



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Emergence of Environmental Management System (EMS) Audit

1. Dr. Mallikarjuna Kaddipudi M.Com, M.Phil, Ph.D

Associate Professor, Department of Commerce,
Government First Grade College, Akkialur Dist
Haveri Karnataka

2. Dr. Umesh H. Arahunasi M.Com, M.Phil, Ph.D

Associate Professor, Department of Commerce,
Government First Grade College, Hulkoti,
Gadag, Karnataka

INTRODUCTION: Waste is a continually growing problem at global and regional as well as at local levels. Solid wastes arise from human and animal activities that are normally discarded as useless or unwanted. In other words, solid wastes may be defined as the organic and inorganic waste materials produced by various activities of the society and which have lost their value to the first user. As the result of rapid increase in production and consumption, urban society rejects and generates solid material regularly which leads to considerable increase in the volume of waste generated from several sources such as, domestic wastes, commercial wastes, institutional wastes and industrial wastes of most diverse categories.

Management of solid waste may be defined as that discipline associated with the control of generation, storage, collection, transfer and transport, processing, and disposal of solid wastes in a manner that is in accord with the best principles of public health, economics, engineering, conservation, aesthetics, and other environmental considerations. In its scope, solid waste management includes all administrative, financial, legal, planning, and engineering functions involved in the whole spectrum of solutions to problems of solid wastes thrust upon the community by its inhabitants. Solid wastes have the potential to pollute all the vital components of living environment (i.e., air, land and water) at local and at global levels. The problem is compounded by trends in consumption and production patterns and by continuing urbanization of the world. The problem is more acute in developing nations than in developed nations as the economic growth as well as urbanization is more rapid.

This issue has now received the attention by international and national policy making bodies and citizens. In the international level the awareness regarding waste began in 1992 with the Rio Conference, here waste was made one of the priorities of Agenda 21*. Here specific attention was given to the environmentally sound management of solid wastes. The Johannesburg World Summit on Sustainable development in 2002 focused on initiatives to accelerate the shift to sustainable consumption and

production, and the reduction of resource degradation, pollution, and waste. The priority was given to waste minimization, recycle, and reuse followed by the safe disposal of waste to minimize pollution.

The government of India started encouraging proper management of solid waste as early as 1960's by giving loans for setting composting plants for MSW. The government of India over the years has taken many initiatives and implemented new technologies and methods. With the rapid urbanization, the problem of the MSWM problem has compounded and India is awakening to the magnitude of the problem. Due to increased public awareness of MSWM, Government for the first time now has included private organizations in providing this public service. New methods of storage, collection, transportation, processing and disposal are being implemented. It is necessary to evaluate the current process at this stage to understand if the methods being implemented are suitable for the Indian scenario and to identify the lacuna in the methods being adopted. This can be achieved by carrying out an audit. An audit not only brings out the shortcomings in a system, but also raises awareness on the problems addressed. Audit of a waste management system is a way to reduce problems caused by waste by revealing the shortcomings of the management system, the responsible actors and identifying the actors and the areas that need improvement.

This endeavor aims at evaluating the theoretical aspects of the Indian MSWM scenario and environmental auditing.

Environment and Hazardous Waste: The term municipal solid waste (MSW) is normally assumed to include all of the waste generated in a community, with the exception of waste generated by municipal services, treatment plants, and industrial and agricultural processes. In the urban context the term municipal solid wastes is of special importance. The term refers to all wastes collected and controlled by the municipality and comprises of most diverse categories of wastes. It comprises of wastes from several different sources such as, domestic wastes, commercial wastes, institutional wastes and building materials wastes. The Municipal Solid Waste sources are categories into four groups which are described in *Table - 1*.

Table - 1: Sources of Municipal Solid Waste

Sources	Examples
Residential	Single family homes, duplexes, town houses, apartments
Commercial	Office buildings, shopping malls, warehouses, hotels, airports, restaurants
Institutional	Schools, medical facilities, prisons
Industrial	Packaging of components, office wastes, lunchroom and restroom wastes (but not industrial process wastes)

Source : (Tchobanoglous, G and Kreith, F., 2002)

Municipal Solid waste management involves the application of principle of Integrated Solid Waste Management (ISWM) to municipal waste. ISWM is the application of suitable techniques, technologies and management programs covering all types of solid wastes from all sources to achieve the twin objectives of (a) waste reduction and (b) effective management of waste still produced after waste reduction. In the Municipal Solid Waste Management the major issues to be considered are: Increasing waste quantities, Wastes not reported in the national MSW totals, Lack of clear definition for solid waste management terms

and functions, Lack of quality data, Need for clear roles in state and local government and Need for even and predictable enforcement regulations and standards

Environment and Health Risk: Potential hazards of solid wastes are numerous to the living community when it is improperly managed. Solid wastes have the potential to pollute all the vital components of living environment (i.e., air, land and water). Some of the hazards caused by solid wastes are listed below;

- Uncollected wastes often end up in drains, causing blockages that result in flooding and unsanitary conditions.
- Open and overflowing bins attract stray dogs, which has been a major cause of the spread of rabies.
- Open waste bins also attract stray and domestic cattle. Cattle in the city causes nuisance by blocking the traffic on the roads. Cattle that graze on the waste from bins end up eating the plastic along with the vegetable matter, which proves to be fatal for them. The milk obtained from the cattle that feed on waste can be contaminated and can prove to be unsafe for human health.
- Flies breed in some constituents of solid wastes, and flies are very effective vectors that spread disease.
- Mosquitoes breed in blocked drains and in rainwater that is retained in discarded cans, tire and other objects. Mosquitoes spread disease, including malaria and dengue.
- Rats find shelter and food in waste dumps. Rats consume and spoil food, spread disease, damage electrical cables and other materials and inflict unpleasant bites.
- The open burning of waste causes air pollution; the products of combustion include dioxins that are particularly hazardous.
- Aerosols and dusts can spread fungi and pathogens from uncollected and decomposing wastes.
- Uncollected waste degrades the urban environment, discouraging efforts to keep streets and open spaces in a clean and hygienic condition. Plastic bags are in particular an aesthetic nuisance.
- Waste collection workers face particular occupational hazards, including strains from lifting, injuries from sharp objects and contact with pathogens when manually handling the waste.
- Dangerous items (such as broken glass, razor blades, hypodermic needles and other healthcare wastes, aerosol cans and potentially explosive containers and chemicals from industries) may pose risks of injury or poisoning, particularly to children and people who sort through the waste.
- Heavy refuse collection trucks can cause significant damage to the surfaces of roads that were not designed for such weights.
- Waste items that are reused without being cleaned effectively or sterilized can transmit infection to later users. (Examples are bottles and medical supplies.)
- Polluted water (leachate) flowing from waste dumps and disposal sites can cause serious pollution of water supplies, ponds and lakes. Chemical wastes (especially persistent organics) may be fatal or have serious effects if ingested, inhaled or touched and can cause widespread pollution of water supplies.
- Waste that is treated or disposed of in unsatisfactory ways can cause a severe aesthetic nuisance in terms of smell and appearance.
- Liquids and fumes, escaping from deposits of wastes (perhaps formed as a result of chemical reactions between components in the wastes), can have fatal or other serious effects.

- Methane (one of the main components of landfill gas) is much more effective than carbon dioxide as a greenhouse gas, leading to climate change.
- Fires on disposal sites can cause major air pollution, causing illness and reducing visibility, making disposal sites dangerously unstable, causing explosions of cans, and possibly spreading to adjacent property.
- Former disposal sites provide very poor foundation support for large buildings, so buildings constructed on former sites are prone to collapse.
- Rag pickers working on landfill are prone to many diseases like respiratory infections such as lung impairment.

Environmental Management System Audit: Environmental Auditing can be defined as a management tool comprising a systematic, well documented, periodic and objective evaluation of how well the management systems are performing with the aim of helping to safeguard the environment by Facilitating management control of environmental practices and Assessing compliance with national legislation, which would include regulatory requirements.

Environmental Auditing first began with the principle of 'polluters pay' to prevent liabilities towards the government. The other important reason could be due to the increasing awareness of the public about environmental protection, the companies voluntarily carried out audits of its operations and processes to prove that their products are environmentally friendly. Environmental audit was introduced in India for the minimization of generation of wastes and pollution.

The ISO standard is an example of commercial environmental auditing initiative. ISO stands for the International Standards Organization, located in Geneva, Switzerland. ISO is a non-governmental organization established in 1947. The organization mainly functions to develop voluntary technical standards that aim at making the development, manufacture and supply of goods and services more efficient, safe and clean.

Environmental audits can be carried out for a number of reasons. These include To verify compliance, To review implementation of policies, To identify liabilities, To review management systems, To identify strengths and weaknesses, To assess environmental performance and To promote environmental awareness.

Other types of environmental investigations are frequently conducted with audit like methodologies- such as open inventories and operated oriented investigations, into prevention of waste and pollution. These studies should be defined separately to avoid mistakes. Thus, it is useful to distinguish between three types of audit like:

- **Environmental Reviews:** These involve an unprejudiced investigation of a company's environmental interactions, impacts and performances, with the aim of establishing an environmental protection system, including organizational and technical measures in addition to assessment and auditing procedures.
- **Environmental Audit:** This requires a systematic and objective investigation of a company's environmental activities, management and equipment against a predetermined set of criteria (legislation, standards, company policy and objectives, etc.).

- ***Pollution Prevention Assessments***: These involve a systematic, periodic and internal investigation of a company's process and operations designed to identify and provide information about opportunities to prevent pollution and waste.

Elements of an Environmental Audit: The environmental audit consists of the following elements.

- *Internal Audit* is an audit carried out by the organization to check its own process and progress.
- *External audit* is an audit carried out by one organization of another organization to check its progress.
- *Mandatory Audit* is an audit carried out by an authority to check the compliance of the process with their requirements. For e.g. insurance checks, export, etc.
- *Voluntary Audit* is an audit carried out voluntarily by an organization or an individual of another organization to improve the process and compliance of the process with the laws.

Types of Environmental Audits: An overview of different audit types and their use are given below. It should be noted that the divisions are not very sharp between the various types.

- ❖ **Liabilities Audit** is often conducted as a prelude to gaining insurance cover and as a means of demonstrating the regulatory compliance.
 - ✓ Compliance Audit is the most common form of environmental audit that is carried out, it is a verification process whereby the facility establishes the extent to which it is complying with the environmental legislation, regulations, emission limits, etc.
 - ✓ Operational risk liability audit concentrate on the potential frequency and consequence of environmentally damaging activities in the various functions of the process. Compliance with regulation does not necessarily reduce liability due to operational risks.
 - ✓ Acquisition audits assess the liabilities due to contaminated land and building remediation costs.
 - ✓ Health and safety audits normally form part of Health, safety and Environment (HSE) audit and involve assessment of adequacy of personal protective equipments (safety, shoes,
- ❖ **Management Audit** pays considerable attention to management systems as they are a guide to how effectively and efficiently the operations runs
 - ✓ A corporate audit is initiated by the main Board of a parent company and is concerned with the organisation structure, roles and responsibilities, policy implementation, awareness and communication. It is carried out as a reassurance to the main Board that their aims and objectives are being implemented throughout the corporate structure.
 - ✓ Management systems audit are carried out to check the systems against the policy and standards such as British standard 7750 or ISO 14001.
 - ✓ Policy audit is carried out to review and reassess the relevance of the policy in the light of developments (legal, technical, financial) within the organisation and outside.
 - ✓ Issues audit is carried out to establish environmental management plan and targets.
- ❖ **Activities audit** cover auditing of select technical and management issues.
 - ✓ Environmental site audit examines all aspects of the facilities performance with respect to the environment. It combines most of the elements of other types of environmental assessment and when undertaken in depth involve considerable time and cost.

- ✓ The waste audits are of two types. The first identifies and quantifies waste streams and is a precursor to both waste minimization programmes. The second type assesses waste management practice and procedures.
- ✓ Product audits cover several aspects of their environmental impacts through design, manufacture, use and disposal. Such audits are pre-requisites for identifying environmentally friendly products for “Green labeling”.
- ✓ Cross boundary audits assess activities, which cut across departments or business units. Transport and supply chain are such examples.

The audit is not an evaluation of alternatives that will optimize a course of action to solve operating, engineering, scientific, legal, technical, employee, or public relations problems. The objective of an environmental audit is to reveal whether the system is controlling in a way that will yield expected and understandable results. The audit will succeed if it reveals shortcomings as well as satisfactory conditions and identifies the necessary steps to cure the shortcomings and augment the satisfactory conditions.

Legal Framework Applicable to Waste Management: Legislation concerning waste is usually differentiated according to the type of waste. International conventions often cover nuclear and hazardous waste, whereas non hazardous waste, often called solid waste is usually more regulated at the national level. From an environmental angle there are various rules, regulations and acts would be the most relevant for MSWM. They are: Municipal Solid Waste (Management & Handling) Rules 2000, The Water (Prevention and Control of Pollution) Act, 1974, The Water (Prevention and Control of Pollution) Cess Act, 1977, The Air (Prevention and Control of Pollution) Act, 1981 and The Environmental (Protection) Act, 1986.

AUDIT OF MUNICIPAL WASTE MANAGEMENT: Auditing has become an increasingly popular tool to assess the environmental policies, quality of implementation, compliance with national law and regulation etc. Auditing has also been widely used in India especially in industries. The most popular audits that are carried out in India are energy audits followed by environmental management systems audit where waste minimization audit is an integral part. Audits on Municipal waste Management in India is however are very limited. Developed countries have established an auditing institution and carried out audits on urban waste management with regard to performance, compliance, risk, monitoring, existence of waste policy, quality of implementation etc.

REFERENCE

- ✓ A.Haque, A., Mujtaba, I.M and Bell,J. N. B., 2000. *A simple model for complex waste recycling scenarios in developing economies*. Waste Management 20, Issue 8, 625-63.
- ✓ Agarwal, A., Singhmar, A., Kulshreshtha, M., Mittak, A. K., 2005. Municipal solid waste recycling and associated markets in Delhi, India. Resources, Conservation and Recycling 44, Issue 1, 73-90.
- ✓ Ambulkar, A. R and Shekdar, A. V., 2004. Prospects of biomethanation technology in the Indian context: a pragmatic approach. Resources, Conservation and Recycling 40, Issue 2, 111-128.
- ✓ Association of Plastics Manufacturers in Europe (APME), 1995. Information system on plastic waste management in Western Europe: European overview, data 1997 France: APME Technical and Environmental Centre and SOFRES Counsel.
- ✓ Channakya, H. N., Jagadish.K.S, and Rajabapaiah, P., 2002. Biogas plants: Towards a green and organic future. Rural Technology- A 25 year Perspective, Silver jubilee Proc. Volume 2.
- ✓ Edelmann, W., Schleiss, K and Joss, A., 2000. *Ecological, energetic and economic comparison of anaerobic digestion with different competing technologies to treat biogenic waste*. Water Sci. Technol. 41, 263-273.
- ✓ Eiland, F., Klarner, M., Lind, M and Baath, E., 2001. *Influence of Initial C/N Ratio on Chemical and Microbial Composition during Long Term Composting of Straw*. Microbial Ecology 41, 272-280.
- ✓ Garibay, S. V. and Jyothi, K., 2003. Market Opportunities and Challenges for Indian Organic products. Research Institute for Organic Agriculture and AC Nielson ORG-MARG.
- ✓ Nunan, F., 2000. Urban organic waste markets: responding to change in Hubli–Dharwad, India. Habitat International 24, Issue 3, 347-360.
- ✓ Ostream, K.M., Millrath, K. and Themelis., 2004. Combining Anaerobic Digester and Waste to Energy, 12th North American Waste to Energy Conference (NAWTEC 12), Columbia.