Waste it Not

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Certificate

This is to certify that

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Abstract

Purpose

The purpose of this application is to reduce the amount of food that goes to waste every day, by getting places like restaurants, supermarkets, events in touch with NGOs and the underprivileged.

Methods

The data for development of this app will be collected from:

- students through close ended surveys
- households through interviews
- restaurants through interviews
- NGOs through interviews
- a review of twenty five research papers

Results

- There is no definite data and definition with regards to food wastage. Data is rarely reported through national statistical offices. This data is reported by different ministries and institutions which leads to inconsistent data.
- There is lack of knowledge, motivation, ability and opportunity amongst the general public. They also underestimate their own waste.
- After informing the sample about how big a problem food wastage is, all of them are willing to work towards curbing it.

Conclusion

Individuals are willing to work towards this issue and it can be huge difference in the situation if they are provided with proper knowledge and opportunities. The government also needs to step up in the formulation of specific legislation and setting up of some targets to reduce the specific type of food components from main waste stream which can be the first important step for any country.

Introduction

Food wastage is fast becoming a worldwide problem of the first order, because there are millions of families with children dying of hunger and others live in abundance and many others throw the food carelessly. Many of us waste food almost every other day, but the actual losses of food and the waste of matter are greater than the consumer's food waste. From agricultural fields and storage sites, through transportation, processing, markets, to places of consumption such as homes, schools, restaurants, and workplaces, more than half of all food produced in the world is wasted.

Here are some intriguing comparisons:

- According to the Food and Agriculture Organization of the United Nations (FAO), one-third of the food produced for human consumption is lost or wasted worldwide, equivalent to around 1,300 million tons per year.

- Roughly one third of the food produced in the world every year, which is approximately 1.3 billion tonnes, gets lost or wasted, which could instead have fed 3 billion people

- In the United Kingdom, 5.6 million people live in deep poverty, where the provision of food is a daily challenge; however, at the same time, 15 million tons of food is wasted per year, with almost half discarded in households in the United Kingdom.

- In England, for example, schools shed about 123,000 tons of food a year at a cost of £ 250 million per year. On average, a US student is responsible for 67 pounds of waste food discarded each school year.

- In developing countries, a lot of labor is needed to produce food. In the most advanced countries, machines and technology are used, but the loss of energy, the destruction of vegetation lands, the use of chemical products and their impact on the environment are phenomenal. By bringing all this together, it is clear that a big problem has arisen and that we are all in a position to help in one way or another.

- In the Indian context, the country ranks 97 out of 118 countries in the Global Hunger Index for 2016. Around 20 million people go to bed hungry and 7,000 people die of hunger every day.

India's lowest ranking is due to the fact that most of the top countries use much of their land to raise birds, while a large part of India is devoted to agriculture, which explains the greater waste of cereals, legumes, fruits, and vegetables in India.

A recent study conducted by Indian Institute of Management, Kolkata, revealed that only 10 percent of food has cold storage facilities in India, this factor, accompanied by inadequate supply chain management, has made India become an important contributor to food waste in both waste before and after harvest in cereals, pulses, fruits, and vegetables. India ranks 63 out of 88 countries in the Global Hunger Index with 20 million Indians starving on a given night, but despite this, in India, almost 21 million tons of wheat is wasted each year.

Food is lost or wasted throughout the supply chain, from initial agricultural production to final domestic consumption. The loss of food represents a waste of the resources used in production, such as land, water, energy, and inputs, which increases the greenhouse gas emissions in vain. The greatest waste results in land degradation by approximately 45%, mainly due to deforestation, unsustainable agricultural practices and excessive extraction of groundwater. Waste also causes national economic losses and also has a great impact on climate change and results in a greater carbon footprint.

There is a saying that "one man's trash is another man's treasure". For us, wasting food is normal, but for someone who has not eaten anything in recent days, it is a treasure. By wasting food, we are not only playing with their lives, but we are also depleting our own environment, as shown above. Therefore, in every way, it is a real threat to society. As responsible citizens, it is our responsibility to act more proactively and minimize food waste. Alone, we can still do a little. But together, we can bring a great change and make the world a better place to live.

Literature Review

What is Food Wastage?

Food loss and food waste refer to the decrease of food in subsequent stages of the food supply chain intended for human consumption. Food is lost or wasted throughout the supply chain, from initial production down to final household consumption. The decrease may be accidental or intentional but ultimately leads to less food available for all. Food that gets spilled or spoilt before it reaches its final product or retail stage is called food loss.

Primary Reasons for food wastage

1. The consumers' lack of sufficient motivation, ability and opportunity to reduce food waste, with problems specifically in the lack of knowledge and a lack of planning and prioritizing. It can be found or it is expected that most consumers are to varying degrees against food wastage and also aware of the existence of the problem, but they might underestimate their own food waste.

2. The lack of infrastructure in many developing countries and poor harvesting/growing techniques are likely to remain major elements in the generation of food waste.

3. Insufficient coverage of other areas of the food supply chain does not allow an informed view of where most food waste occurs.

4. The fruit and vegetable department had the largest recorded wasted mass, with most of this recorded waste coming from rejections.

One major reason for improper food waste management is a lack of proper definition of food wastage, insufficient data and the definition varying from region to region.

1. Challenges remain with regards to data and definitions. Data are rarely reported on a regular basis through national statistical offices, and are either reported by different ministries or academic researchers using different measurement methodologies and definitions.

2. Much of this data is also difficult to access without negotiating with a large number of data holders with different concerns about privacy and confidentiality. For some parts of the

waste stream, there is a lack of sufficient data. 3. In order to establish a reliable food waste dataset, an important first step is to develop a common methodological framework for food waste data estimation. Whether food waste should be measured by its economic value, its volume, its weight, wet or dry, its caloric content is being discussed.

4. Thus the conclusion remains that while there are many existing food waste studies, they are highly variable, both in terms of geographical relevance and methodology. Without a more comprehensive understanding of the food waste being generated, it is very difficult to improve the environmental performance of our waste management systems or improve our ability to make the most use of increasingly scarce resources.

Effects of Food Wastage

1. Approximately $1 trillion of food is lost or wasted every year, accounting for roughly one-third of the world's food. According to the U.N. Food and Agriculture Organization (FAO), reversing this trend would preserve enough food to feed 2 billion people, more than twice the number of undernourished people across the globe.

2. Wasteful behavior in developed countries not only affects them but also deprives developing countries of their fair share of food and resources.

3. The carbon footprint of food produced and not eaten is estimated at 3.3 billion tons of greenhouse gases.

4. Each time food is wasted, all the resources that went into producing, processing, packaging, and transporting that food is wasted too. This means huge amounts of chemicals, energy, fertilizer, land and 25% of all freshwater in the U.S. is used to produce food that is thrown away.

Reduction of Food Wastage

1. The formulation of specific legislation and setting-up of some targets to reduce the specific type of food components from the main waste stream will be the first and more imperative step for any country. It is also equally important to develop a database for the food waste quantity and quality for improved management of resources

2. A study suggests that current surplus food redistribution in the cities can make a significant contribution to food waste reduction and that it should be considered as a strategy to reduce food waste.

3. Reducing the storage temperature proved to have the potential to increase shelf-life which can lead to reduced waste. However, the way of achieving this temperature reduction is of great importance for achieving a net saving in terms of both carbon footprint and money.

4. In developing countries, FW management is seriously lacking in whole management systems and among legislative measures. By making efforts in implementing FW management systems, the future perspective of FW management in developing countries could create opportunities in handling energy demands and moving toward sustainable development.

5. Valorisation: For food waste that cannot be prevented, valorisation options should be used to reduce the negative effects of food waste. This can be achieved mainly by replacing other products in a substituted system. Target products for efficient waste valorisation measures should, therefore, be foodstuffs that can be used to replace other products or services that are expensive, resource-demanding and/or have a high carbon footprint.

6. Anaerobic Digestion: Anaerobic digestion is the process by which organic matter such as an animal or food waste is broken down to produce biogas and biofertilizer. It provides greater environmental benefits in relation to global warming potential, acidification, and ozone depilation compared to incineration and composting of food waste. Use of produced biogas as car fuel provides larger environmental benefits compared to a use of biogas for heat and power production. The use of produced digestate from the anaerobic digestion as substitution for chemical fertilizer on farmland provides the avoidance of environmental burdens in the same ratio as the substitution of fossil fuels with produced biogas.

7. Increasing awareness of the important topic of food waste worldwide provides essential knowledge for decision makers and generates input to awareness campaigns, induces changes in organizational structures, and improves technology as well as fostering social understanding.

8. Exploring the association between religion/religiosity and food waste generation as this may be relevant when designing new policies and awareness campaigns that aim at minimizing FLW.

9. The review documents that psychographic variables play a crucial role in consumer-related food waste behaviors. They motivate consumers to tackle food waste (environmental concern, attitudes, values), they influence their trade-offs and preferences (health and safety concern, environmental concerns, convenience, financial resources/saving money etc.) and have implications for their buying and consumption behaviors. (impulsiveness, curiosity, and interest in new experiences, structuredness/ organization, enjoyment of being thrifty, cooking enjoyment, etc.).

Future Scope

1. This leads us to make it more aware to the vendors and citizens of the country about health hazards caused due to the bacteria in wasted food.

2. Identify a set of common waste collection definitions, standards, and objectives that can be incorporated in all state waste data collection guidelines.

3. Investigate opportunities to improve data collection and reporting on pre- and post-consumer food waste by businesses and food charities.

4. Include the entire supply chain in policy considerations

5. We shall make people more aware of the impacts of using coal power as car fuel instead of using biogas from wasted food. It is a good methodology for reducing the health impacts caused by wasted food.

6. Biogas acts as a fertilizer and requires more research to use it to its fullest potential

7. More synchronized supply chains that use intelligent packaging and data sharing to reduce excess or out-of-date stock.

8. Increased use of retail ready packaging to reduce double handling and damage and improve stock turnover, while ensuring that it is designed for effective product protection and recoverability (reuse or recycling) at end of life.

9. Adoption of new packaging materials and technologies, such as modified atmosphere packaging and oxygen scavengers, to extend the shelf life of foods.

Limitations in this particular issue are likely to increase as the food system becomes more complex and global in nature. It is clear that food availability statistics provide information that should not be used as an estimate of individual dietary consumption and that actual food consumption data will be needed to assess the impacts on the health of future developments in the agricultural and food systems.

Methodology

Planning

During this phase, a conceptual model of the application was created. The various users of the software such as restaurants, event venues, NGOs, the underprivileged people were decided and how can the app be beneficial to each of these categories was discussed. The scope of the app was increased from just helping in reduction of food wastage to creating awareness at least amongst the users of the app by giving them daily tips and intriguing facts on food wastage.

This phase took us a time period of 2 months.

Requirement Gathering

A close ended survey was done with the general public to get a feedback on the idea of our app and how would they want the app to work like. The results of the survey are below.

1. Are you aware of the consequences of food wastage (for example, ¼ of wasted food could feed all 795 million of undernourished people in the world)?

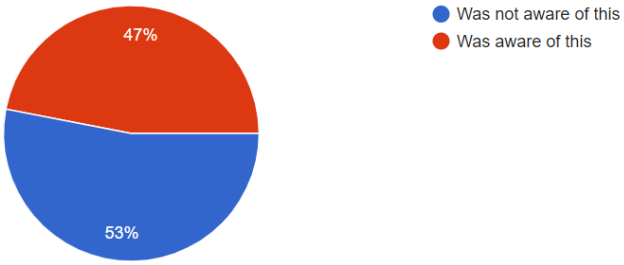

Figure 1: Awareness of food wastage

2. Are you willing to help towards reduction of food wastage?

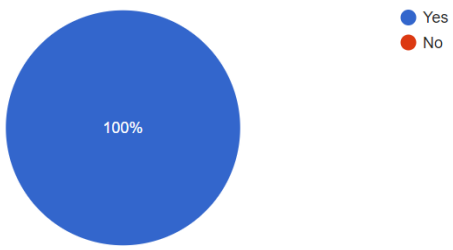

Figure 2: Willingness to help towards reduction of food wastage

3. Largest amount of wasted food is produced at:

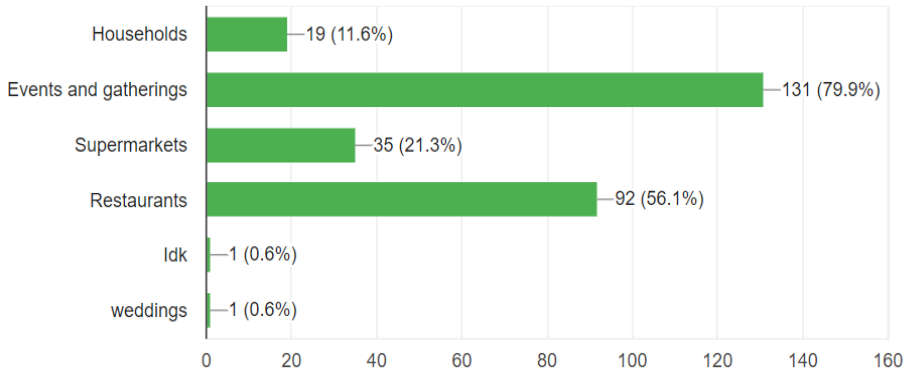

Figure 3: Largest source of wasted food

4. Do you like the idea of delivering wasted food to others?

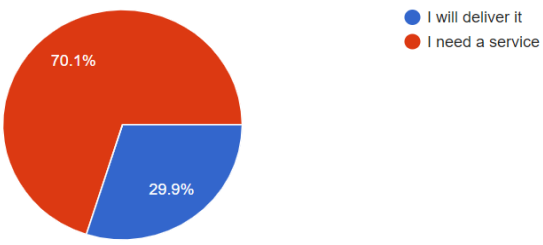

Figure 4: Idea of delivering wasted food to others

5. Are you willing to volunteer for delivering wasted food to others?

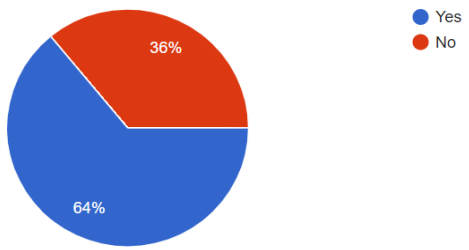

Figure 5: Volunteering for delivery of wasted food

The above survey took a period of 4 days.

For gathering information for designing a better and more useful application, inputs and suggestions will be collected from restaurant owners and NGOs through interviews. This will be done to improve the feasibility of the app.
This process will take a time period of two weeks.

Minimum Hardware and Software Requirements:

- Computers with at least 4 GB ram to design, develop the system.
- Internet Connection
- Java SE
- Android SDK

Design (User Experience and User Interface Design)

This phase will include wireframing the app to understand the future functionalities. Drawing detailed sketches of the app will help to uncover usability issues. There should be a clear understanding of how separate features of the app like how will the UI will look for a food donor or a food receiver or a volunteer and combine together to demonstrate the relationship between each screen and how the every user will navigate through the app. Focus should be on enhancing the user experience and simplicity as many of the users of the app will be uneducated and people below poverty line. Determining the style of the app based on the users is a critical part of this phase.

Design phase will take a minimum period of one week.

Coding

This phase is basically the back-end of the application which requires us to code the app on a platform, which in our case is Android Studio.

This phase will occupy the maximum time which can be up to three months.

Testing

This phase will be performed by people who were not a part of the core development of the application. This will ensure a more genuine experience and honest feedback.

- Functional Testing: To ensure that all the features of the app work as required.
- Usability Testing: To ensure that the app is user friendly and easy to use and understand. A group of new testers will be given the app to use for this for a "first-use" experience.
- Performance Testing: To ensure that the app is responsive quickly.
- Device-specific testing: There are tens of thousands of combinations of devices and operating systems in the world. When testing, be sure to test your application on numerous screen sizes and operating system versions.

This phase will take a time period between one – two weeks.

Deployment

There are two main components to implementing our mobile application in the world. The first will be implementation of your web server (API). The second is deploying the application in Google Play Store and Apple App Store.

This phase will take a day to be completed.

Maintenance and Monitoring

There are numerous libraries that can be used to reliably track application locks. These libraries include information about what the user was doing, what device they were on, and a lot of technical information that is crucial for their development team to solve the problem. Our app can provide us with a lot of understanding about the users (age, gender, location, language, etc.) and how are they using it(time of day, time spent in app, screens viewed in

app, etc.). This app can provide a lot of data in the field of food wastage which currently isn't available properly.

This phase doesn't have a certain time period as issues need to be resolved as when they occur.

Summary and Conclusion

One-third of the food produced for human consumption is lost or wasted worldwide, which is more than enough to feed the entire malnourished population of the entire world. Food wastage is becoming a rising concern over all the countries as it leads to waste of the resources used in production, such as land, water, energy, and inputs, which increases the greenhouse gas emissions in vain.

The most important step to curb this problem is by creating awareness amongst the masses and providing them with opportunities and ability to reduce their own food waste at the least.

We plan to implement the technique of food rescue , also called food recovery, which is the practice of safely retrieving edible food that would otherwise go to waste, and distributing it to those in need. The recovered food is edible, but often not saleable. Products that are imperfect in a way and are edible – a bruised apple or day-old bread – are donated by grocery stores, food vendors, restaurants, and farmers markets. With the help of this app we aim to reduce the amount of food wasted every day and also lessen the number of people going to bed hungry every night.

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