about the importance and value of recycling

Acknowledgements: The author would like to extend her thanks to the Conference Organizers for the invitation and her employer Dar es Salaam Institute of Technology. She is deeply grateful to her family for the continuous support, courage, patients and love it is always the source of successes!

[1] UN-Habitat. The Challenge of Slums: Global Report on Human Settlements 2003. Nairobi Kenya, *United Nations Human Settlements Programme.* **2003**.
[2] F. L. Diaz, **2005**, "Editorial." *Waste Management 25*, 121–122.
[3] M. Ali, *Informal System of Solid Waste Recycling*, WEDC, Civil and Building Engineering, Loughborough, University, **1993**.
[4] I. Baud, Markets, Partnerships and Sustainable Development in Solid Waste Management: raising the questions. *Solid Waste Management and Recycling; Actors, Partnerships and Policies in Hydrebad, India and Nairobi, Kenya*. I. Baud,, J. Post,, C. Furedy, Dordrecht/Boston/London, Kluwer Academic Publishers. **2004**. *76*, 1–20.
[5] I. Baud, J. Post, C. Furedy, *Solid Waste Management and Recycling; Actors, Partnerships and Policies in Hydrebad, India and Nairobi, Kenya*, Dordrecht/Boston/London Kluwer Academic Publishers, **2004**.
[6] B. Bolaane, *Constraints to Organised Recycling in Developing Countries: A case study of Gaborone, Botswana*, WEDC, Civil and Building Engineering, Loughborough University, UK **2004**, *PhD Thesis*.
[7] S. Cointreau, **2006**, *Occupational and Environmental Health Issues of Solid Waste Management - Special Emphasis on Middle- And Lower-income Countries*.
[8] S. M. Kassim, M. Ali, **2003**, *Private Solid Waste Collection Services, Dar es Salaam, Tanzania*, 29th WEDC International Conference towards the Millenium Development Goals, Abuja Nigeria, WEDC, Loughborough University, UK.
[9] S. M. Kassim, M. Ali, **2005**, "Solid Waste Collection by the Private Sector: Households' perspective - findings from a study in Dar es Salaam city, Tanzania." *Habitat International Habitat International Vol. 30 Issue 4*. (pg 769–780).
[10] S. M. Kassim, R. D. Masika, P. Mgaya, L. Nondek, **2002**, *Municipal Solid Waste Management in Dar es Salaam, Final Report, Dar es Salaam, UNIDO. Unpublished Report.*
[11] S. Kassim, **2009**, *Sustainability of private sector in municipal Solid Waste Collection–Is it Possible?. International Conference Ethiopia and published–WEDC Publications - Loughborough University UK.–34th WEDC Proceedings. (pg 439–448).*
[12] S. Kassim, *Private Sector in Solid Waste Management–A book published by VDM Publisher*, Germany **2008**.
[13] S. Kassim, **2008**, *Sustainability of private sector in municipal Solid Waste Collection–Contribution to Poverty Reduction A case study in Dar es salaam City, Tanzania. Institution of Engineers Tanzania Proceedings;–6th International Conference on the Role of engineers in Meeting Millennium Development Goals in Lesser Economies (pg 207–221).*
[14] S. Kassim, **2008**, *Public - Private Partnership Case of Solid Waste Collection in Dar es Salaam (in Implementing Sanitation and Hygiene). Paper presented to the Technical forum on Sanitation and Hygiene towards Millennium development Goals Invited paper by the Ministry of Health and Social Welfare Tanzania (pg 1–24).*
[15] Rotter. V. Susanne, *Material Recycling; Teaching Materials IHE Netherlands.* **2009**.
[16] Sandra. Levinne, *Solid Waste management Privatization Procedual Manual; Waste Reduction and Recycling.* **2000**.
[17] R. Schertenleib, W. Meyer, Synergetic Effects of Municipal Solid Waste Collection, Recycling and Disposal. *International Reference Centre for Waste Disposal WHO Collaborating Centre*: **1992**, 9–14.
[18] M. Thurgood, Household Waste Management in the UK: Some examples of current practices. *UK, Energy Technology Support Unity (ETSU)*: **2000**, 4–5; 6–12; 38–39.
[19] UNCED, *Agenda 21. The "Earth Summit", United Nations Conference on Environment and Development (UNCED)*, UN Publications, **1992**.
[20] UNCHS, *Sustainable Human Settlements Development: Implementing Agenda 21*, **1994**.
[21] UNDP. Human Development Report 2003 Millennium Development Goals: A compact among nations to end human poverty, *United Nations Development Programme* **2003**, 111–128.
[22] United Nations. *The Global Partnership for Environment and Development: A Guide to Agenda 21*, New York, United Nations **1993**, 88–94.
[23] United Nations. **2002**, *World Urbanization Prospects The 2001 Revision Data Tables and Highlights. New York, Department of Economics and Social Affairs United Nations Secretariat.*
[24] United Nations. *The Challenge of SLUMS Global Report on Human Settlements 2003, United Nations Human Settlements Programme*: **2003**, 114.
[25] I. D. Williams, C. Taylor, **2004**, "Maximising Households Waste Recycling at Civic Amenity sites in Lancashire, England." *Waste Management* ***Vol.*** *24*, 861–874.

