Solid Waste Management Emphasis on Hotel Waste-pedigree

Abhijeet S.Gaikwad[1], Tanuj B.Mapari[2], Dipak N.Meher[3], Pratik V. Sarkate[4], Dr. Ayub Shaikh[5]
[1,2,3,4] *Student, G H Raisoni College of Engineering And Management, Wagholi, Pune*
[5]*Assistant Professor, G H Raisoni College of Engineering Management, Wagholi, Pune*

***Abstract*— Every day, tones of solid waste are disposed at various landfill sites. This waste comes from homes, offices, industries and various other agricultural related activities. These landfill sites produce foul smell if waste is not stored and treated properly. It can pollute the surrounding air and can seriously affect the health of humans, wildlife and our environment. There are major sources of solid waste like Residential, commercial, industrial, institutions etc among these now a day's Hotel industry and restaurant are producing large amount of solid waste.**

Presently there are improper waste management practices in hotel industry. And lack of suitable facilities (equipment and infrastructure) and underestimates of waste generation rates, inadequate management and technical skills, improper collection, and route planning are responsible for poor collection and transportation of municipal solid wastes. The main objective of present study is about the management of hotel waste to create sustainable business along with generating profit from waste. It reveals that proper management of waste can lead to higher profitability for hotel and save environmental pollution

I.INTRODUCTION

Due to globalization, there has been a substantial growth in the tourism industry which leads to increase in the number of guests visiting hotels. As per the report of Ministry of Tourism (Govt. of India, 2012), India received 6,290,319 international tourists and the number is ever increasing. This ultimately leads to increase in the waste generated in hotels. The present trend of convenience consumerism offered by hotels to its guests is generating much more waste than consumed. Considering this fact it is necessary to identify waste generated in hotels.

Only then the efficient way of this alarming issue can be solved and strategies can be developed to overcome this problem. The term waste usually relates to materials produced by human activity, and the process is generally undertaken to reduce their effect on health, the environment or aesthete. Over a period of time, it has been found through research that 50-65 % of the waste generated in the hotels can be recycled. The solid waste generated in hotels could be in the form of organic waste: kitchen waste, vegetables, flower leaves, fruits, toxic waste paints, bulbs, spray cans, pesticide containers, shoe polish;

Recyclable: Paper, glass, metals, plastics and other solid waste such as rags etc . However, waste is not something that should be discarded or disposed It can further be a valuable resource if addressed correctly, through policy and practice. With the help of consistent waste management practices followed by hotels, there is an opportunity to reap a range of benefits like economical, social, environmental, etc it into recyclable form and finally by purchasing the goods made with reused material.

The Central Recycling Canter (CRC) is an area where recyclable materials are stored at the hotel facility until transported to a processor. One of the major benefit of recycling is it prevents useful material from being land filled and thus saves energy and natural resource. The recycling team should involve not only the hotel staff but the hotels guests too. If the hotel takes initiative to inform the guests, they willingly participate in the same. This information can be provided by placing information cards in guest rooms. This informs the guest where to leave their recyclable material.

In the present situation hotel industries are analyzing the need of waste reduction and they are emphasizing to implement various new practices which can cut their waste disposal cost, protect and conserve nature and also increasing loyalty of guests (Georgia Hospitality Environmental Partnership Report, 1996). As the load of the waste increased and put more in

the ground, then landfills produce and release methane gas (CH4) which is a contributor for causing greenhouse effect (Abu-Khader, 2006) and play an important role for global warming and increasing the carbon footprint (Deepak et al., 2017). Landfills also produce leachate (a toxic sludge) which can kill our flora and fauna through water contamination (Georgia Hospitality Environmental Partnership Report, 1996.

The tourist sector has grown significantly as a result of globalization, resulting in an increase in the number of guests visiting hotels. According to the Ministry of Tourism's report (Govt. of India, 2012), India attracted 6,290,319 international tourists in 2012, with the number continuing to rise. As a result, the amount of waste generated in hotels rises. The current tendency of hotel visitors being offered convenience consumerism is generating far more garbage than is being consumed. Given this, it is critical to determine the trash generated by hotels. Only then would it be possible to find an effective solution to this alarming problem and devise measures to address it. The term "waste" usually refers to materials created by human activity, and the procedure is usually carried out to minimize their impact on human health, the environment, or aesthetics. Through research, it has been discovered that 50-65 percent of the garbage generated in hotels may be recycled over time. Organic garbage includes kitchen waste, vegetables, flower leaves, fruits, hazardous waste includes paints, bulbs, spray cans, pesticide containers, and shoe polish; recyclable waste includes paper, glass, metals, plastics, and other solid debris such as rags. Waste, on the other hand, should not be abandoned or disposed of. If properly addressed through policy and practice, it can also be a significant resource. There is a possibility to enjoy a range of benefits, such as economic, social, and environmental, by converting garbage into recyclable form and then purchasing goods created from reused material, with the help of consistent waste management procedures implemented by hotels.

II. AIM AND OBJECTIVES

AIM-To determine the economic cost of food waste, it is first important to determine the causal relationship between Solid wastes and study its impact on human health, tourism, and environmental aesthetics."

OBJECTIVE-

- To list and classify various recyclable wastes generated in hotel guest rooms and restaurants.
- To Identify the source of food waste Generation in hotel and restaurant.
- To reduce wastage of food and quantity of solid waste generation
- Collection of different types of waste in hotel Separately
- To convert the hotel food waste to chicken feed.
- To produce manure and biogas from non-usable biodegradable hotel solid waste

III. LITERATURE REVIEW

Manual on solid waste management", Dr. Sneha Palnitkar, IJCEA

The manual begins with a description of the types, sources and characteristics of municipal solid wastes, as well as quantities and rates of waste generation in India. What follows are operational aspects of key functions of the process of solid waste management – street sweeping, door-to-door collection of waste, storage of wastes, transportation and treatment of wastes. The operational aspects focus on man-power requirements, equipment design, norms to measure performance of workers, and work systems for different types of locations – commercial, residential, high-rise buildings, slums and so on.

Rashmi Shah, U.S. Sharma and Abhay Tiwari, "Sustainable Solid Waste Management in Rural Areas" (2012) IJTAS

Our study shows that about 287gms of residential/agriculture solid waste per capita is generated in these villages every day. We found that street sweeping, grass was cutting, and agricultural waste, cattle dung, drain and public toilet cleaning contribute most to waste generation in these villages. Most common practices of waste processing are uncontrolled dumping which causes mainly water and soil pollution. The qualities of both solid & liquid wastes are increasing and if the wastes are disposed in an uncontrolled manner these may cause adverse impact on public health & environment. Therefore, the solid wastages are still a major

problem in these rural areas. To overcome these problems, we have proposed to implement vermicomposting.

Assessment of industrial Liquid Waste Management in Omdurman industrial Area, ROGHAIA AHMED ALI ELNASRI

The results obtained showed that pollutants produced by all the factories were found to exceed the accepted levels of the industrial pollution control. The effluents disposed of in the sites allotted by municipal authorities have adverse effects on the surrounding environment and public health and amenities.

Solid and Liquid Wastes: Avenues of Collection and Disposal, SuryawanshiP.C. , Jain K.A., Bhardwaj S. , Chaudhari A.B. and Yeole T.Y.

For high moisture and organic nutrients-rich Indian wastes, predictably with high methane potential, anaerobic digestion appears to be most suitable option, providing renewable biogas as a substitute for fossil fuels and organic manure as an equally important by-product for soil enrichment. Admittedly, the existing anaerobic technologies are suited to homogeneous wastes, while the same ones for processing heterogeneous solid urban wastes need to be modified by trial and error in the absence of alternative technologies.

Solid waste issue: Sources, composition, disposal, recycling, and valorization, Hussein I. Abdel-Shafy a, Mona S.M. Mansour

Disposal of solid wastes is a stinging and widespread problem in both urban and rural areas in many developed and developing countries. Municipal solid waste (MSW) collection and disposal is one of the major problems of urban environment in most countries worldwide today. MSW management solutions must be financially sustainable, technically feasible, socially, legally acceptable and environmentally friendly. Solid waste management issue is the biggest challenge to the authorities of both small and large cities'.

Revolution in Rural India through Solid Waste Management, Raj Parmar, Dr Arti Pamnani

This paper studies the present scenario of solid waste management of Near Burujwadi village taluka shirur town which is located in western region of Gujarat state. Near Burujwadi village taluka shirur is a medium scale town with population of 1, 18,302 person. The existing data of solid waste management of the town has been collected. The analysis of this data has been done and identified the lacuna in the solid waste management system of the town. The waste generation rate of the town has been calculated which is 0.338 kg/capita/day.

Latifa Mechkirrou, Food Waste reuse as a feed for organic chicken: A case study, E3S Web of Conferences 234, 00090 (2021)

Food waste is inevitable in the food system and should be caught and recycled rather than dumped as solid waste. Thus, promoting food waste as chicken feed is beneficial. The studies were conducted on an organic chicken farm near Taza, Morocco, to assess the feeding practicality and nutritional value of a poultry Lab Prepared Feed (LPF) made from kitchen food waste. The consumption indices for organic chickens fed exclusively Lab-Prepared Feed were 1.18 and 1.17 for tests 1 and 2, respectively. Lab-Prepared Feed (LPF) looks to be a good substitute for commercial foods, according to the findings of the testing. Dietary waste can be used as a novel poultry feed substitute.

Food waste in animal feed with a focus on use for broilers Linda Truong, International Journal of Recycling of Organic Waste in Agriculture (2019)

Purpose Despite global food output of 3.99 billion tonnes, one in nine people is malnourished. Given the expected nine billion global population by 2050, it is critical to examine the current state of food waste and reuse.

Measuring food waste by weight and percentage across the food supply chain was done through a thorough literature review. Food waste was studied globally, in the US, and in California (USA). Results Food waste (meat, vegetables, fruits, and breads) is huge daily. Previous study suggests that food waste can be successfully utilised in monogastric animal diets. To fulfil the increased need for chicken production, research should be performed to study the partial use of alternative feed ingredients. We recommended using food waste to supplement corn and soy in broiler diets.

Dominik Leverenz, Gerold Hafnen, SaluaMoussawel, Reducing food waste in hotel kitchens based on self-reported data, 2021

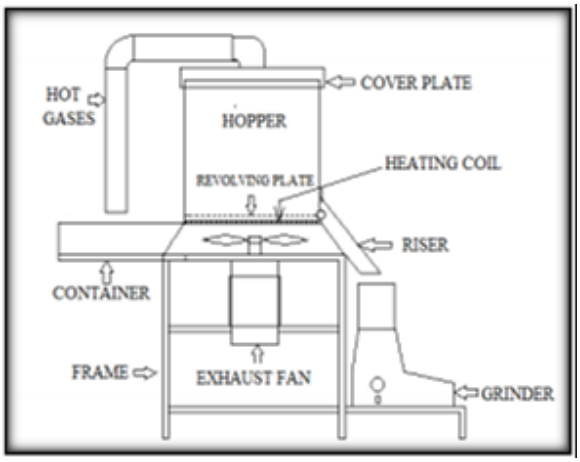
To investigate if self-reporting in hotel kitchens can reduce food waste at the breakfast buffet. The study found that self-reporting interventions cut breakfast buffet leftovers by half. The decreases were tied to

prevention tactics created by each pilot kitchen based on their own data. Simple operational changes like using smaller serving dishes and restocking the breakfast buffet with less freshly prepared food proven to be quite helpful. To strengthen our study's methodology and validate the concept, we can evaluate whether self-reporting interventions reduce food waste at various types of buffets and food services.

IV. DESIGN AND DEVELOPMENT

Fig shows the simple setup for the pedigree making machine. It consists of the furnace made up of MS sheets. There is a lid for the manually feeding of fruit and the vegetable waste. Inside the furnace compartment A Heater coil and Temperature measuring device are installed which is not visible in the figure. Heating coil is used to heat the pulp and the temperature measuring device is used to monitor the temperature inside the furnace. A Exhaust fan is installed near the furnace compartment so as to increase the heat transfer rate by inducing hot air to the furnace. Exhaust Fan is driven by the DC motor. The furnace is followed by the grinder, the household grinder is installed near the furnace. Feeder mechanism is provided is provided to transfer the pulp from furnace to the grinder which operates on the mechanical linkage. To collect the powder form pedigree a collecting vessel is used at the bottom.

This setup implies conversion of wet Fruit and Vegetable pulp into useful pedigree which can be totally utilized by farm cattle. This machine consists of feeding the pulp manually into the furnace. The furnace consists of a heating coil with a blower.



This setup induces hot air into the system with the help of blower. In the furnace, drying process of pulp takes place. Blower increases the rate of heat transfer which in turn decreases the time of reducing the moisture content in the pulp. Monitoring of pulp and temperature inside the furnace can be performed with the help of temperature measuring device and time period for which the pulp is heated. Temperature measuring device is installed inside the furnace.

Further this dried pulp is forwarded to the grinder with the help of feeder mechanism to grinder where it will be almost converted into powder form. Grinding of pulp will be monitored using the optimum time required for converting dry pulp into almost powder state.

SPECIFICATIONS OF COMPONENTS

Sr. No	Component	Specification
1	Heating Coil	750-Watt, AC, 1m length
2	Exhaust Fan	Diameter 160mm, 250CFM
3	Household Grinder	AC 230V, 40Watt
4	DC Motor	12V, AC
5	Rack and Pinion Gear	ID 10MM
6	PVC Pipe	110mm Diameter
7	PVC elbow	110mm Diameter
8	Switch	3/2 Switch

LIMITATION:

- Increasing cost of pedigree day by day.
- Poor knowledge of farmers to provide nutritive pedigree.
- Huge Production of Fruit and Vegetable waste.
- Drawbacks of conventional pedigree processing methods.
- Less availability of fodder in summer season.
- Increasing environmental pollution by barracking.

V. CONCLUSION

1 Waste production from hotel industries is one of the major issues in India because waste is not treated well.

2 Therefore, develop a holistic framework for waste management has important role in the

optimization of each waste material in hotel industry.

3 Most of the wastes in hotels are recyclable or compostable.

4 The study shows that hotels can not only make environmentally friendly contributions, but also make profits out of a proper recycling practice in a long-term.

5 Waste elimination at source and recycling can saves GHG emission to a large extent. Therefore, it can decrease pollution and slow down global warming, which is a major problem mankind is facing nowadays.

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