

**Abstract:-**

Food waste is a growing area of concern with many costs to our community in terms of waste collection, disposal and greenhouse gas production. The food waste can comprise 30 to 70 per cent of the total waste generated by food service businesses and institutions such as restaurants, cafeterias and grocery stores. A study was conducted in thirty restaurants of Haryana and Delhi between September and November 2013 with an objective to explore the existing food waste management practices being followed by them. A well structured questionnaire was administered personally to 210 employees (seven employees of each restaurant) working in these organizations at different levels. Data from questionnaires was statistically analyzed. Findings show that none of the restaurants surveyed practice waste segregation before disposal. Out of the total 36.6 per cent respondents confirmed that they had a waste reduction program as against 63.4 per cent who reported none. The number of respondents who reported not having a waste management team was 171 as compared to 39 who have one in their restaurant. Majority of the respondents (85.7%)



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## FOOD WASTE MANAGEMENT PRACTICES IN SELECTED RESTAURANTS OF HARYANA AND DELHI

narrated that their restaurants had no effective recycling program for items such as glass, paper, plastic etc. while only 14.3 per cent responded otherwise. Seven studied restaurants burn most of the waste in open area, nine used dumping and fourteen exercised waste collection by the local municipality. The waste disposal activity was not documented by any of the selected restaurants. There is a crucial and urgent need for restaurants to go "Green" by reducing food waste generation; ensuring proper waste disposal practices while providing quality services.

**Keywords:**

Restaurant, Food Waste, Management, Disposal.

## INTRODUCTION

Food waste is a growing area of concern with many costs to our community in terms of waste collection, disposal and greenhouse gas production. According to the U.S. Department of Agriculture (USDA), more than one-fourth of the food produced in the United States spoils, is tossed out or goes uneaten on the plate. The USDA estimated that food lost in retail stores, restaurants and private homes in 1999 amounted to more than 100 billion pounds. Food waste can comprise 30 to 70 percent of the total waste generated by food service businesses and institutions such as restaurants, cafeterias and grocery stores (Goblin, 2000). Large number of visitors and guests visit the restaurants for outing or business purposes and plate waste is generated by them.

Food service businesses throw food away because of over preparation, expanded menu choices, plate waste and fluctuations in food sales beyond the control of food service operators such as sudden weather changes. The USDA estimates that if just five percent of food losses were recovered (instead of discarded as solid waste), it would provide one day's food for 4 million people and save 50 million dollars a year. (Sherman,1998).

Whenever a restaurant is situated in a busy city centre or in a remote and pristine beach resort, there are a number of environmental and social issues to contend with, not least of them being how to deal with the waste created by daily operations. A large fraction of solid waste is not collected at all because these organisations lack adequate capacity to transport their waste and sanitary landfills to dispose off the waste. These solid wastes could be in the form of organic waste: kitchen waste, vegetables, flower leaves, fruits, toxic waste paints, bulbs, spray cans, pesticide containers; recyclable: paper, glass, metals, plastics and solid waste such as rags etc. (Florida Department of Environmental Protection U.S.A. 2008). Food waste poses significant risks on food safety and security. The link is rarely acknowledged because food is often regarded as a disposable commodity in developed countries. Consequently, the long-term effects of food production become neglected. Policies often favour economic growth in the food industry, rather than emphasize environmental protection and nutrition promotion (Lin et. al., 2009). Inappropriately managed food waste also threatens human health through the generation and proliferation of pathogens and disease causing vectors resulting in malaria, dysentery, dengue typhoid, cholera and leptospirosis (Sustainable Development and Regional Planning Division 2007). Handling hazardous and dangerous substances can also lead to injury or illness if people come in contact with them or do not use them properly. Cleaning and disinfecting often demand the use of hazardous substances. Handling food and biological waste, often combined with damp work is risky and can lead to allergic reactions and skin diseases such as dermatitis. Employees are also exposed to cooking fumes and second-hand smoke (European Agency for Safety and Health at Work 2008). Over the past 30 years, the generation of solid waste has shown a significant increase in per capita waste generation. There has also been a change in the composition of waste with more non-biodegradable and hazardous waste which are detrimental to human and environmental health. In general the changing socioeconomic and demographic variables have been influencing both the type and quantity of waste being produced by the restaurants. Keeping these points in mind, this study has examined the current waste generation and management practices in restaurants of Haryana and Delhi.

## OBJECTIVES:

### The objectives of the study were:

- to explore the existing food waste management practices being followed by the selected restaurants
- to examine strategies of preventing the generation of food waste
- to make suggestions for achieving sustainable approach to resource use and a reduction in the quantity of waste

## METHODOLOGY

A descriptive observational study was conducted in conveniently selected thirty (30) restaurants of Haryana and Delhi between September and November 2013 with an objective to explore the existing food waste management practices being followed by them. A well structured questionnaire was administered personally to Restaurant manager, chef, two Asstt. Cooks, two service personnel (waiter) and a sweeper of each restaurant to obtain information regarding current waste disposal and management practices. The physical observation of the composition of the waste generated and the vicinity of the temporary dumpsite in each restaurant was done using an observation checklist. The data collected was statistically analyzed.

## RESULTS

The nature of wastes produced in restaurants of Haryana and Delhi is exhibited in Table 1.

**Table 1: Nature of Waste Generated by Restaurants**

Type of Waste	Food Waste			Other Waste		
	Leftover cooked food n (%)	Plate Waste n (%)	Peels, leaves, skins, trimmings, rotten fruits and vegetables n (%)	Clothing, paper, cardboard n (%)	Plastics, glass bottles, cans n (%)	Polythene bags, Milk sachets n (%)
= 10 %	24(80.0)	23(76.7)			3 (10.0)	26(86.7)
11 - 20 %	6(20.0)	7(23.4)		23(76.7)	10 (33.3)	4(13.3)
21 - 30 %			4(13.3)	7(23.4)	17 (56.6)	
31 - 40 %			6 (20.0)			
41 - 50 %			20 (66.7)			
51 - 60 %						

Out of the total selected 30 restaurants, a majority 20 (66.7%) reported that the major component of waste generated in their restaurants which accounts to more than forty per cent is peels, leaves, skins, trimmings, rotten fruits and vegetables followed by 6(20.0%) which accounted for the same component to be in the range of 31–40 per cent and only 4(13.3%) where this component is ranked between 21–30 per cent of the total waste. Regarding the leftover cooked food and plate waste eighty per cent and approx seventy seven per cent restaurants claimed these types of wastes to be less than 10 per cent. Likewise, 23 (76.7 %) restaurants responded that clothing, paper, cans and cardboard account between 11–20 per cent while remaining 7 (23.4%) reported them to be in the scale of 21- 30 per cent. Seventeen units reported that plastics, glass bottles and cans consist of 21–30% of the total waste while ten restaurants claimed it to be between 11–20 %. The polythene bags and milk sachets constituted less than 10 per cent as revealed by personnel of 26 (86.7%) selected restaurants.

**Table 2 : Waste Management Practices being Followed in the Restaurants**

S.No.	Variable	Response	No. of Respondents (n=210)	Percentage (%)
1	Waste segregation	Yes	0	0
		No	210	100
2	Knowledge of strategies for solid waste reduction	Yes	80	38.1
		No	130	61.9
3	Existence of any waste reduction program	Yes	77	36.6
		No	133	63.4
4	Existence of waste management team	Yes	39	18.6
		No	171	81.4
5	Provision of any effective recycling program for items such as glass, paper, plastic etc.	Yes	30	14.3
		No	180	85.7
6	Orientation program on solid waste reduction in the restaurant	Yes	28	13.4
		No	182	86.6

Documented in Table 2 are the waste management practices in the selected restaurants. Findings show that none of the restaurants surveyed practice waste segregation in kitchen, dish washing area or any other part of the restaurant before disposal. Out of the total 36.6 per cent respondents confirmed that they had a waste reduction program as against 63.4 per cent who reported none. The number of respondents who reported not having a waste management team was 171 as compared to 39 who have one in their restaurant. Majority of the respondents (85.7%) narrated that their restaurants had no effective recycling program for items such as glass, paper, plastic etc. while only 14.3 per cent responded otherwise.

**Table 3: Waste Disposal Methods Adopted by Restaurants**

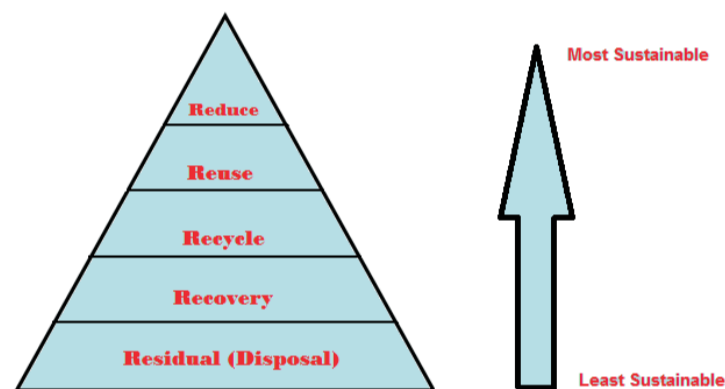
S.No.	Variable	No. of Restaurants (n=30)	Percentage (%)
1	Burning in open area	7	23.3
2	Dumping	9	30.0
3	Regular collection by local municipality/MCD	14	46.7

Seven studied restaurants burn most of the waste in open area, nine used dumping and fourteen exercised waste collection by the local municipality. The waste disposal activity was not documented by any of the selected restaurants. (Table 3).

**DISCUSSION AND CONCLUSION**

Food waste has become a matter of concern for restaurant industry. When the rotting food ends up in landfill it turns into methane, a greenhouse gas that is particularly damaging to the environment. The composition of waste generated by restaurants in the study area included left over foods, peels, leaves, skins, trimmings, fruits, vegetables, bottles, plastics, clothing, paper, cans etc. The restaurants also often generate large quantities of solid waste in the form of packaging materials, kitchen and garden waste, old furniture, discarded equipment and potentially hazardous waste such as asbestos and solvents. Findings from this study show that none of the restaurant surveyed practice waste segregation before disposal. Source separation is not very popular in developing countries because people view the handling of waste as being “below an accepted level of social dignity” (Habitat, 1994). Segregation of recyclable waste at source is thus not seriously done by households and establishments which throw such waste on the streets/ drains or in the municipal bins unsegregated. At least 15 per cent of the total waste can conveniently be segregated at source for recycling. Part of this waste is picked up by rag-pickers in a soiled condition and sold to middle men at a low price who in turn pass on the material to the recycling industry at a higher price after cleaning or segregation and the waste that remains uncollected finds its way to the dumping grounds (The Indian Centre of Plastics in the Environment, 2007). The current study reveals that improper waste disposal methods such as burning in open area and dumping are still undertaken by some of the selected restaurants which in turn are greatly responsible for degradation of the environment. Burning hazardous waste leads to the release of three types of pollutants into our environment: heavy metals, unburned toxic chemicals and new pollutants. Leachate from the waste can contaminate soil, surface water and groundwater. Majority of the employees reported that neither waste reduction nor any effective waste recycling program is being followed by their respective organisations.

It is strongly suggested that a 5R Waste Management Model shown below in fig. 1 be followed by each restaurant to obtain zero waste in five easy steps. Few forward-thinking restaurants and chains are using 3R model for waste management. The waste hierarchy has taken many forms over the past decade, but the basic concept has remained the cornerstone of most waste management strategies. The aim of the waste hierarchy is to extract the maximum practical benefits from materials and to generate the minimum amount of waste.



Waste reduction, reuse, recycling, recovery and residual management (the 5Rs) should be promoted as a way of reducing disposal costs, reducing the burden on landfills and reducing environmental impacts. The environmental benefits of the 5Rs would include: contributing to targets for diverting organic waste from landfill, reduction of environmental impacts associated with landfill (toxicity in leachate and methane production), improved recycling rates, reduced waste disposal costs, reduced nuisance from rats, vermin and flies attracted to food left in residual waste (Friends of the Earth, 2007). There is a need for restaurants to go “Green” by the efficient use of energy; reducing solid waste generation; ensuring proper waste disposal practices while providing quality services. This can be achieved by staff training, education, awareness and proper implementation of solid waste reduction strategies.

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