

P-ISSN: 2706-7483
E-ISSN: 2706-7491
NAAS Rating: 4.5
IJGGE 2025; 7(2): 57-60
www.geojournal.net
Received: 22-12-2024
Accepted: 28-01-2025

Narender Kumar
Ministry of Environment,
Forest and Climate Change,
New Delhi, Delhi, India

Shailja Aggarwal
Ministry of Environment,
Forest and Climate Change,
New Delhi, Delhi, India

Corresponding Author:
Narender Kumar
Ministry of Environment,
Forest and Climate Change,
New Delhi, Delhi, India

Reduction and management of waste in hotel industry

Narender Kumar and Shailja Aggarwal

DOI: <https://www.doi.org/10.22271/27067483.2025.v7.i2a.344>

Abstract

This study aims to review the status of waste management practices in the hospitality industry in India and at the global level. Hotel is the largest consumer of resources and the largest producer of waste materials. Food waste has become a big issue due to improper facilities and support. This review will be helpful for waste management in the hospitality sector and beneficial for economic growth, reducing the ecological footprint and environmental friendly. Total food waste represented around 23% of the financial loss of the full value of the purchased food items. In the USA, the average person generates about 4 pounds of waste per day per person, and it causes a rise in the cost of landfilling. Nowadays, food waste has become a well-known subject in national and international policies and academic debates because of its harmful economic, social, and environmental impacts. Using the 7Rs technique, food waste production and management goals were achieved. Hospitality industries have to mandate environment-friendly practices like water conservation and saving energy, and these can be helpful in waste reduction and recycling. In many countries, many hospitality industries are environment friendly.

Keywords: Hospitality, waste, environment-friendly, sustainable

Introduction

India is the world's third largest producer of municipal solid waste and produces 1.50 lakh metric tonnes of waste per day. NEERI has conducted a study on amount of waste generation in different cities and it has found that amount of total waste generation varies from 0.2 to 0.4 kg per capita per day in the urban areas and it goes upto 0.5 kg per capita per day in metropolitan cities. Due to increase in population and urbanization demand of hospitality industry is increasing day by day. Increasing the number of hotels and restaurants causes waste generation. Hotel is the largest consumer of resource and also largest producer of waste materials. Out of total human consumption around one third of food material is lost and waste, which is around 1.3 billion tons per year. In USA the average person generates around 4 pound of waste per day per person and it causes rise in cost of landfilling. The price to dispose waste in 2017 was increased 3.5% from 2016 which was \$ 50.60 per ton (Mohan *et al.*, 2017) ^[5]. Food loss in hospitality industry generally occurs at production, preparation, processing, distribution and storage. Food waste generates from different departments of hotels like food and beverage production department, F&B service department, front office, store, finance department, laundry (housekeeping department) and hotel gardens are also a bigger source of waste production. Indian tourism and hospitality industry is growing services sector in Indian services. It is 3rd biggest subset of the service sectors. Hotel and restaurant services contributed around US\$ 187.9 billion or 12.5 percent to total Gross Domestic Product in the period of 2014-15, while growing the fastest at 11.7 percent Compound Annual Growth Rate over the period 2011-12 to 2014-15 (Omidiani *et al.*, 2016) ^[6]. India's GDP is expected to increase by US\$ 136.3 billion in 2015 to US\$ 275.2 billion in 2025 from travel and tourism sector. Tourism industry is third largest foreign exchange earner for India. In 2014, the country managed foreign exchange earnings of USD 19.7 billion from tourism.

Increase in hotel and tourism sector causing increase in waste production which causes different kind of health or environmental effect and also cause climate change and global warming. The way of waste handled, stored, collected and disposed can leads to different kinds of hazards to ecosystem. An approach of Integrated Solid Waste Management can help and guide about generation of wastes, recycling and disposal of waste. A study in Bali and found that participating in food waste management practices provides economic benefit to hospitality industry and also improves reputation of hotels. Fig 1 depicts the generation of waste from hotel industry.

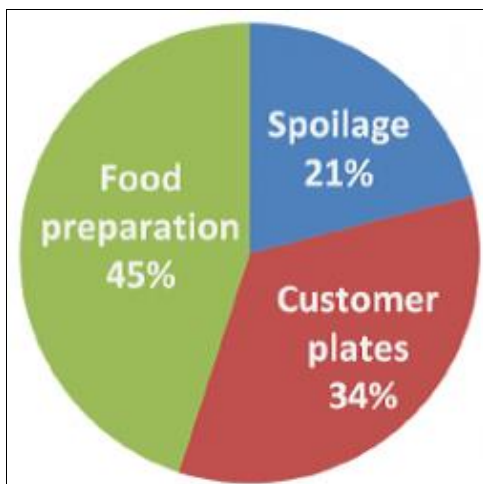


Fig 1: Food waste generation sources

In many studies it was shown that environmental friendly places attract more tourism and tourist like to purchase eco-friendly product at high cost also. Many hospitality industries are participating in environmental sound policies and waste management policies which are ecofriendly. These kinds of policies provide positive responses and benefits from customers and also built good image in business. Hospitality industries have to mandated environment friendly practices like water conservation and save energy and these can be helpful in waste reduction and recycling. In many countries many hospitality industries are environmental friendly (Papargyropoulou *et al.*, 2019) [7]. Tourism is a type of activity which is destroying our environmental at a faster rate because of improper management and it's totally dependent on environment, but if tourism practices managed properly then it will enhance environment. Now due to increasing awareness by government, nongovernmental organization and locals the tourism and travel sector become aware of its negative effect on environmental and wildlife and also aware of environment sustainability (Yadav *et al.*, 2024) [9]. Environment friendly practices and greenery in tourism sector increase tourist attraction and increase economy also. Some hospitality industries have mandate environment friendly program and green hotel practices like save water, save energy, other resources for sustainable management.

These practices help in waste reduction and recycling of materials. Marataba Trails Lodge (South Africa), Hoshinoya Karuizaa (Japan) etc are few examples of green hotels. Coconut Lagoon (Kerala Backwaters), Knha Earth Lodge (M.P), the Tamara Coorg (Karnataka) etc are few examples of green hotels in India. These ecofriendly hotels waste management practices provide benefits like improving business image, reduce carbon footprint, reduce waste transport cost, reduce labor cost and provide health benefit also (Yadav *et al.*, 2023) [8].

The main source of waste generation is hotel industry now these day, hotel produces waste from kitchen, guest room, laundry and from other kind of courses. According to EPA, US generates 246 million tons of municipal solid waste in 2005, which includes 11.9% food waste. Food waste include waste from vegetables and other food material left from cooking, serving and preparation of food material and it also includes animal residue left like chicken piece in preparation practice it includes both wet and dry waste (Alsuwaidi *et al.*, 2022) [1]. Resource Conservation and Recovery Act delineates to categories of waste hazardous and non-hazardous waste. Non hazardous waste includes household waste, cardboard, paper, plastic, metals, cloths wood and organic waste. Sources of waste in hospitality industry includes bars, kitchen, guest room, restaurant, administrative, reception and bathroom.

Type of waste materials and their composition

A study eight hotels of New Delhi, Noida, Gaziabad and Gurugram in 2013 and different kind of food waste was found as wet food waste is 61.2%, glass 14.8%, 6% newspaper, plastic bottles 1.5%, other mixed kind of waste 1.5%, cardboard 13.7% laminated paper 0.5%, 0.47% aluminum, mixed paper 0.7% and 0.2% trash. A study at Pennsylvania includes these wastes like 47% Compost, Plastic bottle 10%, Other plastic material 2%, 13% Trash, 7% Newspaper, 3% Terracycle, 6% Glass, 5% Aluminium, 2% is card board, 6% mixed paper in hotel with Food & Beverage services and without F&B services 17% Plastic bottle, 19% Compost, 12% Trash, 6% Other plastic, 5% Tetracycle, 12% Aluminium, 5% Mixed office, 6% Cardboard, 14% Glass, 3% Newspaper (Fig. 2) (Mohan *et al.*, 2017) [5].

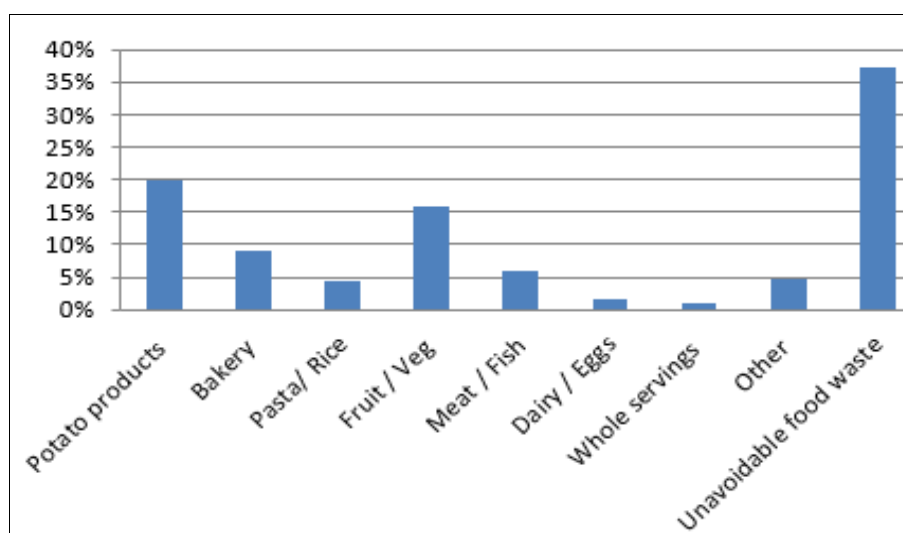


Fig 2: Food waste in hotels by their types

Management of waste in hospitality industry

Production of different kinds of waste in hotel is a key concern. On average a guest produces one kilogram of waste per day and annually produces tonnes of waste. Recycling, reusing and composting of waste are not typically followed by hotels because it is considered as expensive and time consuming like it require labors, resources and energy also. For better waste management we can adopt 7Rs as reuse, reduce, recycle, refuse, rot, repair and restore. According to Integrated Solid waste Management, waste production is reduced by following source reduction which includes reduce in toxicity, less packaging material, product use again and again, high quality product with more lifecycle, on site mulching and composting; recycling includes collecting, segregating, processing, using recycled or recyclable product or eco labeled products and then composting; disposal includes combustion practice with or without energy recovery and then landfilling (Amicarelli *et al.*, 2022; Yadav *et al.*, 2024) [2, 9]. According to Cummings (1997) [3] in hospitality industry customer play important role for waste management practices like in recycling practices and in waste reducing practices. This all is possible by encouraging customers by hotel staff to use dustbin according to their specification in room as well as outside areas in hotels like balcony, corridors, banquet etc. According to Hayward customer behavior is changing towards the environment friendly practices. In many hotels it was found that high

participation of customer for waste recycling and reducing programmers' in hospitality industries.

Methane gas is generated when food material rots, methane gas have 21 times more global warming potential than CO₂. If we consider food waste material as a country it will become world's third largest emitter of Carbon Dioxide (Diaz-Farina *et al.*, 2023) [4].

Needs of waste management in hotels

Waste management is a programme which helps in reducing the waste generation and improves utilization of resources, material, energy, water and other resources. According to International Tourism Partnership Report 2008, a guest generate 1 kilogram of waste per day which means tonnes of waste per year and it requires a lot of money in many ways like purchasing packing materials and their disposal of those materials. Around 30% of the waste is reused, recycle and recovered in nature. Therefore it requires managing waste properly and save environment and natural resources.

Process used for food waste reduction

1. First step is to measure the total food waste material
2. Then develop a proper action plan for decrease food waste by data collected, with proper targets, in limited time frame and with responsibilities
3. Review the progress in every week and each month
4. Share work progress with staff members, consumers and industry.

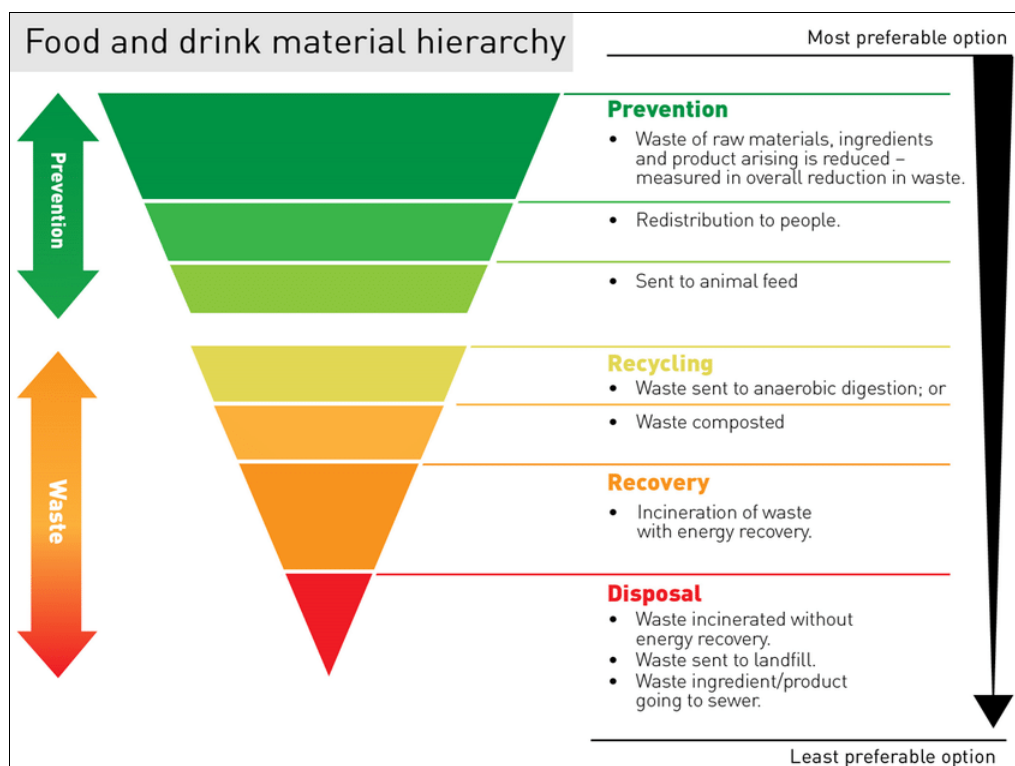


Fig 3: Food and drinking material hierarchy

Different ways to manage the hospitality waste

Firstly, purchase those items for hospitality industry which are environment friendly like Ecogreen product which includes those products which have long life, made up of green material and produce less waste material at the end of life (Fig. 3). Waste produce in hotels is put in different bins according to directions. Reuse again and again those items which are reusable like polybags, plastic bottle and other

instruments. Then collect waste from hotels then transfer to collection station and segregate waste according to their quality for material recovery by different ways like screening, shredder then aluminum separation by eddy-current separator and ferrous metals by magnetic belt. The material is recycled is like carbon trading scheme established in Kyoto protocol that would give rise to carbon saving practices and reducing carbon footprints.

Table 1: Type of waste from hospitality industry and their reduction methods

Sr. No.	Designation	Waste Reduced
1	PETE	Combustion
2	HDPE	Recycle
3	PVC	Combustion
4	LDPE	Recycle
5	PP	Recycle
6	PS	Recycle
7	Metals	Recycle
8	Paper	Recycle
9	Aluminum	Recycle
10	Steel cans	Recycle
11	Plant and vegetables	Recycle
12	Paper and cardboard	Recycle
13	Glass	Recycle

Source: Omidiani *et al.*, 2016^[6]

After recycle or recovery of material another method adopted for waste reduction is composting (Table-1). Composting is a process in which organic waste is degraded by aerobic microorganism under controlled condition and a byproduct produced which is used as mulch or organic fertilizer. In our hospitality industry we collect yard trimming, food waste and other kinds of waste and then properly manage and collect in pifles for composting by windows method by providing proper temperature, pH and moisture to microbes for waste degradation and after degradation the mulch is used as soil conditioner and a nutrient for plants grown in hotel areas. Biological reactor vessels also used for complex use. And vermi composting is also a method of biodegradation by the use of worm species *Eisenia fetida*, *Eudeilus eugeniae* etc.

The most commonly used method for waste disposal is landfilling. Municipal solid waste in landfill undergoes physical, chemical, biological process and generate by product as leachate. Leachate is thick brown liquid and Leachate is produced by the biological degradation by microbes and by addition of water through rainfall. Composition of leachate depend upto its materials mainly it consists of inorganic material, dissolved organic material, heavy metals and xenobiotic organic compounds. Leachate is very hazardous material released from dumpsite. If not managed properly it will degrade groundwater quality, cause health effects and damage the environment or causes global warming and climate change.

Conclusion

The present article is based on literature review for waste management in hospitality industry. The hotel requires proper management of waste in hotel and also aware staff for management of aste. If hotel have proper management of waste and hotel is environment friendly then the guest corporate with staff for environment friendly practices. The green hotel practices also help in economic growth of hospitality industry. Recycling and waste reduction techniques are commonly used and these techniques are environment friendly which help in reduce global warming. Use of resources in better ways and reduce the use of resources in hospitality industry leads to sustainable development.

References

1. Alsuwaidi M, Eid R, Agag G. Tackling the complexity

of guests' food waste reduction behaviour in the hospitality industry. *Tour Manag Perspect*. 2022;42:100963.

- Amicarelli V, Aluculesei AC, Lagioia G, Pamfilie R, Bux C. How to manage and minimize food waste in the hotel industry: An exploratory research. *Int J Cult Tour Hosp Res*. 2022;16(1):152-67.
- Cummings LE. Waste minimisation supporting urban tourism sustainability: A mega-resort case study. *J Sustain Tour*. 1997;5(2):93-108.
- Diaz-Farina E, Díaz-Hernández JJ, Padrón-Fumero N. Analysis of hospitality waste generation: Impacts of services and mitigation strategies. *Ann Tour Res Empir Insights*. 2023;4(1):100083.
- Mohan V, Deepak B, Mona S. Reduction and Management of Waste in Hotel Industries. *Int J Eng Res Appl*. 2017;7:34-37.
- Omidiani A, Hashemi Hezaveh S. Waste management in hotel industry in India: A review. *Int J Sci Res Publ*. 2016;6(9):670-680.
- Papargyropoulou E, Steinberger JK, Wright N, Lozano R, Padfield R, Ujang Z, *et al*. Patterns and Causes of Food Waste in the Hospitality and Food Service Sector: Food Waste Prevention Insights from Malaysia. *Sustainability*. 2019;11(21):6016.
- Yadav S, Bajar S, Hemraj, Rohilla R, Chhikara SK, Dhankhar R. Assessment of groundwater quality near municipal solid waste landfill by using multivariate statistical technique and GIS: A case study of Bandhwari (Gurugram) landfill site, Haryana, India. *Sustain Water Resour Manag*. 2023;9(6):174.
- Yadav S, Rohilla R, Chhikara SK. Review on Landfill Leachate Treatment: Focus on the Applicability of Adsorbents. *Proc Natl Acad Sci India Sect B Biol Sci*. 2024;14:1-9.