

# URBANIZATION AND SOLID WASTE MANAGEMENT CHALLENGES: A REVIEW OF LITERATURE

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**Abstract** The aim of this study is to find out the Challenges of urbanization and Solid Waste Management urbanized city areas in developing countries most of these urbanizing cities and also a commercial hub, providing employment opportunities and accelerating the pace of urbanization, resulting in a corresponding increase in municipal solid waste (MSW) generation. Solid waste management is a one of main challenge for the any developing city and its authorities in developing countries mainly due to the increasing generation of waste, the burden posed on the municipal budget as a result of the high costs associated to its management, the lack of understanding over a diversity of factors that affect the different stages of waste management and linkages necessary to enable the entire handling system functioning. With the rapid urbanization of a developing city and Municipal waste is a term coined to the solid waste produced by the people and the society in their day to day operations. Secondary data was collected from books on this subject matter, publications, research studies, journals, and websites published by the local and foreign intellectuals of the subjects. It presents rich data results from literature review methods. This study describes and evaluates the present state of municipal solid waste management in municipal council area and identified the challenges face due poor management of the solid waste. Finally also summarizes the proposed policies and initiatives of the solid waste management in any urban council to improve the existing MSW management system in order to find the feasible solution for overcome the challenges.

**Keywords:** Municipal Solid Wastes, Municipal Solid Waste Management, Integrated Solid Waste Management. Solid Waste Management Strategies. Municipal Council

## I. INTRODUCTION

Municipal waste is a term coined to the solid waste produced by the people and the society in their day to day operations. In other terms, these are also called as domestic waste. In order to study the analysis of waste management, it is very important to define what it is: Waste analysis is the detection of waste creeks, their origins, their composition and their destinations which is often accomplished through waste audit or assessment procedure. For example industrial waste varies in their composition and it is in more concentrated form which contains hazardous materials than compared to that of municipal solid waste and therefore it requires technologies and specific handling procedures In both categories, there exists major opportunities for prevention and resource recovery. There are variety of methods for disposing solid waste which vary globally which includes methods like dumping in open space, sanitary landfilling, incineration, and composting. Sanitary landfilling is prevalent in many developed countries, while in underdeveloped or less developed countries it is rare. In developing countries, low cost methods like dumping in open spaces, appears more acceptable than the other disposal methods. Despite the huge environmental problems, it is considered the main disposal method of urban solid waste in many of the cities.

## II. OBJECTIVES

Objectives of the literature revive under the Title of Urbanization and Solid Waste Management Challenges are as follows.

- i. To explore current state of waste management process.
- ii. To recognize the Key performance indicators to measure waste management success.
- iii. To examine main practical and strategic challenges of the waste management practices.
- iv. To develop constructive remedies that can be adopted on a strategic basis for the identified issues to improve municipal waste management efficiency.

## III. METHODOLOGY

The conceptual frame work for the challenges affecting successful solid waste management in developing cities had been prepared and this had been restructured to focus around the literature and empirical proof acquired. Further moving forward, hypothesis have been created for the study and these excessively have been justified focused around literature and empirical proof. Also it will specifically explain the methodology, the sample size, data collection, research design and other tools used in the research

## IV. LITERATURE REVIEW

To Explore Current State Of Waste Management Process municipal solid waste is a term usually applied to a heterogeneous collection of wastes produced in urban areas, the nature of which varies from region to region. MSWM refers to the collection, transfer, treatment, recycling, resource recovery and disposal of solid waste in urban areas. MSWM is the most important service a council provides. Accordingly, most of the low-income countries as well as middle-income countries, MSW is the largest single budget item. Accordingly, solid waste is usually the one service that falls completely within the local government's purview. There, MSW includes wastes generated from residential, commercial, industrial, institutional, construction, demolition, process, and municipal services. Some studies, only consider residential waste as MSW, and in high income countries, only 25 percent to 35 percent of the overall waste stream is from residential sources. Country wide SWM infrastructure is weak, equipment is old and ill maintained, absenteeism is extremely high among municipal waste collectors, and resources that are spent are often misspent on duplication

of efforts or corruption. There are many possible reasons why projects fail to meet the expectations and good intentions of the implementers. The report, and much of the literature researched, attributes the low success to lack of coordination, inadequate political will, too many players, jealousy among agencies and villagers, mistrust of new ideas, and resistance to change. As is true in other developing countries suffers from a lack of financial and human resources to obtain and implement expensive technologies, and has a shortage of skilled experts. Though the literacy rates in developing countries are extremely high, graduates are completing higher education without gaining practical, applicable skills and experience.

To Recognize the Key Performance Indicators to Measure Waste Management Success. Integrated Solid Waste Management (ISWM) is a comprehensive waste prevention, recycling, composting, and disposal system. An effective ISWM system considers how to prevent, recycle, and manage solid waste in ways that most effectively protect human health and the environment. ISWM involves evaluating local needs and conditions, and then selecting and combining the most appropriate waste management activities for those conditions. The major ISWM activities are waste prevention, recycling and composting, and combustion and disposal in properly designed, constructed, and managed landfills. Further, Integrated Waste Management (IWM) is an approach that is most compatible with an environmentally sustainable development. It refers to the complementary use of a variety of practices to safely and effectively handle municipal solid waste. The strategy used to develop an integrated waste management system is to identify the levels at which the highest values of individual and collective materials can be recovered. The most favourable is reduction, which suggests using less to begin with and reusing more, thereby saving material production, resource cost, and energy. The least desirable is land filling. The approach not only aims at maximizing recovery of reusable and recyclable materials, but also reduces pollution and protects human health and the environment. The purpose of the waste management hierarchy is to make waste management practices as environmentally sound as possible. The waste management hierarchy has been adopted in various forms by most industrialized countries. The hierarchy is a useful policy tool for conserving resources, for dealing with landfill shortages, for minimizing air and water pollution, and for protecting public health and safety. In many developing countries, some aspects of this hierarchy are already in place, since traditional practices revolving around waste prevention reuse, and recycling are established.

To Examine Main Practical and Strategic Challenges of The Waste Management Practices In any developing country, urban areas are identified as Municipal council (MC) and urban council (UC) areas. Waste collection and disposal is happening in all the above MCs and UCs. It is estimated that large amount of tons/day of solid waste are generated in a city. The most common practice in almost all municipalities in developing countries are open burning, land filling (not technical) and open dumping of wastes. These methods are not considered as environmental friendly. About 85 % of collected waste is subjected to open dumping. Further, there are very good SWM system has been established in most of the councils. However, operation, maintenance, monitoring and evaluations are not properly implementing by these local authorities which leads for so many solid waste issues in urban areas. Further, today SWM issues are become a major environmental problem and also a national issue. To maximize resource recovery with a view to minimizing the amount of waste from disposal To minimize adverse environmental impacts due to waste disposal to ensure health and well-being of the people and on eco-system. Further, a major activity that bounded from the National Policy is the setting up of the Waste management Program to solve the solid waste problem at the national level, with the concept of reusing the resources available in the collected garbage to the maximum before final disposal.

To Develop Constructive Remedies that can be Adopted on A Strategic Basis for The Identified Issues to Improve Municipal Waste Management Efficiency At the present, solid waste management depends solely on collection and disposal method. These conventional methods need to be changed and should promote alternative techniques such as reduce, reuse and recycle the waste. And also, the Sri Lankans' the most popular and the easiest method of disposal; land fill technique must be the last option. Proper financial support should be given for the SWM to improve the infrastructure facilities, such as operating new equipment, technologies, training the staff and implementing awareness programs so on. Eradication of conventional mixed waste disposal. Developing the mechanism to separate waste at the source of generation and collecting those separated waste by local authorities without mixing them. Public education and participation is an important aspect in the context of current socio-economic pressures and complexities. It also envisages creating institutional methods to engage the city residents in municipal planning and decision making. Social awareness programs for home-level waste reduction, reuse and composting are also needed. Urban

waste management will be easier and more effective only if the local authority can develop institutional mechanisms to promote sustainable partnerships with different stakeholders of the city such as the residents, civil society organizations and the private sector. Proper record keeping methods are needed. Currently, councils do not provide vital information required by the administrators and planners to understand the ward-specific, lane-specific quality and quantity of generated waste. It does not even provide leading information to plan the cadre and vehicle deployment effectively. Hardly any records exist that can indicate the types and volumes of different waste to help planners determine the different recycling modes and processes that can be used. Further, councils can collaborate with the Department of Education, the Central Environment Authority, Universities, other related agencies and NGOs, to conduct city wide public education activities to raise the environmental awareness levels of the public and the city residents in order to obtain their cooperation to implement the SWM Strategies, for doing researches in this context. Need human resources and also technical knowledge in LAs to coordinate both consumers and producers to promote the use of sustainable consumption and production though 3R and 5R and other SWM techniques. Develop alternative approaches like Waste to Energy' ensuring that these facilities are designed to maximize the environmental, financial and social benefits At the end, solid waste management should be an adaptive management approach with monitoring, identifying challenges and finding solutions to overcome those challenges. Accordingly, responsible parties should continue to adapt and evolve their solid waste management operations and infrastructure and create more resilient and adaptable systems. Further, as one of the main problems, a country like Sri Lanka facing is funding for these activities (Development of infrastructures) and failure to pay adequate attention for solid waste management. In this regards, mechanism should be developed for funding these activities such as main focus should be given to public and private sector participation.

## V. JUSTIFICATION OF LITERATURE REVIEW

In the overall outcome it can be noted that through local and international literature a vast degree of lack in the sufficient measures connected to the waste management issues can be recognized and integrated to the research methodology. It was help to identified to explore current state of waste management process and with that it was

help to derive to examine main practical and strategic challenges of the waste management practices in any developing country. Along with those factors and considerations finally this review was help to identify develop constructive remedies that can be adopted on a strategic basis for the identified issues to improve municipal waste management efficiency.

## VI. DISCUSSION

Environmental problems may also be reduced by converting as much waste as possible into a solid product instead of washing the waste away into the wastewater. In general solid waste is fairly easy to control, requires less energy and is cheaper than wastewater treatment. In a few developed countries, environmental problems have led to the formulation of high quality standards for discharged water. To meet these standards, a combination of anaerobic and aerobic is required, often coupled to nutrient removal systems.

## REFERENCE

- Anonymus (1974). Chromium. Report by the Committee on Biological Effects of Atmospheric Pollutants of the National Academy of Sciences, Washington, D.C. USA,
- Augsburger, N.D., H.R. Bohanon, J.L. Calhoun and J.D. Hildinger (1980). Environmental control handbook for poultry and livestock. Acme Engineering & Manufacturing Corp., Muskogee, Oklahoma.
- Barnes, D., Forster, C.F. and Hrudey, S.E. (1984). Surveys in Industrial Wastewater Treatment: Food and Allied Industries. Pittman Publishing Limited, London, England.
- Berg, J.C.T. van den (1988). Dairy technology in the tropics and subtropics. Pudoc, Wageningen, the Netherlands.
- Berg, J.C.T. van den (1990). Strategy for dairy development in the tropics and subtropics. Pudoc, Wageningen.
- Buljan, J. (1994). Environmental aspects of processing and trade in hides, skins and leather, United Nations Industrial Development Organization (UNIDO), Geneva. To be published.
- Clonfero, G. (1990). Typical Tannery Effluent and Residual Sludge Treatment. Workshop on pollutional control/low waste technologies in agro based industries in selected countries from the asia and the pacific region. United Nations Industrial Development Organization (UNIDO), Geneva
- Contreras, J.A. (1991). Impact of slaughterhouse water on the environment in the Philippines and other southeast Asian countries. Bureau of Animal Industry, Metro Manila, Philippines.

Crawford, R.J.M. and Coppe, P. (1990). FAO animal production and health paper 85. The technology of traditional milk products in developing countries. Food and Agricultural Organization of the United Nations, Rome, Italy.

Davis, L.E. (1985). Using animal by-products in formula feeds. National Renderers Association, London, England

Department of the Environment (1978). Waste Management Paper no 17, Waste from tanning, leather dressing and fellmongering. A technical memorandum on recovery, treatment and disposal including a code of practise. Her Majesty's Stationery Office, London, England

DHV (1993). Economic feasibility of the UASB technology, a comparative study on costs. IBRD Workshop on UASB Technology for Sewage Treatment. Washington, D.C., USA, December 1, 1993.

Donnerhack, W., Ackermann, R., Liebe, L., Repke, D., Vo., U., Geier, U. and Clausing, D. (1987). Rationelle Wasserverwendung in der Lebensmittelindustrie. VEB Verlag für Bauwesen, Berlin

Duitshof (1994). Stork Red Meat Systems (RMS), Lichtenvoorde, the Netherlands. Personal communication.

EEC (1991). Urban Waste Water Directive, EEC-Council Directive 91/271/EEC.

Eriksen, P.J. (1978). FAO animal and production health paper 9. Slaughterhouse and slaughterslab design and construction. Food and Agricultural Organization of the United Nations, Rome, Italy.

El Boushy, A.R.Y. and Poel, A.F.B. van der, (1994). Poultry feed from waste. Processing and use. Chapman & Hall, London, England.

El Boushy, A.R.Y., Poel, A.F.B. van der, Koene, J.I.A. and Dieleman, S.H. (1991). Tanning waste by-products from cattle hides, its suitability as a feedstuff. Bioresource Technology 35 page 321-223

EPA (1971). Dairy food plant wastes and waste treatment practices. EPA 12060 EGUO 3/71, US Environmental Protection Agency, Washington, DC.

EPA (1974). Development document for effluent limitation guidelines and new source performance standards for the red meat processing segment of the meat product and rendering processing point source category, report no. 440/1-74-012-a, US Environmental Protection Agency, Washington, DC.

EPA (1979). Processing chrome tannery effluent to meet best available treatment standards, report no. 600/2-79-110, US Environmental Protection Agency, Industrial Environmental Research Laboratory, Cincinnati OH

FAO (1990a). World statistical compendium for raw hides and skins leather and leather footwear 1970-1988. Food and Agricultural Organization of the United Nations, Rome, Italy.

FAO (1990b). The technology of traditional milk products in developing countries. FAO Animal Product and Health Paper 85. Food and Agricultural Organization of the United Nations, Rome, Italy.

# PROCEEDINGS

- FAO (1993). Production Yearbook, Vol. 45. Food and Agricultural Organization of the United Nations, Rome, Italy.
- Feikes, L. (1983). Ökologische Probleme der Lederindustrie. Bibliothek des Leders band 8. Umschau Verlag, Frankfurt am Main.
- Fox, P.F. (1982). Developments in Dairy Chemistry - 1. Applied Science Publishers, London, England.
- Fox, P.F. (1989). Developments in Dairy Chemistry - 4. Elsevier Applied Science, London, England.
- Fox, P.F. (1993). Cheese: chemistry, physics and microbiology. Volume 1 General aspects. Second Edition. Chapman & Hall, London, England.
- Franklin, K.R. and Cross, H.R. (1982). Meat science and technology international symposium proceedings, Lincoln, Nebraska, November 1-4, 1982. National Live Stock and Meat Board, Chicago, USA.
- Girard, J.P. (1992). Technology of meat and meat products. Ellis Horwood Limited, Chichester, England
- Government of Tanzania, Ministry of Agriculture, Dept. for planning and marketing (1993). Livestock sector (sub-sector papers)
- Harper, W.J., Bailsdell, J.L. and Grosshopf, J. (1971). see: EPA (1971)
- Heinen, P. (1994). Poland: Livestock sector review. Coveconsult b.v., Velp, The Netherlands
- Heinz, G. (editor), Sheridan, J.J., Allen, P., Ziegler, J.H., Marinkov, M., and Suvakov, M.D. (1991). FAO animal production and health paper 91. Guidelines for slaughtering meat, cutting and further processing. Food and Agricultural Organization of the United Nations, Rome, Italy.
- Hemingway, R.W. and Karchesy, J.J. (1989). Chemistry and Significance of Condensed Tannins. Plenum Press, New York, USA.
- Higham, R. (1991). Leather Industry, Case study No. 3. Conference on Ecologically Sustainable Industrial Development. United Nations Industrial Development Organization (UNIDO), Geneva