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Food Waste Management In Restaurants

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Abstract:
The paper delves into the pervasive issue of food waste, with a specific focus on Bangalore, India. Examining the practices of restaurants across various parameters.The study highlights innovative approaches adopted by some establishments and concludes by proposing strategies for effective food waste management.
Background*:*
Food waste is a global problem that poses significant environmental, social, and economic concerns.The persistence of global hunger and the staggering amount of food wastage remain major hurdles in achieving the sustainable development goal 2 set by the United nations.
Approximately one-third of the world's food production is wasted with India, as the second-largest producer of staples globally, standing out for its substantial role in food wastage.
Materials and Methods*: Managers, owners, or other qualified personnel of 74 restaurants in Bangalore, India, were interviewed to gain an understanding of food wastage levels and management.*
Key Word*: Food wastage; world hunger; SDGs; India; Bengaluru*

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I. Introduction

The UN considers "Food" to be one of the biggest problems facing the world [1]. From global hunger to food wastage, the issue continues to persist despite great efforts. SDG 2 of the sustainable development goals set by the UN states the need to end hunger, achieve food security and improved nutrition, and promote sustainable agriculture. It continues in SDG 12.3 which aims to halve global food wastage by 2030 [2]. Unfortunately, the world is not on track to achieve these goals [3].

A third of all food produced in the world (approximately 1.3 billion tonnes) is lost or wasted every single year, worth about 1 trillion dollars [4]. When food is discarded, all inputs used in the production, transportation, preparation, and storage are also wasted. This waste has drastic effects on the climate. The resources needed to produce the food that gets lost/wasted amounts have a carbon footprint of about 3.3 billion tons of CO2 [5]. It continues to emit methane, a greenhouse gas more potent than CO2 after being put in landfills, further exacerbating the problems of climate change.

Still, however, the biggest issue with food waste is the paradoxical nature of how so much food is wasted despite so many people going to bed hungry at night. All the food produced but never eaten would be sufficient to feed two billion people, which is more than twice the number of undernourished people across the globe [4]. But nowhere is it more apparent than with India.

India is the second largest producer of wheat, rice and vegetables in the world [4] and among the top producers of livestock products, but also one of its biggest contributors to its wastage. India makes up 7% of all food wasted in the world [7]. This is made worse with the fact that India ranks 107th out of 121 countries on the global hunger index (8). Its score has worsened since 2014..

At 19.3 percent, India has the highest proportion of children under 5 years with lower weight for their height, in the world. 16.3% of the population is undernourished with one in every three children being stunted [8]. A structural problem exists in the system as India is one of the biggest producers of critical staples and yet has a population that is nutrition derived. Food wastage exists on all levels from production and transportation to consumption.

II. Purpose

A case study in the city of Bangalore, Karnataka, the third biggest city in India. The purpose of the paper is to investigate a major source to which this wastage could be attributed: restaurants, compare data from previous studies, and examine solutions. It also looks at other potential waste generated as plastic packaging. Through interviews, the paper explores strategies employed by restaurants to reduce waste and suggests other fixes. At the

end of the research, several restaurants were reached out to once more, to relay innovative solutions and ideas in use by others which could be implemented.

III. Material And Methods

Study Design: ???

Study Location: Restaurants in a radius of 15 km were looked at. Locales included Koramangala, Sarjapur, Marathalli, Whitefield, MG Road, HSR, Devarabisanhall, Electronic City, Indiranagar and Jayanagar.

Sample size: 74 restaurants.

Sampling: Restaurants were classified based on four categories:
a) Location: Restaurants in a radius of 15 km were looked at. Locales included Koramangala, Sarjapur, Marathalli, Whitefield, MG Road, HSR, Devarabisanhall, Electronic City, Indiranagar and Jayanagar.
b) Price range: The cost of a meal for two people was taken from websites like Swiggy, Zomato, and Dineout, then placed into one of five ranges: 0-249, 250-749, 750-1249, 1250-1999, and 2000 or above. The unit used was rupees. Shown below is the distribution of price ranges
c) Cuisine: The cuisine or type of restaurants looked at were North Indian, South Indian, Italian, Chinese, Japanese, Pan Asian, middle-eastern, pizzerias, cafes, breweries/bars, ice-cream parlours, 5-star, and buffets. If a restaurant had both a buffet section and ala-carte section, they were split up and data was collected separately, counted as two different restaurants.
d) Chain or Independent restaurants: Both chain/franchise restaurants and independent restaurants were considered.
The study aimed to cover all categories to gain a representative sample. A total of 100 restaurants were shortlisted, and 74 responded. The remaining either declined or were unavailable to take the interview.

Data collection:
Primary data was collected over a period of 8 weeks between the months of February and April.

A semi-structured interview format was used, with a range of topics to be covered but room for follow up questions was allowed. Only restaurant managers, owners, or those with knowledge of the entire process were interviewed to ensure accurate data collection. Formal and informal discussions were held with employees based on availability. The names/identity of restaurants were anonymised to maintain privacy and encourage honest answers.

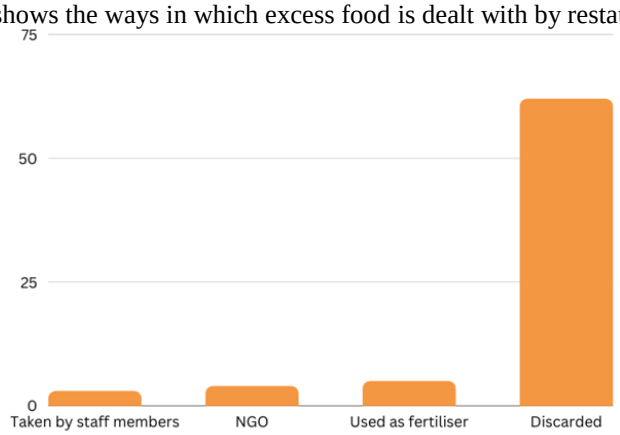
Points to be covered in interviews:
- Leftover food disposal
- Type of food most commonly left over
- Quantity of food left over
- Packaging method of online orders and takeaways
- Proportion of online orders to in-store orders
- Expired inventory disposal
- Quantity of inventory that goes unused/expired
- Type of inventory that most often goes unused/expired
- Storage facilities
- Quantity of waste produced at the preparatory stage (vegetable peels, incorrectly cooked food etc)
- Margin of additional food preparations made
- Acceptance of food returns and handling (discarded or modified and sent back etc)
- Tie-ups with food banks, NGOs, etc
- (For franchises) central policies on how to deal with food waste
- Innovative methods of dealing with wastage
- Future plans to deal with wastage
- Inventory restock schedule

Limitations:
- A new type of delivery-only restaurant, also called “cloud kitchens” were not included in the study.
- Results may not apply to the entirety of India as results were only gathered in one city, where development is significantly greater than other parts of the country. Restaurants may have access to better storage facilities and IT equipment than other rural areas.
- Data was only collected over 8 weeks, which may not reflect behaviour over the entire year.

IV. Results

- Out of the 74 restaurants that data was collected from, 70.3% of them were chain restaurants.
- Of the chain restaurants, 58.3% had specific company policy on what is needed to be done with leftover food.

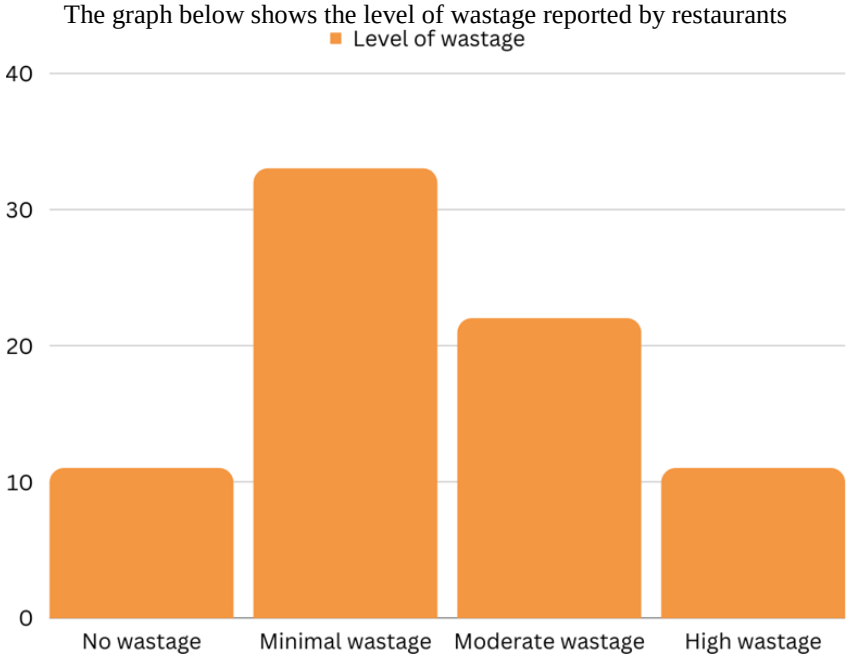
The graph below shows the ways in which excess food is dealt with by restaurants



49/72 restaurants that discarded their excess food were chain restaurants

All 5 of the restaurrants that used excess food as fertilisers were independent restaurants

The graph below shows the level of wastage reported by restaurants



- Restaurants with lower number of online orders were more likely to have plastic packaging
- Food was only occasionally returned in 9 out of the 74 restaurants in the study
- 67 out of the 74 restaurants in the study had used eco friendly methods of packaging
- Out of the 7 restaurants that had used plastic for packaging, 5 of them belonged to the < ₹250 category
- Of all restaurants asked, only three had a tie up with food banks/NGOs to give away the leftovers. Several managers expressed the sentiment of wanting to give away food to the poor/needy but were hesitant to do so in fear of consequences from food making people sick .
- Chain restaurants had mixed policies on disposal of leftovers/waste with 64% of franchises had no specific policy and disposal was left up to the manager.
- Only 7 restaurants out of the 74 restaurants in the study use plastic for delivery purposes out of which 5 belong to the <₹249 category.
- Planning is done with chefs and other executives to decide how much food to prepare. Some restaurants have a goal to keep wastage to under 0.5%.

- .A la carte has minimal wastage with close to 0 takeaways in fast food places.
- .If extra food was prepared it was mostly between 5%-10%
- Around 25% of the restaurants get their vegetables on a daily basis or once every 2 days from local vendors
- Inventory wastage is lower in places which don't highly depend on cold storage/ have no cold storage as excess inventory isn't bought

V. Food banks

Food banks are organisations that collect food donations from various sources and redistribute this to those experiencing food insecurity. The USDA defines food insecurity as a lack of consistent access to enough food for every person in a household to live an active, healthy life [9]. Across urban settings, the prevalence of food insecurity has been found to range from 51 to 77%, yet over 70% of India's population resides rurally, where data concerning food insecurity is limited [10] . Owing to large amounts of wastage and the rising number of people who suffer from food insecurities, volunteers and food banks have taken a more active role in solving this issue. With 90% of the food banks and volunteers contacted saying that they started their operations in the past five years, there is a clear indication that awareness about India's hunger problem has increased.

A dedicated social worker in Bengaluru, RB Shivakumar, was interviewed for further insight into this situation. He emphasised that events like weddings waste over 30% of their food. Shivakumar, operating alone, collects surplus food from weddings and other social events to provide for those in need. He stated that the excess food he collects can sustain 7,000 to 8,000 people every day.

However, during the primary research phase, it was discovered that restaurant managers faced obstacles when attempting to donate excess food due to concerns about potential legal challenges. Suppose the donated food had been left out too long or was improperly handled and left consumers ill. It would pose significant problems if charges were pressed (as they have been in several cases before, particularly in one where a "public fridge" was built)[15]. Although many restaurants have surplus/excess food, the managers believe that the excess is too little to justify the additional cost and effort associated with transporting and handling it through food banks.

VI. Solutions

One effective way to reduce inventory wastage for restaurants that have multiple outlets in the same city could be by incorporating a system where inventory can be rotated between outlets. This was the system used by one of the restaurants in the study, where the managers of each outlet would communicate with each other about the inventory levels and hold monthly meetings to discuss ways to reduce food and inventory wastage.

With buffets being one of the leading contributors to food wastage in restaurants, a prominent buffet chain has established a partnership with an NGO to ensure that surplus food is directed to those who are in need. According to the restaurant manager, this has proven to be an effective approach in minimising the quantity of excess food that would otherwise be discarded.

Restaurants should be encouraged to use 27 cm plates and this could be enforced through the associations to ensure uniformity. The average consumer consistently serves more onto relatively larger dinnerware than onto relatively smaller dinnerware [11]. This is thought to occur as a result of the Delboeuf illusion which makes a meal appear smaller than it really is when more white space surrounds the food (Van Ittersum and Wansink, 2012). This means that a large plate can make a meal look smaller and this causes guests to order meals they will never land up finishing. Thus using 27 cm plates would reduce the amount of food waste [12]

Owing to the lack of sustainable alternatives to plastic packaging, a certain restaurant chain started the bring your own bowl initiative in 2019 where an amount of ₹10 from the customers bill would be redirected to a charity. This encouraged customers to bring their own reusable container for their ice cream.This initiative helped accumulate over ₹40,000 and helped reduce the use of plastic [13].

VII. Conclusion

The state of Karnataka's well-reinforced ban on single use plastic has resulted in most restaurants moving to biodegradable paper/cardboard packaging With most restaurants still using plastic packaging being from the lowest price range, this may indicate that eco-friendly/biodegradable packaging is still too expensive for some restaurants to afford. The reasons given by managers were also due to price restraints, but other reasons provided include lack of knowledge about the plastic ban and insufficient level of home deliveries/take outs to maintain stock of eco-friendly packaging material.

The fact that there are very few returns could be a contributing factor to wastage. It may indicate that often, consumers do not return food even if it is unsatisfactory, meaning it could be wasted. It could be due to feelings of anxiety/discomfort. Restaurants encouraging returns could mean that instead of customers wasting food they are not pleased with, their problems with the food could be rectified and given back, to prevent wastage.

The findings line up with previous research showing that the service sector does not contribute as much to food wastage, with the majority being produced at the household and retail level. The biggest exception remains in buffet systems, where wastage can reach several kilograms a day, translating into tonnes over years.

With the help of IT, restaurants seem to be able to effectively forecast demand each day and order only as much as they need. The data indicates minimal wastage at this stage of the food industry, lining up with previous estimates of the service sector only making up about 10% of wasted food, with the exceptions being buffets/events. Further research into solutions should therefore focus on wastage in households or reducing wastage in big events. Nevertheless, the study reveals there is still room for improvement in the restaurant industry, and managers can adopt solutions from others.

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