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Assessment of Food Wastage in Hostel Messes: A Case of NDRI, Karnal

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ABSTRACT.

Food security cannot be achieved merely through increasing agricultural productivity. Attention also needs to be given to measures to reduce wastage. The present study attempts to assess the pattern of food wastage by the students in mess and in other places and their level of awareness regarding its consequences. The data were collected from hundred students. Descriptive statistical tools along with Garrett's ranking technique was used for analysis of data. Majority of the students were found to leave food in their plates. Taste of the food, differences in food habit and taking more than required were cited as the main reasons for wasting food.

Keywords

Food security, food wastage, Garrett's, ranking, students

JEL Codes

C81, Q18

INTRODUCTION

Half the food in the last year was thrown out. One billion people are hungry. The next food revolution is about what you're not eating. According to the IFPRI-2015 Global Hunger Index (GHI), India ranks 80, out of the 104 hungriest countries, significantly worse than neighbouring China (21), Nepal (58), Sri Lanka (69), and Bangladesh (73). One-sixth of the Indian population is undernourished; 190 million people in India go hungry daily out of which 33 per cent of women and 28 per cent of men with Body Mass Index (BMI) below normal due to lack of enough food for consumption. Further, about one in four children are malnourished, 3,000 children die daily from poor diet related illness, 30.7 per cent of children aged below 5 are underweight and 58 per cent of children in India are stunted before they are 2 years old. Moreover, in recent years, Indian food prices have risen at double digit levels, pinching the budgets of many working class urban families in a country where food still accounts for an average of 31 per cent of monthly household expenditure.

While millions starve in a country ranked second in the world for the number of children suffering from malnutrition, India also witnesses abject waste in abundance. It loses 23 million tonnes of cereals, 12 million tonnes of fruits and 21 million tonnes of

vegetables each year (FAO, 2011). A fresh estimate from the Ministry of Food Processing reported whopping Rs 58,000 crore (Rs 580 billion) worth of agriculture food items get wasted in the country every year (IIPA, 2011).

Given the challenges posed by climate change and limited land and water resources, food security cannot be achieved merely through increasing agricultural productivity. Attention also needs to be given to measures to reduce wastage. Reduced wastage not only reflects an increase in food available for human consumption, but they also reflect a more judicious use of our limited natural resources. While increasing food availability, reducing food loss and waste can alleviate poverty and provide gender benefits while reducing pressure on ecosystems, climate, and water. Reduction in these losses would increase the amount of food available for human consumption and enhance global food security, a growing concern with rising food prices due to growing consumer demand, increasing demand for biofuel and other industrial uses, and increased weather variability (Mundial, 2008). A reduction in food wastage also improves food security by increasing the real income for all the consumers (World Bank, 2011). Reducing food loss and waste may be one of those rare multiple win-win strategies.

Food wastage comprises both food loss and waste.

Food loss refers to food that spills, spoils, incurs an abnormal reduction in quality such as bruising or wilting, or otherwise gets lost before it reaches the consumer. Whereas, food waste refers to food that is of good quality and fit for human consumption but that does not get consumed because it is discarded-either before or after it spoils. Food waste typically, but not exclusively, occurs at the retail and consumption stages in the food value chain and is the result of negligence or a conscious decision to throw food away. For reducing food loss, improvement in infrastructure is important whereas for reducing food waste small efforts at individual level can count a lot.

Food gets wasted mainly in those places where it is prepared in bulk like in social gatherings, restaurants, etc. In residential campuses, hostels are an important site of food wastage. As food is prepared daily in hostels for a large number of students it leads to food wastage on daily basis. At present time, with large number of students residing in hostels even cutting wastage to half would be a huge step towards food security and a boon for the environment. The present study attempts to assess the pattern of food wastage by the students residing in these hostels in mess and in other places and their level of awareness regarding its consequences. The information with respect to food wastage can prove helpful in designing proper waste reduction strategy.

METHODOLOGY

The study was carried out in National Dairy Research Institute, Karnal (Haryana). NDRI is a premier dairy research institute which undertakes research, teaching and extension activities towards dairy development in the country. Hundred students comprising of fifty male and fifty female students were selected randomly. A pretested schedule was used to collect information regarding pattern of food wastage by students and their level of awareness regarding food safety and consequences of food wastage. Opinion survey regarding different measures to reduce food wastage was also conducted.

Simple tabular and percentage analysis were used for analyzing majority of the data. Garrett's raking technique was used to determine the major reasons behind food wastage and the major sites of food wastage. The Garrett's ranking technique provides the change of orders of particulars into numerical scores. The prime advantage of this technique over simple frequency distribution is that the particulars are arranged based on their importance from the point of view of respondents. Hence, the same number of respondents on two or more particulars may give different ranks.

Garrett's formula for converting ranks into percent was used to obtain percent position which is given by:

$$\text{Percent position} = 100 * (R_{ij} - 0.5) / N_j$$

Where,

R_{ij} = rank given for i^{th} factor by j^{th} individual

N_j = number of factors ranked by j^{th} individual

The per cent position of each rank was converted into scores referring to the Table (Garrett and Woodworth, 1969). For each factor, the scores of individual respondents were added together and divided by the total number of the respondents for whom scores were added. These mean scores for all the factors were arranged in descending order, ranks were given and most important factors were identified.

RESULTS AND DISCUSSION

The respondents were students pursuing either masters or doctorate so majority of them belong to the same age group of twenties, the average age was found to be 24.5 years.

Pattern of Food Wastage: The perusal of Table 1 shows the frequency and pattern of food wastage by students in the hostel mess. Majority of the respondents (64 per cent) left food in plate followed by 20 per cent who rarely left food and 16 per cent who left food quite frequently. This depicted food wastage in the form of leftover was common among students. The male students were more likely to leave food in plate than their female counterpart.

Around 5-10 per cent of the total food taken was wasted by most of the respondents (64 per cent). About 24 per cent respondents wasted less than 5 per cent food whereas 4 per cent wasted more than 25 per cent. Food wastage was relatively more in the case of male students. These results were in line with the one reported by Lorenz *et al.* (2016) in their study on university students where 75 per cent respondents were not having considerable plate leftovers against 17 per cent with moderate and 8 per cent with considerable plate left over.

Rice comprised major share of the leftover in the case of female respondents while for male respondents vegetables were wasted more. None of the respondent was found to waste sweets and non-vegetarian food item. The reason behind this can be that these items are served in limited quantity. Study on food wastage in social gatherings by IIPA (2011) revealed that vegetables and chapattis were wasted more because by taste and habit Indians are fond of eating hot food. If the chapati /roti is not hot they will not eat it hence wastage is more in it. Most of the respondents (61.36 per cent) said that wastage was higher in the form of leftover food. This wastage can be avoided easily by being little careful while taking food.

Quantity of leftover food in the case of female respondents was highest in the hostel mess followed by social events, restaurants, cafeteria and home (Table 2). For male respondents, social events stood at number one position followed by mess, restaurants, cafeteria and home. Highest wastage in mess and social events was observed as food is cooked in bulk. On the other hand the wastage was lower in home and cafeteria. Thus, there is a scope of reducing wastage in bulk cooking for masses.

Taste of the food was ranked first among the reasons of food wastage (Table 3). This showed that improving

Table 1: Pattern of food wastage

Particulars	Category	Female	Male	(Per cent)
				Total
Frequency of leaving food in plate after having meal	Quite often	16	16	16
	Often	60	68	64
	Rarely	24	16	20
Quantum of food being left in plate (as percentage of food taken)	<5	32	16	24
	5-10	60	68	64
	10-15	0	8	4
	15-20	8	0	4
	20-25	0	0	0
	>25	0	8	4
Share of food items in the leftover	Snacks/ starters	12	8	10
	Salad	4	4	4
	Vegetables	20	40	30
	Non-vegetarian	0	0	0
	Rice	44	28	36
	Chapati	8	16	12
	Dal	4	4	4
	Sweets	0	0	0
Form in which food is wasted	Leftover in plates	68.18	54.55	61.36
	Unserved food	0	9.09	4.55
	Both	31.82	36.36	34.09

Table 2: Garrett score and rank for places according to the quantity of leftover food

Places	(Per cent)			(Per cent)		
	Score			Rank		
	Female	Male	Total	Female	Male	Total
Hostel mess	66.2	61.6	63.9	I	II	I
Cafeteria	37	40.6	38.8	IV	IV	IV
Restaurant	52	54.2	53.1	III	III	III
Social Events	63.2	64.2	63.7	II	I	II
Home	31.6	29.4	30.5	V	V	V

the quality of food being served can be effective in reducing wastage. Other than taste, taking more food and difference in food habit were the other two important reasons. Making people more aware about the serving size can also help. Lorenz *et al.* (2016) also found palatability of food and larger portion sizes to be important reasons behind food wastage by university students.

Around 70 per cent of respondents reported that they tend to waste more food in buffet system rather than when

food is served by the caterers. This showed the carelessness when we are allowed to consume food according to our will. Similar results were reported in the study conducted by IIPA (2011).

Awareness Regarding Food Safety and Food Wastage

Majority of the respondents (60per cent) reported that they check date of packaging before purchasing any packed food item. This showed that there was sufficient awareness among respondents regarding food safety. Though, a large percentage (40 per cent) of respondents was found to bother less about packaging date.

The results revealed that more than 84 percent of female respondents preferred to throw away the food after expiry date. This percentage was higher when use by date gets over. The percentage of male respondents who preferred to throw away the food was relatively lower. This showed our over reliance on packaging dates rather than testing it actually for quality. Similar preference of throwing away food was observed in a study conducted by Qi and Roe (2015) in which 68 percent of respondents believed that throwing away food after the package date has passed reduces the chance of food borne illness.

About 20 per cent of respondents tend to left excess

Table 3: Garrett score and rank for reasons of food wastage

Places	Score			Rank		
	Female	Male	Overall	Female	Male	Total
Taste of the food.	67.4	66.2	66.8	I	I	I
Taking more than you can eat	54.2	47.2	50.7	II	III	II
Prefer to take more as you have to pay same for any quantity.	41.4	39.2	40.3	V	V	V
Try to taste all the dishes.	42.4	44.6	43.5	IV	IV	IV
Difference in the food habit.	44.2	52.8	48.5	III	II	III

Table 4: Food wastage in various systems

Particulars	(Per cent)	
	Buffet	Served by caterers
Female	80	20
Male	60	40
Overall	70	30

Table 5: Frequency of checking date of packaging before purchasing any packed food item

Category	(Per cent)		
	Always	Sometimes	Never
Female	60	40	0
Male	60	36	4
Overall	60	38	2

food as such whereas majority (54%) of the respondents preferred to pack and take home the excess food.

Not a very good percentage of respondents were found to be aware of harmful impact of food wastage on food security, environment and on depleting natural resources. This illustrated that there is a need to create mass awareness and sensitize people for not wasting food. A study conducted by Neff *et al.* (2015) revealed that respondents were concerned about reducing food wastage due to personally relevant concerns of saving money and aligning one's behaviors and moral attitudes but they placed little priority on environmental concerns due to lack of knowledge about the

Table 7: Course of action adopted if in a restaurant more than required food is ordered

Alternatives	(Per cent)		
	Female	Male	Overall
Finish it anyhow	12	36	24
Leave excess food as such	20	20	20
Ask the people there to pack the left food	64	44	54

Table 8: Extent to which food wastage can trigger following consequences

Consequence	(Per cent)		
	Very much	Some extent	Not at all
Loss of individual's money	44	48	8
Endanger food security	60	36	4
Reduced production	28	30	42
Loss of valuable natural resources	62	30	8
Loss to farmers	36	28	36
Hinder development of a country	58	38	4
Pollute the environment	34	52	14

environmental consequences of wasting food. The study conducted by Brooklyndhurst (2007) also found evidence of a lack of awareness and understanding of the environmental implications of food waste among the respondents.

Table 6: Course of action adopted if the best before or use by date of the product is over

Alternatives	Best before			Use by		
	Female	Male	Overall	Female	Male	Overall
Throw it away	84	60	72	96	68	82
Use it anyhow	16	32	24	0	24	12
Give it to someone	0	8	4	4	8	6

Table 10: Proposed solutions regarding food wastage

Particulars	Ways	(Per cent)		
		Female	Male	Overall
Best way to dispose excess food	Packing and throwing it in the municipal dustbins	0	4	2
	Sorting it out and use it for composting	16	20	18
	Use it as an animal feed	24	52	38
	Donate it to poor people	72	44	58
Best way to reduce food wastage	Creating mass awareness	68	64	66
	Charging strict penalty	28	28	28
	Restrict the number of dishes that can be prepared in an occasion	4	8	6
	Restrict the number of guests	0	0	0

Table 9: Awareness regarding organizations that collect excess food and redistribute it among the poor

Category	(Per cent)	
	Yes	No
Female	4	96
Male	12	88
Overall	8	92

A huge per cent of respondents (92per cent) were unaware of any organization working for diverting the excess food to less fortunate (Table 9). This shows that there is a dire need to promote awareness about these food recovery organizations.

Proposed Solutions: Majority of the female respondents (72per cent) are of the opinion that the best way to dispose excess food was to donate it to the less fortunate whereas male respondents (52per cent) reported that it can be used as an animal feed. A very low percentage of respondents (2per cent) preferred to throw away the food.

About 66 per cent respondents felt that mass awareness is the best way to reduce food wastage followed by 28 per cent respondents who revealed that imposing strict penalty can be more effective. A small percentage of respondents (6per cent) said that restricting the number of dishes can reduce wastage whereas none of them preferred restriction on the number of guests. This shows that lower percentage of people are in favour of strict measures like restrictions and penalty. Study conducted by IIPA (2011) also reported that majority of the respondent ranked education and mass awareness campaign as the first priority to control food wastage. Next preference was to limit the number of dishes. Most of them did not favor any legislation to control food wastage as it can rise to corruption and also lead to unnecessary harassment.

CONCLUSIONS

Reducing food wastage is an important step in the direction of ensuring food security. The present study assessed the pattern of foodwastage by the students and

their level of awareness regarding its consequences. Majority of the students were found to leave food in their plates. Male students generally tend to waste more food than their female counterpart. Similarly, tendency to waste food was more in the buffet system. Taste of the food and differences in food habit along with tendency to take more than required were cited as main reason for wasting food. Students were found to have over reliance on the use by dates printed on the packets. There was a lack of enough awareness about the implications of food wastage. Mass awareness needs to be created regarding food wastage. Making the students pay according to the exact amount of food they take rather than taking a uniform consolidated amount from all can also prove effective. A war on waste has yet to be waged when it comes to food. With food prices recently hitting historic highs and global food demand continuing to rise, now is the time. Awareness among the youth mass regarding it can prove beneficial in the long run.

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