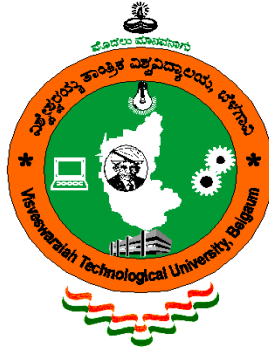


Visvesvaraya Technological University

Jnana Sangama, Belgavi – 590018



AICTE ACTIVITY POINTS REPORT (20 Points)

ON

Zero Food Waste - Connecting Homeless

Submitted By

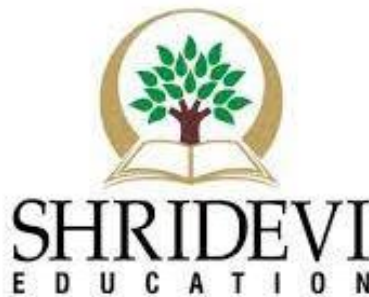
Ms. Bhavana [1SV21AD003]

Under the Mentorship of

Mr. Renukaradhya P C

Assistant Professor

Department of Artificial Intelligence and Data Science



ShriDevi Institute of Engineering and Technology

[Affiliated to Visvesvaraya Technological University, Belgaum]

Sira Road, NH-4, Maralenahalli, Tumakuru, Karnataka – 572 106

2023-2024

ShriDevi Institute of Engineering and Technology

[Affiliated to VTU, Belgaum]

Sira Road, NH-4, Maralenahalli, Tumakuru, Karnataka – 572 106



CERTIFICATE

Certified that the AICTE Activity Points activity entitled “**Zero Food Waste - Connecting Homeless**” carried out by **Ms. Bhavana** bearing **USN: 1SV21AD003** a bonafide student of **ShriDevi Institute of Engineering and Technology** in partial fulfillment for the award of **Bachelor of Engineering in Artificial Intelligence and Data Science** of the Visvesvaraya Technological University, Belagavi during the year 2023-24. It is certified that all theory/practical/corrections/suggestions indicated for Activity Points have been executed under the directions of **Mr. Renukaradhya P C**. The activity report has been approved as it satisfies the academic requirements in respect of AICTE Activity Points prescribed for the said degree.

Signature of Mentor

Mr. Renukaradhya P C
Assistant Professor
Dept of AI&DS
SIET - Tumakuru

Signature of HOD

Dr. Charan K V
HOD and Assoc. Professor
Dept of AI&DS
SIET - Tumakuru

Signature of Principal

Dr. Narendra Viswanath
Principal
SIET - Tumakuru

DECLARATION

I, **Ms. Bhavana** bearing the USN **1SV21AD003**, student of 4th Semester B.E. Department of Artificial Intelligence and Data Science, **ShriDevi Institute of Engineering and Technology**, Tumakuru declare that the AICTE Activity work entitled “**Zero Food Waste - Connecting Homeless**”, has been duly executed by me under the guidance of LGS Social Innovation and Research Centre (An unit of LGS Trust) and **Mr. Renukaradhya P C**, Assistant Professor, Department of Artificial Intelligence and Data Science, ShriDevi Institute of Engineering and Technology, Tumakuru. The Activity report of the same is submitted in partial fulfilment of the requirement for the award of Bachelor of Engineering degree in Department of Artificial Intelligence and Data Science by Visvesvaraya Technological University, Belgaum during the year 2023-2024.

Date:

Ms. Bhavana

Place: Tumakuru

1SV21AD003

ACKNOWLEDGEMENT

The satisfaction that accompanies the successful completion of the activity report which would be complete only with the mention of the almighty God and the people who made it possible, whose report rewarded the effort with success of activity presentation

We are grateful to **ShriDevi Institute of Engineering and Technology** for providing us an opportunity to enhance our knowledge through the activity.

We express our sincere thanks to **Dr. Narendra Viswanath**, Principal, SIET - Tumakuru for providing us an opportunity and means to present the activity.

We express our heart full thanks to **Dr. Charan K V**, Associate Professor and Head, Department of Artificial Intelligence and Data Science, SIET - Tumakuru for encouragement in our activity work, whose cooperation and guidance helped in nurturing this activity report.

We would like to express profound thanks to the activity mentor **Mr. Renukaradhya P C**, **Assistant Professor**, Department of Artificial Intelligence and Data Science for the keen interest and encouragement in our activity presentation.

We extend our thanks to the **LGS Social Resource and Research Center** for their effort and endurance to bring out the best in us.

Finally, we would like to thank our family members and friends for standing with us through all times.

Ms. Bhavana

[1SV21AD003]

Abstract

Food Waste is the major issue in any nation. It not only affects the hygiene and global gas emissions but also the economy and time involved in growing the food. All nations are attempting to achieve the Zero Food Waste but none has achieved considering the irregular planning of consumers and the taste irregularities. This activity is focussed on providing an Engineering Solution that could help achieve the Zero Food Waste with technology aid. The digital taste, connectivity of leftover food with the individual score on food waste is considered as the possible solutions. Along with this government policies and its Mandation is explored in this activity. The potential steps of food cycle contributing to the food waste is analysed along with the works of NGO in connecting the foodless of excess food. This activity is not focussed on the core solutions to avoid food waste but the solution towards the consumer end to minimize the food waste and bring to NIL Food Waste. The solution is provided by the LGS Trust as a sample one along with the option to Engineering Students to list their own Engineering solutions to solve these issues. Considering the scope of Activity Points, the theme is presented on paper and not the implementation. Theoretical understanding with public survey on the necessity of such platforms and awareness is conducted as a part of the activity. Listing the engineering solution to the problem statement associated sits on the top priority.

Activity Implementation Plan

Activity Name:	Zero Food Waste – Connecting Foodless
Activity Category as per AICTE Activity Points:	Food Preservation / Packaging
Total Hours of Involvement:	80 Hours
Total Activity Point Earned by this Activity:	20 Points

Implementation Plan:

Task Number	Particular	20 AICTE Activity Points (80 Hours)	
		Duration	Activity to be done
Task No. 01	Theory / Video Lecture	10 Hrs	10 Videos
Task No. 02	Case Study Questions	20 Hrs	20 Questions
Task No. 03	Public Survey	40 Hrs	Survey with 20 Persons
Task No. 04	Solution as an Engineer	05 Hrs	05 Questions
	Activity Report	05 Hrs	Proof of Activities

CERTIFICATE

**LGS Social Innovation
and Research Centre**
(A unit of LGS Trust)



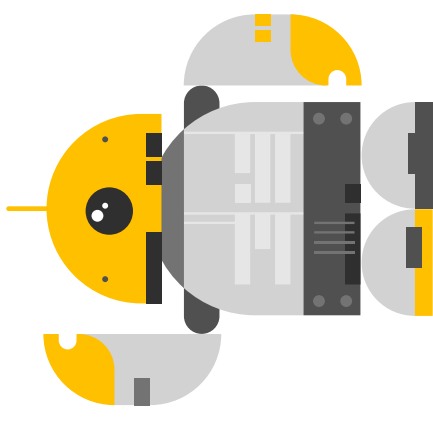
This is to certify that

Bhavana

GSTIN: 29AABTL9441K1Z3

NGO Darpan ID: KA/2020/0254433

has satisfactorily completed the Activity **ZERO FOOD WASTE – CONNECTING FOODLESS** designed to award 20 AICTE Activity Points involving implementation for 80 Hours (Theory and Practical). The activities involved Theory Classes, Case Study, Public Survey and Solution as Engineer.



Student USN: 1SV21AD003

Certificate ID: ZFH03C5709

Duration: 01/July/2023 to 15/July/2023

B. G. Shivanna

President

Mr. B. G. Shivanna

Harsha S

Secretary

Mr. Harsha. S

29.07.23

Treasurer

Mrs. B. Kowsalya

Registered with



CERTIFICATE

Certified that the Activity entitled “**ZERO FOOD WASTE – CONNECTING FOODLESS**” for the AICTE Activity Points was implemented by Student **Bhavana** with Student ID/USN **1SV21AD003** under the support of registered NGO - “**LGS Social Innovation and Research Centre, a Unit of LGS Trust**” and monitoring of **Mr. B.G. Shivanna**, a Red Cross Coordinator, NSS Coordinator, Himalaya Wood Badge Holder, Scouts and Guides Instructor.

My suggestion was considered in creating the syllabus, conducting theory class – Survey – Case Study and Practical activities. The implementation was done as per the standards to make students learn the social problems and come up with the Engineering Solution for the same.

The procedures followed to earn **20 AICTE Activity Points** for the student is satisfactory as per my experience in the Red Cross - Scouts and Guides.

Date: 24-Aug-2023



**Programme Manager
NSS/NCC/Red Cross
Co-Ordinator**

Signature of Red Cross Coordinator

Mr. B. G. Shivanna

B.A., M.P.Ed,

Red Cross Coordinator

Ph: 9448165040 / 9880436959

TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
Chapter 01	Introduction	1
Chapter 02	Problem Statement	2
Chapter 03	LGS Social Innovation and Research Centre	3
Chapter 04	Ongoing Solutions and Technical Gap	4
Chapter 05	Proposed Engineering Solution by NGO	5
Chapter 06	Learning and Contribution by Student	6
Chapter 07	Conclusion	7
APPENDICES		
Appendix 01	Public Survey Analysis	9
Appendix 02	Photo Proof of Public Survey	20
Appendix 03	Engineering Solution by Student	23
Appendix 04	Case Study Questions	25

Chapter 01

Introduction

To understand the food waste, it is necessary to go through food cycle and the difference between raw and cooked food. The food cycle is out of the scope. Hence differences are discussed in this section.

Raw Food	Cooked Food
They are the non-cooked and non-processed foods	They are cooked and/or processed food
Ex: Fermented Foods, Sprouted Grains, Raw Vegetables, Raw Foods, Nuts and Seeds	Ex: Boiled food, processed food
They are more nutritious	They are less nutritious as enzymes and nutrients are lost during processing and heating
There are advantages and disadvantages associated with Raw Food	There are advantages and disadvantages associated with Cooked Food
Raw Food may contain dangerous micro organisms whose ingestion are fatal to human	Cooked Food eliminates dangerous microorganisms whose ingestion are fatal to human
Raw Food needs less enzymes in Human Body for digestion	Cooked Food needs more enzymes in Human body for digestion
Raw food has more water soluble vitamins	Cooking and Processing loses the water soluble vitamins in Food
Digestion of some raw foods are difficult as cells of foods are hard	Digestion of cooked foods are easy as cells of food are broken by heating
Absorbing nutrients from digested raw foods are difficult due to food cell walls	Absorbing nutrients from cooked foods are easy as food cell walls are broken
Consuming raw food is not enjoyable due to lack of taste and aroma	Consuming cooked food is enjoyable due to taste and aroma
One can depend on raw food sourced from plants but cannot eat raw meat for long time	One can depend on cooked food sourced from plant and animal for long time
Some Raw Foods provide less energy compared to the cooked part	Some Cooked Foods provide more energy compared to the raw part

Chapter 02

Problem Statement

Food waste is the vast subject and associated problem statements are also more. This section lists few of the problem statements linked with this activity.

- Balancing demand and supply to avoid excess growing of food
- Minimizing the Food Wastage in Food Distribution
- Lack of planning in the food availability
- Digitization of taste to address food waste in hotel
- Lack of individual accountability in food wastages happened
- Lack of networking in immediate supply of excess food with foodless
- Lack of food compost machine process

Addressing the above problem statements with engineering solution is the scope of this activity. Achieving zero food waste is ideal and solution is needed at present situation to bring the food waste to almost zero.

Chapter 03

LGS Social Innovation and Research Centre

(A Unit of LGS Trust)

This Activity is executed under the implementation support of the registered NGO “LGS Social Innovation and Research Centre – A Unit of LGS Trust”. The platform helps in identifying the public issue, analyse the drawbacks of current solution and develop an Engineering Solution to bridge the technical gap. They are supporting students in the implementation of AICTE Activity Points.

Mode of Implementation in this `:

As the activity needs minimum of 80 Hours activity, the following activities are done by student

Activity	Accountable for
Theory Information	10 Hours
Case Study Questions	20 Hours
Public Survey Activity	40 Hours
Solution as Engineer	05 Hours
Activity Report	05 Hours

Chapter 04

Ongoing Solutions and Technical Gap

Following are some of the ongoing solutions

Globalizations have imparted among the civilians to address the food waste. Many have started by volunteering and establishing NGO's. Following are some of them:

- Mechanization of Food Harvest with crates to minimize human touch
- Less number of unloading and loading to avoid handling waste of food
- Mechanized food processing to minimize the wastage of food
- Connecting the excess food with foodless
- Conducting campaign on social sites about the zero food waste

These measures are driven by public and are not effective in reaching zero food waste but has contributed awareness and appreciable amount of contribution in minimizing food waste.

Technical Gap in the Ongoing Solution:

Though present solution is successful in reaching the people, the sophisticated platform is not available to meet the objectives. Technical gap is seen in,

- Complete automation of food harvest
- Third Party quality check of food in transit to avoid unloading more than once
- Lack of control on food quantity growth due to void of demand and supply ratio
- Lack of automation in food processing units
- Lack of technology to digitize the taste
- Lack of technology for individual accountability in food waste

A Engineering Solution is needed that can fill the technical gap with the user friendly monitoring applications.

Chapter 05

Proposed Engineering Solution by NGO

LGS Trust has proposed following solutions as a part of this activity

1) Collection Centre in Every Gram Panchayat:

- One Collection centre in every Gram Panchayat to purchase farmer's products
- Grading and Quality check certificate issued by the Collection Centre
- Regular supply of collected products to the retail shops and industries in other areas
- Conducting live auction to the sellers from pan India and Well organized logistics

2) Taste Digitization:

Taste is a mixture of 5 basic tastes – Sweet, Salt, Sour, Bitter and Umami and we can develop a quantification system to the taste

- Similar to pH level
- Digitizing the all basic tastes

Then onwards we can utilize this data in 2 ways:

- 1) Upon cooking any food, the chef calculates the reading of every taste by placing the sample on device. This says the reading of each taste for that food. This helps in digitizing the taste and delivering to the customer saying the taste of that food
- 2) Every Human has different taste likings.
 - a. So while ordering the food itself he can say the digital values of taste needed so that chef cooks accordingly in case of instant foods
 - b. If already cooked food are there, before purchasing to eat, he can get to know the digital value of taste and purchase it or not as per the reading displayed

3) Food Wastage Score:

Like the CIBIL score to track the Financial Credit of a Human, if a score system is implemented to track the Food Wasted by an individual in an year, it helps in accounting each individual to the waste happened. Such a score helps in

- Tracking the Food Waste by a person
- Tracking the type of food wasted
- Tracking the reason for food wastage
- Placing penalty for such food wastage

Chapter 06

Learning and Contribution by Student

Learning of Student:

This Activity Points module has explored the following topics in the 80 hours course:

- 1) Theoretical understand of Food Cycle and Food Distribution Methods
- 2) Differences between Raw and Cooked Food
- 3) Contribution of Rural and Urban population in food waste
- 4) Government policies for food wastage reduction
- 5) Food Waste process and its effects
- 6) Level of awareness among civilians about food waste
- 7) Ongoing solutions and its ineffectiveness in solving the issue
- 8) Necessity of technology aided startup
- 9) Sample engineering solution by the LGS Trust for this issue
- 10) Case study on activity similar contents
- 11) Conduction of public survey to analyse the public opinion on Food Wastage Solutions
- 12) Proposal of student's own solution to the issue

Contribution by Student:

This course is implemented with the objective of understanding the public issue lacking the engineering solution with the survey analysis and suggesting the engineering solution. Student has contributed by

- Conducting the public analysis with 20 individuals for 60 questions
- Creating awareness among the public about the Food Waste
- Explanation of food waste controlling measures to public
- Interacting with public about technology solutions in addressing food waste
- Explanation on the importance of Grievance in shaping society with right thoughts
- Learning the startup opportunity to address food waste issue
- Preparation of Engineering Solution to resolve platform issues.

The implementation of such plan is not under the scope of Activity Points and the proposal of solution is done by the student

Chapter 07

Conclusion

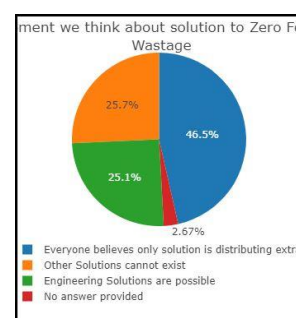
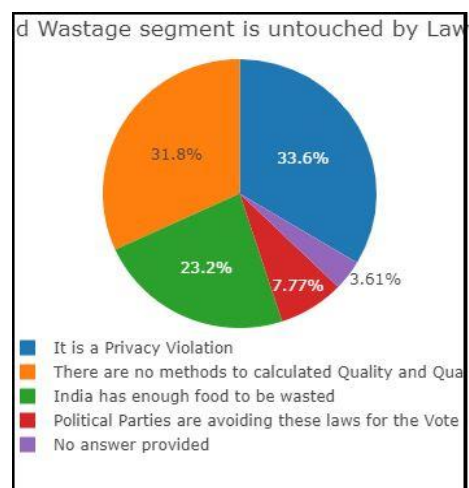
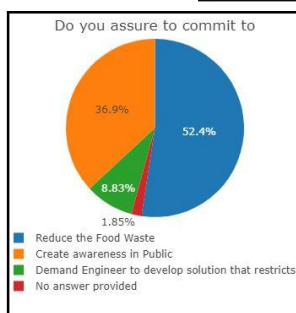
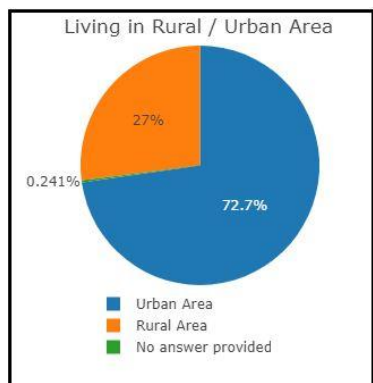
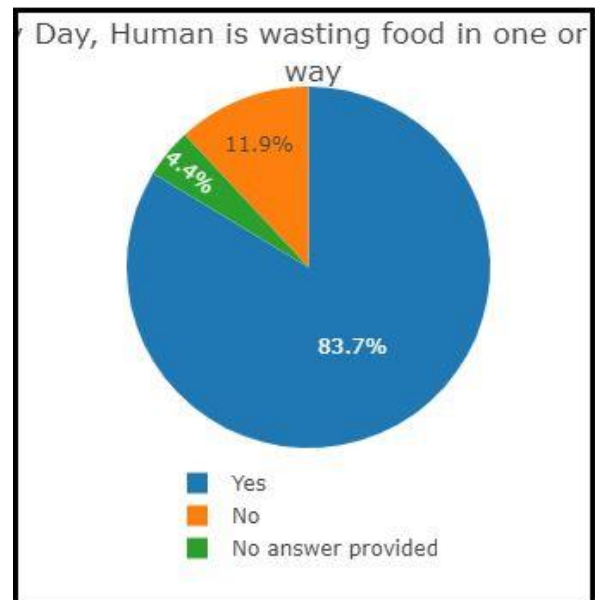
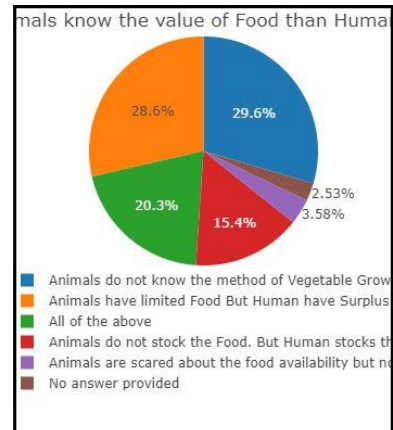
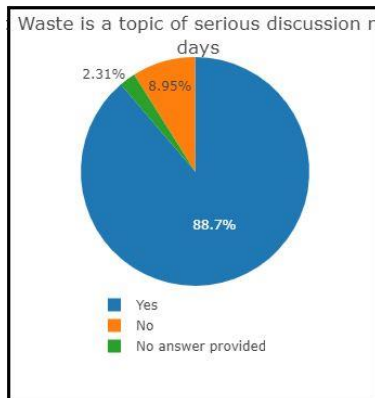
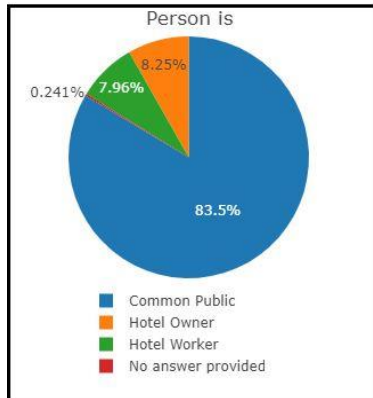
Food Waste is ongoing issue associated with every human. Adhering to the human's unplanned system of food habits – considerable quantity of the cooked food and raw food are always on waste. The food waste is associated with demand and supply ratio. The necessity of demand and supply monitoring by government policy is very much needed. The activity with the focus on engineering solution has explored the possibly technology adoptions to enforce the food waste avoid measures. The food waste is not just the waste of cooked/raw food but it accounts the economical and time wastage associated to farm inputs and the water needed to grow them. So it is optimal to declare food as national property than the individual. No one is allowed to waste food as more effort is there in a gram of food. Modern technologies are well sophisticated to implement the solutions with the permissions from government as food is most neglected among human considering its vast availability.

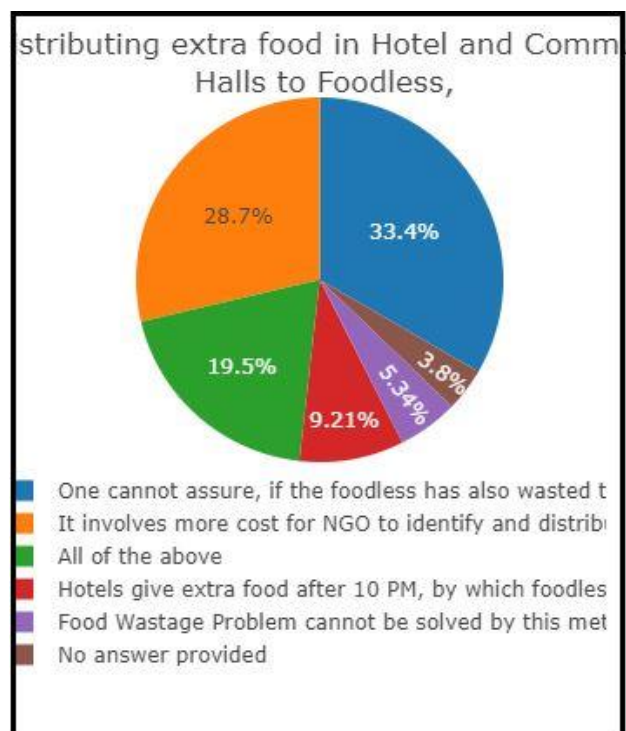
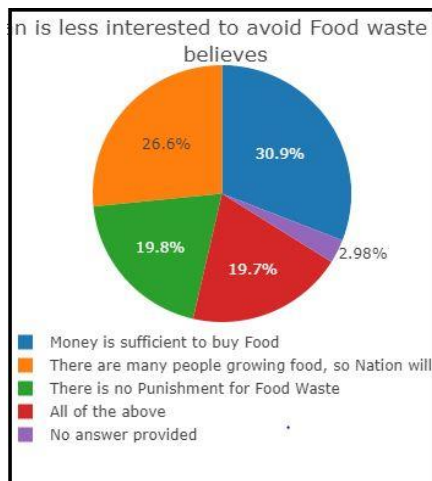
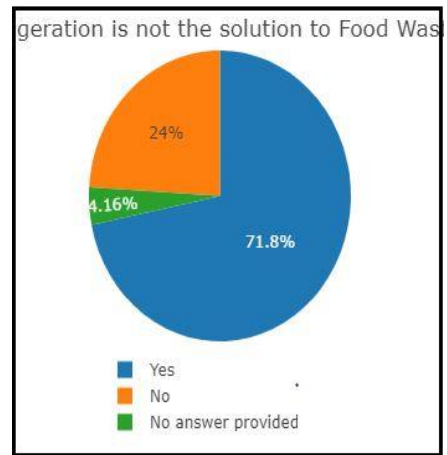
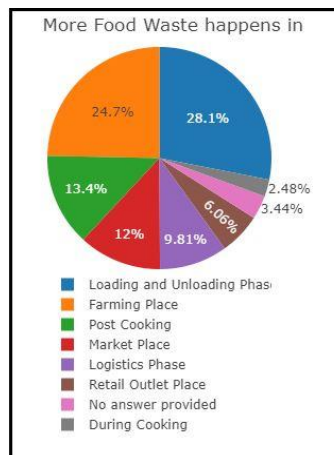
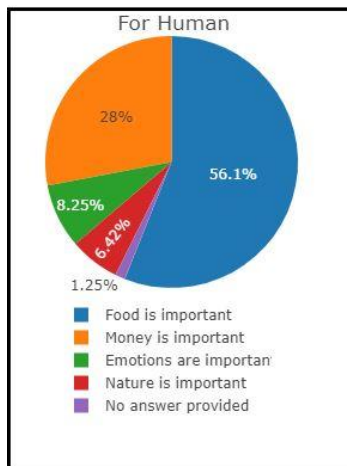
Considering the scope of AICTE Activity Points, the activity is limited to understanding the existing social issue, identifying the technical gaps, interacting with public and developing the engineering solution for the problem statement. All these tasks are completed and the proofs / summary of same is attached to this report as appendices. The tasks needed to implement for 80 hours are completed. The solution is proposed by student to the concerned problem statement. Implementation of the solution is impossible in 80 hours. Hence only plan is suggested.

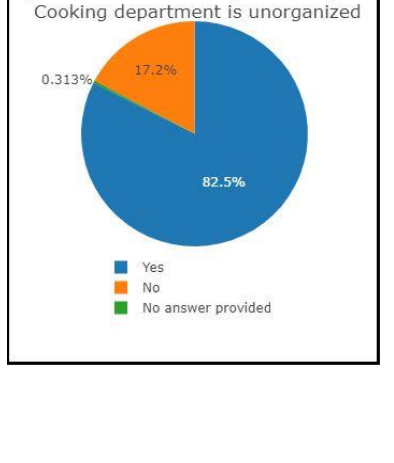
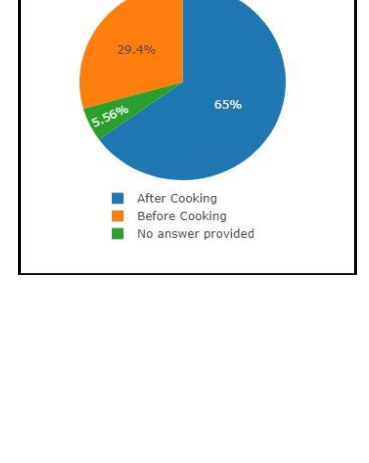
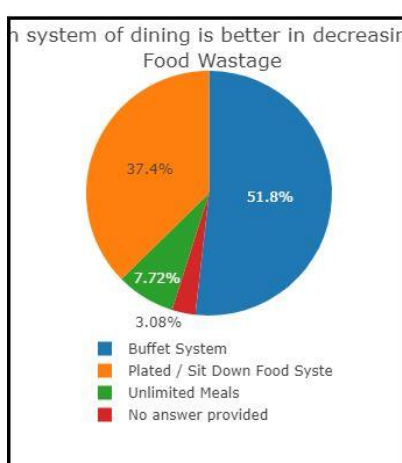
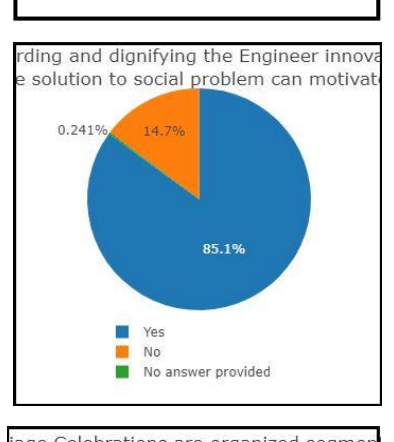
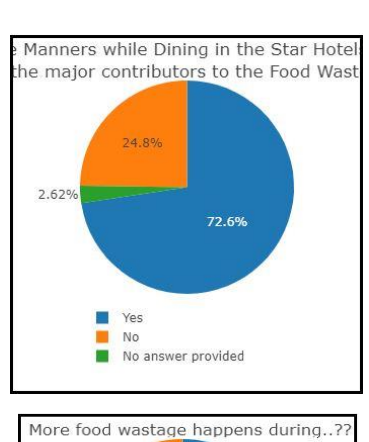
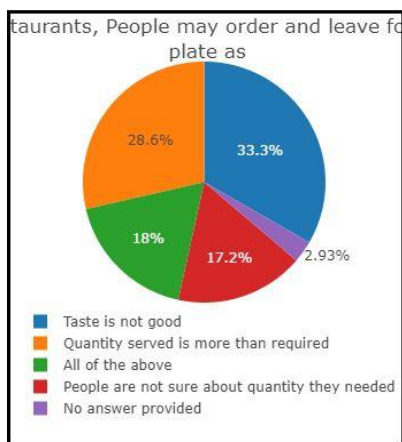
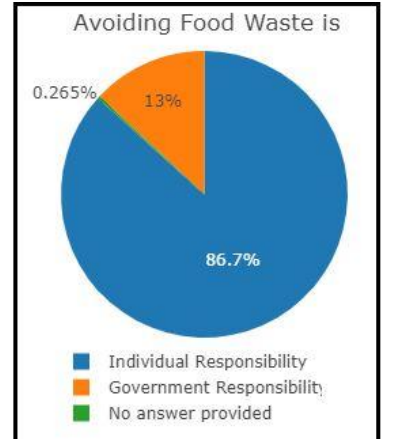
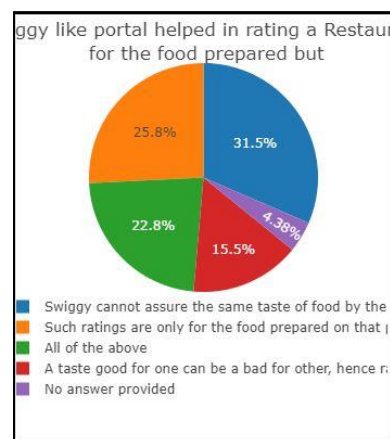
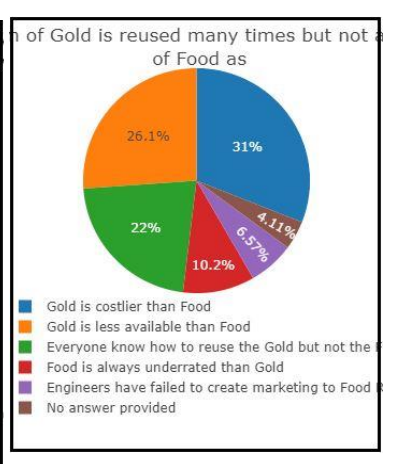
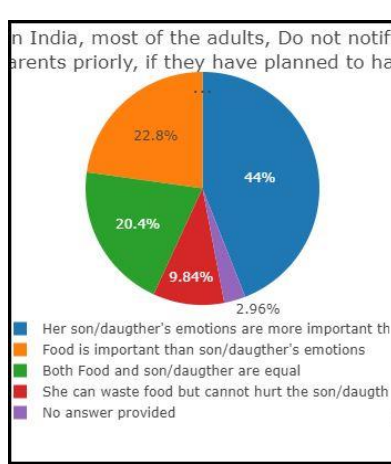
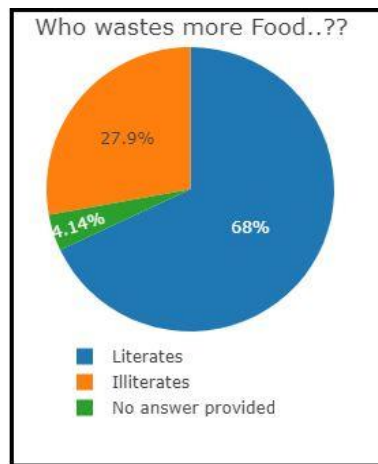
APPENDICES

Appendix 01

Public Survey Analysis



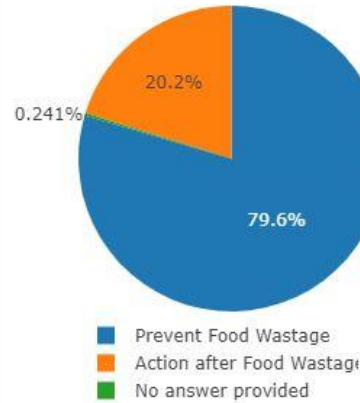




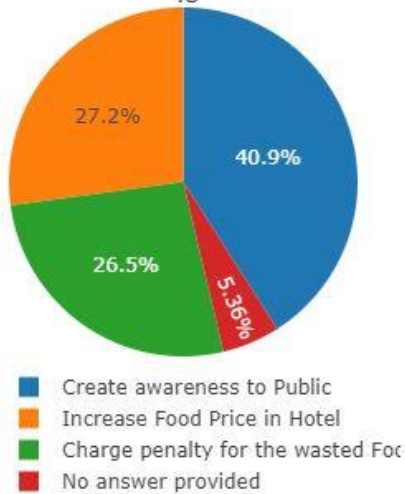
factors compelling to buy more Raw Food



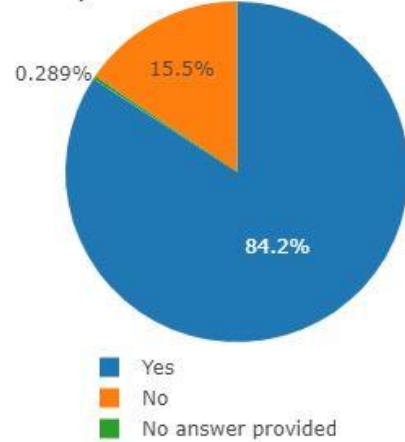
What is needed at this moment..??



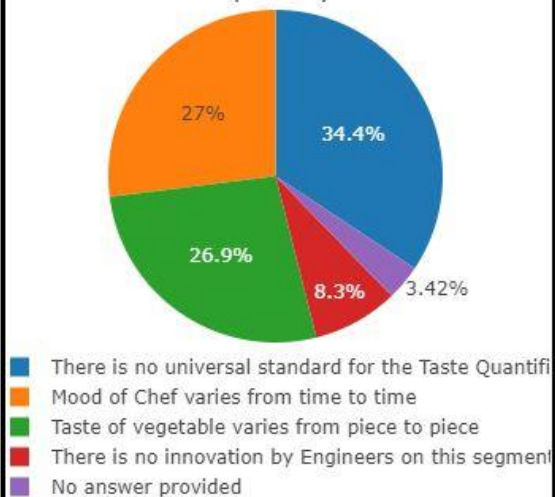
only Solution to avoid Food Wastage in is



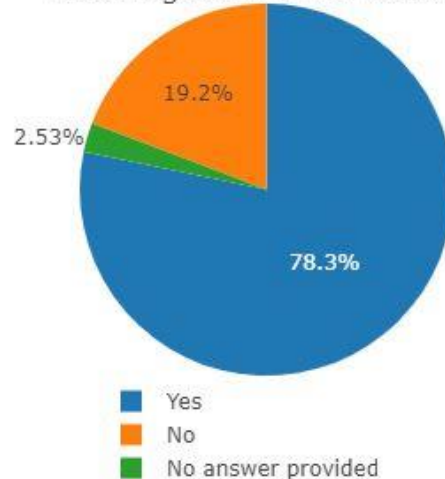
Engineer solving Social Issues is the Creator of a Healthy and Self Sustainable Society



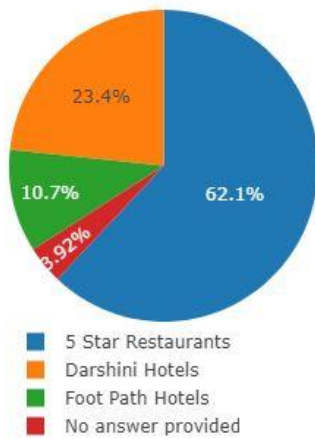
One cannot quantify the taste as



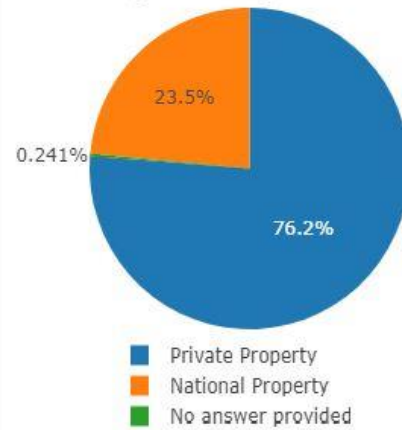
Food / Snacks are the major contributors to avoiding more Food Wastage



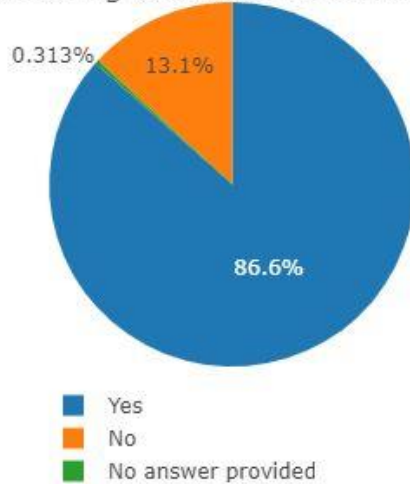
Where does more food wastage happens.



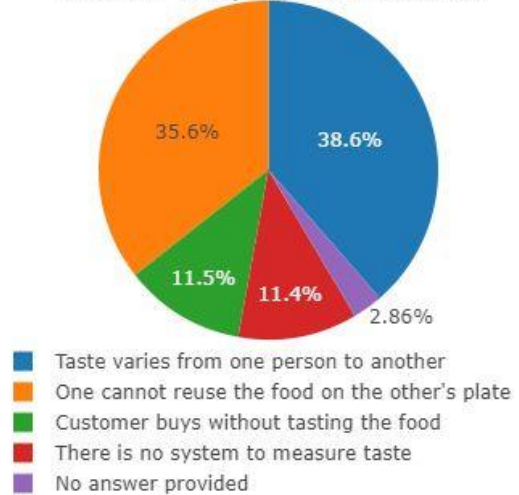
After purchasing a Food. It is



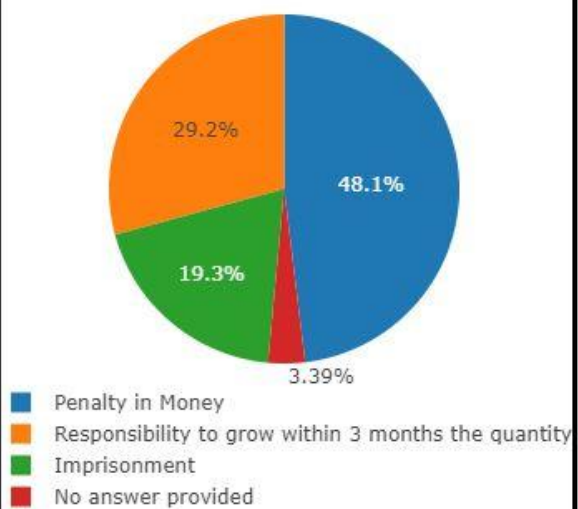
of associated Indian Laws implementation monitoring is needed at this moment



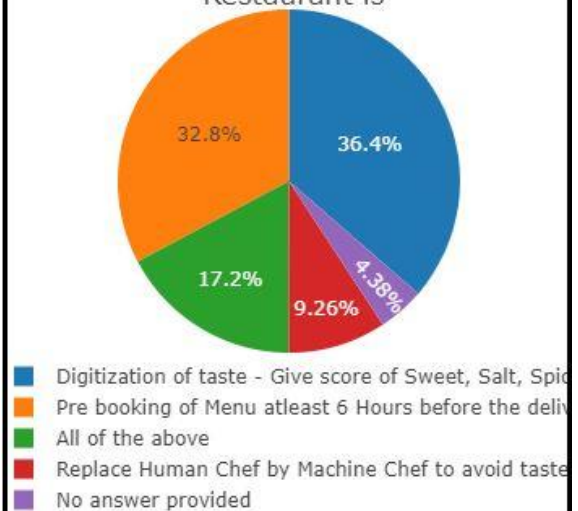
Give system to return damaged goods but the non-tasty foods in Hotel as



What should be the Penalty of Food Wastage



Main solution to avoid wastage in Hotels & Restaurant is



List of Public Survey Questions

Personal Details		
01	Photo	
02	Full Name	
03	Person is	Hotel Owner Hotel Worker Common Public
04	Living in Rural / Urban Area	Rural Area Urban Area
05	Age	
06	Food Waste is a topic of serious discussion now a days	Yes No
07	Achieving Zero Food Waste is impossible	Yes No
08	Do you assure to commit to	1) Reduce the Food Waste 2) Create awareness in Public 3) Demand Engineer to develop solution that restricts Human from wasting the Food
09	For Human	1) Money is important 2) Food is important 3) Emotions are important 4) Nature is important
About Food Waste		
10	Animals know the value of Food than Human as	1) Animals have limited Food But Human have Surplus Food 2) Animals do not know the method of Vegetable Growing but Human knows the Agriculture Methods 3) Animals do not stock the Food. But Human stocks the Food 4) Animals are scared about the food availability but not the Human 5) All of the above
11	Who has achieved Zero Food Waste till today..??	1) Human 2) Domestic Animals 3) Wild Animals 4) No One
12	Every Day, Human is wasting food in one or other way	Yes No
13	Human is less interested to avoid Food waste as he believes	1) Money is sufficient to buy Food 2) There are many people growing food, so Nation will not go to the Food Scarcity Level 3) There is no Punishment for Food Waste 4) All of the above
14	Refrigeration is not the solution to Food Wastage	YesNo

15	More Food Waste happens in	1) Farming Place 2) Loading and Unloading Phase 3) Logistics Phase 4) Market Place 5) Retail Outlet Place 6) During Cooking 7) Post Cooking
16	More Uncooked Food Waste happens in	1) Farming Place 2) Market Place 3) Retail Outlet Place 4) In Home
17	More Cooked Food Waste happens in	1) Hotels and Restaurants 2) Domestic Houses 3) Marriage Halls
18	Food Wastage segment is untouched by Law as	1) It is a Privacy Violation 2) India has enough food to be wasted 3) There are no methods to calculated Quality and Quantity of Food Wastage 4) Political Parties are avoiding these laws for the Vote Lobby
19	Moment we think about solution to Zero Food Wastage	1) Everyone believes only solution is distributing extra food to foodless 2) Other Solutions cannot exist 3) Engineering Solutions are possible
20	By distributing extra food in Hotel and Community Halls to Foodless,	1) One cannot assure, if the foodless has also wasted the food or not 2) It involves more cost for NGO to identify and distribute (Petrol Expenses) 3) Hotels give extra food after 10 PM, by which foodless would have slept 4) Food Wastage Problem cannot be solved by this method 5) All of the above
21	In India, most of the adults, Do not notify parents priorly, if they have planned to have food outside. This causes waste of Cooked Food. In this case, for a Mother	1) Her son/daugther's emotions are more important than Food 2) Food is important than son/daugther's emotions 3) Both Food and son/daugther are equal 4) She can waste food but cannot hurt the son/daugther
22	A Gram of Gold is reused many times but not a Gram of Food as	1) Gold is costlier than Food 2) Gold is less available than Food 3) Everyone know how to reuse the Gold but not the Food 4) Engineers have failed to create marketing to Food Recycling than compared to Gold 5) Food is always underrated than Gold

23	Only effective solution to avoid Food Wastage is	1) Make Food Price more than the Gold's Price 2) Punish the person wasting Food. Punishment is not a Jail / Fine, but it must be eco-friendly 3) Both
24	Who wastes more Food..??	1) Literates 2) Illiterates
25	Packed Food / Snacks are the major contributors in avoiding more Food Wastage	Yes No
26	If Engineering Solution is not provided, then Food price may reach to the Gold Price	Yes No
About Food Waste in Hotels and Events		
27	Table Manners while Dining in the Star Hotels are the major contributors to the Food Waste	Yes No
28	Main reason for the Food Wastage in Hotel is	1) Variation in the Taste of Food 2) Not sure of number of customers visiting their Hotel
29	Where does more food wastage happens..??	1) 5 Star Restaurants 2) Darshini Hotels 3) Foot Path Hotels
30	In Restaurants, People may order and leave food on plate as	1) Taste is not good 2) Quantity served is more than required 3) People are not sure about quantity they needed and hence they order more and eat less 4) All of the above
31	Main solution to avoid wastage in Hotels & Restaurant is	1) Digitization of taste - Give score of Sweet, Salt, Spicy, Sour from 1 to 10 for each food every day 2) Pre booking of Menu atleast 6 Hours before the delivery 3) Replace Human Chef by Machine Chef to avoid taste variations in Food 4) All of the above
32	More food wastage happens during..??	1) Before Cooking 2) After Cooking
33	We have system to return damaged goods but not to the non-tasty foods in Hotel as	1) Taste varies from one person to another 2) One cannot reuse the food on the other's plate for eating 3) Customer buys without tasting the food 4) There is no system to measure taste

34	One cannot quantify the taste as	1) Taste of vegetable varies from piece to piece 2) Mood of Chef varies from time to time 3) There is no universal standard for the Taste Quantification 4) There is no innovation by Engineers on this segment
35	What should be the Penalty of Food Wastage..??	1) Imprisonment 2) Penalty in Money 3) Responsibility to grow within 3 months the quantity that he has wasted in 1 month
36	The only Solution to avoid Food Wastage in Hotel is	1) Create awareness to Public 2) Increase Food Price in Hotel 3) Charge penalty for the wasted Food
37	In the case of Expired Packed Food / Food Materials / Snack foods, who has to be blamed..??	1) Manufacturer 2) Retailer 3) Consumer 4) Government
38	What is needed at this moment..??	1) Prevent Food Wastage 2) Action after Food Wastage
39	After purchasing a Food. It is	1) Private Property 2) National Property
40	Major factors compelling to buy more Raw Food are	1) Marketing Team creating Buy 1 Get 1 Offers 2) Mindset to buy more when prices are low
41	Increase in the food Wastage may cause	1) More synthetic Foods - Flavouring Agents 2) Increased price of foods 3) More Global Warming 4) All of the above
42	Govt is thinking of Food Waste Management but not to avoid Food Waste	True Wrong
43	Engineers contribution in Food Preservation is more than Preventing the Food Wastage	True Wrong
Opinion on Engineering Solution		
44	What is needed at this Moment to avoid Food Wastage..??	1) Govt Policy to avoid Food Waste 2) Punishment for the Food Waste 3) More NGO's to distribute excess Food 4) Engineering Solution to prevent Food Wastage

45	Possible Engineering Solution to avoid Cooked Food Wastage is	1) Pre-booking (6 Hours Earlier) by Customers to Restaurants 2) Digitizing the taste of Food 3) Platform to showcase the Numerical value of taste for each food on each day 4) Tracking the Food Waste done by every individual 5) All of the above
46	Like CIBIL Score, a system is needed to calculate the amount of Food Wasted by 1) Each Individual 2) Each Firm on daily basis	Yes No
47	Marriage Celebrations are organized segment but Cooking department is unorganized	Yes No
48	To avoid Food Wastage in Marriage Halls	1) Less Food has to be Cooked 2) Don't cook Food, give them Food Coupon to buy Food on any day in any Hotel 3) A system that counts People at entrance of Venue and prepares food accordingly is needed
49	In India, emotions are more valued than the Food as	1) Food is not costly 2) Emotions are overrated for one's dignity
50	Which system of dining is better in decreasing the Food Wastage	1) Buffet System 2) Plated / Sit Down Food System 3) Unlimited Meals
51	Immediate Engineering Solution needed in avoiding Food Wastage is	1) Awareness Website and Videos 2) Excess Food Distributing Networks 3) Track each Individual for quantity of Wasted 4) Digitizing Taste 5) None of the above
52	Every Hotel should be tracked on the following every day	1) Raw Food Wasted during Cooking 2) Cooked food Wasted due to non tastier food 3) Cooked food Wasted due to non availability of Customers 4) All of the above
53	Swiggy like portal helped in rating a Restaurant for the food prepared but	1) Such ratings are only for the food prepared on that particular day 2) Swiggy cannot assure the same taste of food by the Hotel every day 3) A taste good for one can be a bad for other, hence rating does not help completely in minimizing the Food Wastage 4) All of the above

54	If Government can bring laws to relax the tax payment till 5 Lakhs of Income, it can also bring laws to put penalty on individual wasting more than 50 KGS of Food per year	Yes No
55	Government has to mandate every home to have one Food Decomposer Machine	Yes No
56	Avoiding Food Waste is	1) Individual Responsibility 2) Government Responsibility
57	Engineer solving Social Issues is the Creator of Healthy and Self Sustainable Society	Yes No
58	Every government office must have the photo of Engineer who has solved social problem along with National Leaders	Yes No
59	Awarding and dignifying the Engineer innovating the solution to social problem can motivate all Engineers to solve such other issues	Yes No
60	100 % of associated Indian Laws implementation and monitoring is needed at this moment	Yes No

Appendix 02

Photo Proof of Public Survey







Appendix 03

Engineering Solution by Student

Solutions are provided to the following problem statements as a Engineering Student.

1. Avoiding Food Preparation without plan in Home and Hotels
2. Rating Food Taste everyday in Hotels as everyday taste varies
3. Avoiding Excess Food Preparation in Events, Marriages and Parties
4. Possible actions to save food other than redistributing to Orphanage and Slums
5. Tracing every individuals' food waste score

Solution:

- Ans: Recipe management mobile application : develop intuitive and user-friendly mobile application that Provide access to a vast database of recipes. these apps will allow users to plan their meals in advance by selecting Recipes ,creating shopping lists, and setting reminders for cooking times. this technology can bridge the gap by providing users with a structured plan for food preparation .
- Ans.Food quality monitoring sensors :install IOT sensors in hotel kitchen that can monitor and measure Various parameters of food quality ,such as temperature ,humidity ,and freshness. these sensors can provide Rael-time data regarding the condition of the ingredients and the cooking process ,ensuring consistency in Taste. hotel staff can use this data to make necessary adjustments and maintain a high standard of food quality.
- Ans: Green and digital technologies are increasingly being used to reduce food waste at consumer level, including in storage, packaging, pre-treatment, portion control, compost, traceability, and supply-demand matching. Once the wedding is complete and guests have eaten, NGOs are given a call and they come with their trucks to pick up leftover food which is immediately sent to places where underprivileged or poor community resides. This way, good use of food is assured and food wastage at weddings avoided.
- Ans: Lean Path is a food-waste-prevention system that combines software with a smart scale and camera to track, monitor and calculate the impact of food waste in commercial kitchens. Staff use the scale to weigh and classify everything that is thrown out, from a piece of produce dropped on the floor to the food customers do not order or leave on their plates, and the software performs robust analyses to identify patterns. By

placing the scale next to or above the kitchen's main garbage container, this documentation step can be implemented without compromising or interrupting staff's work pattern.

- Ans: Place labeled containers and tracker sheets in each location where you will collect food waste, such as the prep station, dish pit, etc. Record information on the tracking sheet each time wasted food is scraped into the bin. Use simple methods to keep track of quantity like plate size. Descriptions like 'one potato' or 'one piece of chicken breast' are enough to be effective. You could also use the hand method by counting out palm-sized portions of the food you are eating." Taylor also warns against overthinking it

Appendix 04

Case Study Questions

Following are the list of 20 case study questions worked in this Activity:

- Do a short interview with your mother/ guardians about the food the waste ..? ask her the following questions ..
- Quantity of wastage before cooking in grams per day..? Ans: around 250-350 grams per day.
- Quantity of wastage left on plates in grams per day..? Ans: around 75 grams per day.
- Quantity of cooked food left by the end of the day in grams per day..?



Ans: it depends on the particular day , it may be around 100-500 grams per day.

- has refrigeration solved the food waste issue..?

around 90% of food wastage issue is solved, but items that can't be stored in the refrigerator are get wasted.

- water consumption in a home per day..? Ans: around 25-30l.
- water source in home..? Ans: corporation.
- Do a short interview with near by vegetable and fruit shop keeper about the food wastes? ask him/her the following questions

a.quantity of vegetable/fruits left unsold in KGS per day..?

Ans: around 8-10KGS per day.



b.quantity of vegetables /fruits damaged in KGS per dayw.?

Ans: around 2-3 KGS per day.

c. what does he do with damaged/unsold/ rotten/vegetables/fruits.?

Ans: he will try to sale it for half rate or he will feed for street animals.

d. any process followed to remove to remove the rotten vegetables or fruits..?

Ans: there is no particular process for it so he will do it manually.

- Discuss on the mode of solid waste processing in different countries

. Ans: * colombia put the plastic for recycling.

*In Indonesia , people can trade trash for free health care.

- sweden has adopted a recycling policy which funnels all the energy generated by burning waste into the national heating network.
- semakau landfill: it is a bio-diversity hotspot that is home to flourishing mangroves.
- Keep a record of food waste per one day in your home Ans:

Particular	Waste quantity	Reason to consider as waste
Raw food waste in GMS	100-200 gms	Spoiled food is considered As waste
Cooked food waste in GMS	300-400 gms	Left over food is considered as waste
Water waste in LTRS (tank filled per day analysis)	60-70 L	Leathered water is considered as waste



- Do a short interview with nearby hotel owner/worker about the food waste..? ask him/her the following questions.

- Quantity of raw food wasted in grams per day..?

Ans: around 500 grams per day

- Quantity of cooked food left unsold in grams per day..?

Ans: it mainly depends on the day and unsold food may ranges from 2000 grams.

- Quantity of cooked food left on plate by customer in grams per day..?

Ans: around 30-50 grams.

- what does he do with leftover food on plates..?

Ans•. throw it to garbage or else they will feed street animals

- e. How much he pays to garbage collector per month to collect food waste..?

Ans: he pays 100Rs per month.

- f. How much money he loses due to food waste per month..?

Ans: it depends on how much they have invested , they will lose around 5-7% per month.

- Do a short survey on list of food that you have wasted in your 1 day food cycle. Ans:

List of raw food	Reason	List of cooked food	Reason
Vegetables	Peels cannot be used for cooking	Curry leaves	I personally don't refer
Fruits	Spoiled fruits cannot be used	Green chills	It trigger abdominal pain

- Interview with your parents on following question and get answer in Yes/No. a.Do they know scientific process to preserve pickels other than refrigeration..? Ans: Yes.

b.Do they know scientific process to preserve cooked food other than refrigeration..?

Ans:Yes.

c.Do they know scientific process to preserve raw food other than refrigeration..?

Ans:Yes.

d.Do they know scientific process to preserve fruits other than refrigeration..? Ans:Yes.

e.Do they know scientific process to preserve the meats..? Ans:Yes.

- "Restricting people to not to waste food is the privacy violation. Everyone has right to buy/eat/throw whatever food they have". do you agree this..? comment

Ans: Yes, people have their own right to buy/eat/throw whatever food they have.

- "Some people eat chilly . Some people do not" Hence if any individual leaves the chilly on food plates can it be considered as food waste...?

Ans: Yes it is considered as the food waste.

- "illiterates know the value of food more than literates" Do you agree. Ans: No, it depends on the individual how much they value food.
- Food wastage in local hotels is less compared to the star hotels. Comment

Ans: Yes, food wastage in local hotel is less compared to the star hotels because quantity of food prepared in local hotels is less compared to star hotel.

- "Food waste is the result of un-planning of the day to day activity". Do you agree..? Justify the same

Ans: Yes, if we plan for the day how many will eat and how many won't it will reduce the food waste.

- "Government should prescribe the limit of food wastage per individual per year".

Do you support this..? Comment

Ans: Yes, this may reduce the food waste because people may stop wasting food due to restriction implemented by the government.

- "Senior Citizens / Diseased Individuals feel like eating but upon receiving food on plate, they eat only half...!!" Now this food goes on waste. Can this be

considered as fault of Senior Citizen / Diseased Individual / Person serving food..??
Comments

Ans: Yes, it is the fault of the person serving food, because as knowing they are senior citizens/diseased individual he/she should serve according to their capacity.

- What should be the penalty of Food Wastage..?? Justify
- Imprisonment
- Penalty Fee
- Responsibility to grow within 3 months the quantity that he has wasted in 1 month

Ans: b. penalty fee, due to the fear of penalty people will automatically reduce the food wastage.

- Connecting Surplus food left to Foodless is auspicious. But this doesn't solve the issue of Food Wastage. It can just be a response to the wasted food.

Do you agree...?? Comment

Ans: Yes, it is the good response but he/she may provide the food to foodless people for few days , after few day they will become lazy to provide food and it may get wasted.

- Every Hotel should be tracked on the following every day.
- Raw Food Wasted during Cooking
- Cooked food Wasted due to non tastier food
- Cooked food Wasted due to non availability of Customers Do you agree..?? Comment

Ans: Yes, by tracking the above personally they will come to know how much they are wasting per day and they will reduce it so may reduce their losses personally.

• In the case of Expired Packed Food / Food Materials / Snack foods, who has to be blamed..??. Comment

- Manufacturer
- Retailers
- Consumers
- Government

Ans: Retailers, they have to check the expired date of food before selling it to the costumer, because some costumer may be illustrates.

• 'Human Chefs has to be replaced by Machine Chefs. This way we can avoid taste alteration and food wastages". Do you agree..?? Comment

Ans: Yes, by keeping the machine to prepare the food, it avoid the change in food taste , it may help to reduce the food wastage.

• "Food is National Property not the individual's though he has paid for it". Comment

Ans: Yes, the commission has taken the view that the Right to Food is inherent to life with dignity and article 21 if the constitution of India which guarantees a fundamental rights to life and personal liberty should be read with articles 39(a)and4.