BUSINESS REQUIREMENT ANALYSIS

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EMPOWERING SUSTAINABILITY: ACTIONABLE STRATEGIES TO REDUCE FOOD WASTAGE

GROUP - 3

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BUSINESS REQUIREMENT DOCUMENT

VERSION HISTORY

Version Number	Date	Description	Author	Reviewed By	Approved By
1.0	15/06/2024	Initial draft for reducing food waste in college hostel mess	Rhytham Jain Shubham Verma Tulasi Thanmai Channa Abhishek Padhy Abhinit Kumar		

EXECUTIVE SUMMARY:

Reducing Food Wastage in a College Hostel Mess

This document presents a high-level description of a proposed system to significantly reduce food wastage in a college hostel mess. The initiative involves creating awareness among students to encourage responsible food consumption behaviors, thereby minimizing waste. The project includes the current state (AS-IS) and future state (TO-BE) diagrams, business rules, and detailed business requirements to guide the implementation effectively.

The goal is to develop a sustainable, cost-effective, and environmentally friendly approach to managing food waste. By addressing immediate environmental concerns and fostering a culture of sustainability within the college community, this project aligns with the mission of JAGSoM B-School.

INTRODUCTION:

About JAGSoM

JAGSoM is amongst the select few Business Schools in India with an International Profile: AACSB Accredited & QS Ranked for Marketing, Finance and Analytics programs.

JAGSoM B-School Mission Statement:

Nurture holistic, socially responsible, and continuously employable professionals.

Current JAGSoM Waste Management:

At present, JAGSoM College has a basic food waste management system in place. The primary method of handling food waste involves collecting the leftover food from the hostel mess and donating it to a local piggery. Daily food waste collected go upto 40 kg .This approach helps in recycling the food waste, but there are several limitations and opportunities for improvement.

Project alignment with mission statement:

The proposed food waste reduction project aims to address these challenges by implementing a comprehensive system that includes precise measurement of food waste, increased student awareness, and data-driven strategies for waste reduction. This initiative will not only enhance

operational efficiency but also contribute to the college's mission of nurturing socially responsible and continuously employable professionals.

This food waste reduction proposal directly supports the mission of JAGSoM B-School by:

- Holistic Development: Promoting critical thinking about food consumption habits and their broader impact.
- Social Responsibility: Instilling environmental stewardship and sustainability practices.
- Continuous Employability: Providing students with valuable knowledge and skills in sustainable practices, enhancing their professional prospects.

If approved and implemented, this initiative will enable JAGSoM B-School to cultivate socially responsible students who are aware of their environmental impact and equipped to make sustainable choices, thereby contributing positively to society and the global workforce.

PURPOSE AND SCOPE OF DOCUMENT

Purpose

The primary purpose of this project is to develop and implement a comprehensive system to significantly reduce food wastage in the college hostel mess. This system aims to create awareness among students about responsible food consumption, implement precise measurement of food waste, and utilize data-driven approaches to improve food management practices. The initiative aligns with the mission of JAGSoM B-School to nurture holistic, socially responsible, and continuously employable professionals by fostering a culture of sustainability and environmental stewardship.

Scope

The scope of this project encompasses several key components, which include the implementation of a food waste measurement system, student awareness campaigns, waste data analytics and reporting, and the use of motivational posters. The project activities are designed to be comprehensive and continuous, ensuring long-term effectiveness and engagement.

Out of Scope:

1. **Non-food Waste:** The BRD focuses on food waste reduction. Other types of waste management, such as paper waste or plastic waste, are out of scope unless directly related to food waste reduction initiatives (e.g., reducing packaging waste).

2. **Infrastructure Changes:** Major infrastructure changes, such as building new waste processing facilities or modifying existing structures, are typically out of scope unless specifically included in the project's scope statement.

3. **Legal and Regulatory Compliance:** While the project may touch on compliance with waste management regulations, detailed legal and regulatory discussions, permits, or compliance audits are usually out of scope for the BRD.

4. **Financial Details:** The BRD may outline high-level cost estimates or budget allocations, but detailed financial discussions, such as specific budget lines, funding sources, or financial projections, are generally out of scope.

5. **Specific Technology Solutions:** While the BRD may mention digital systems for data logging or analysis, detailed technical specifications or discussions about specific software or hardware solutions are typically out of scope.

6. **Human Resources Management:** Detailed discussions about staff training, hiring, or performance management related to the project are usually out of scope for the BRD.

7. **Marketing Strategies:** While the BRD may include awareness campaigns, detailed marketing strategies or promotional plans are generally out of scope unless directly impacting the project's objectives.

8. **Long-Term Maintenance:** While the BRD may touch on initial setup and implementation, long-term maintenance and ongoing support activities are usually out of scope unless specifically included in the project scope statement.

PROJECT PARTICIPANTS AND CONTRIBUTORS

- Project Sponsor: College Administration
- Project Manager: Rhytham Jain
- Project members: Shubham Verma, Tulasi Thanmai Channa, Abhishek Padhy, Abhinit Kumar
- Mess Staff: Responsible for daily waste measurement and data recording
- Students: Primary participants in awareness campaigns and waste reduction initiatives
- Graphic Design Team: Develops campaign materials (posters, flyers, etc.), can be done by Business Analytics and Martech student volunteers
- Hostel Committee: Analyzes collected data, generates reports, and sets up and maintains the digital logging system
- Student Volunteers/Clubs: Assist in promoting and conducting awareness campaigns

Intended Audience

- College Administration: For oversight and decision-making
- Mess Staff: For implementation of the waste measurement system
- Students: To engage in and adopt sustainable practices
- Faculty: To support and promote the initiative within the college community
- Parents and Guardians: To be informed about the college’s sustainability efforts

Benefits

- Environmental Benefits: Reduced food waste contributes to lower carbon footprint and more sustainable resource use.
- Educational Benefits: Increased student awareness and understanding of sustainability practices.
- Operational Efficiency: Improved waste management processes through accurate measurement and data analysis.
- Cost Savings: Reduced waste can lead to lower disposal costs and more efficient use of resources.
- Community Impact: Sets a positive example of sustainability within the college and broader community.

BUSINESS OBJECTIVES

- Waste Reduction: Achieve a measurable reduction in food waste generated by the hostel mess.
- Student Engagement: Increase student participation in sustainability initiatives and awareness campaigns.
- Data-Driven Decisions: Use data analytics to inform and optimize food waste reduction strategies.
- Sustainability Culture: Foster a culture of sustainability within the college community.
- Continuous Improvement: Regularly review and improve waste management practices based on feedback and data analysis.

INTENDED BUSINESS SOLUTION

1. **Waste Monitoring**: Install systems to measure and monitor food waste daily to identify patterns and areas for improvement.
    - *Justification*: Accurate data on food waste levels is essential for targeting reduction efforts effectively.
    - *Implementation*: Set up digital weighing scales and logging software to record waste data.
2. **Student Awareness**: Conduct campaigns to raise awareness among students about food wastage and its impacts.
    - *Justification*: Educated students are more likely to participate in waste reduction efforts.
    - *Implementation*: Develop educational materials and hold workshops and events.
3. **Regulatory Compliance**: Ensure all operations comply with local environmental regulations, JAGSoM guidelines to avoid legal issues and promote sustainability.
    - *Justification*: Compliance with regulations is mandatory and ensures long-term project viability.
    - *Implementation*: Regularly review local regulations and adjust practices as necessary.

ACTIVITY DIAGRAMS

AS-IS DIAGRAM

- **Description**: The current process where high food wastage occurs due to large portions and a lack of waste monitoring.

1. Food is prepared in large quantities without precise control over portion sizes.
2. Students serve themselves or are served generous portions.
3. Uneaten food is discarded without measurement.
4. Waste disposal involves sending food waste to landfills.

TO-BE PROCESS FLOW DIAGRAM

- **Description**: The desired process that includes portion control, waste monitoring, and biogas conversion.

1. Food is prepared with portion control measures in place.
2. Students are served optimized portion sizes or serve themselves with resized plates.
3. Uneaten food is measured using weighing machines.
4. Waste data is recorded and analyzed.

5. Organic waste is converted into biogas, reducing landfill use.

GAP ANALYSIS

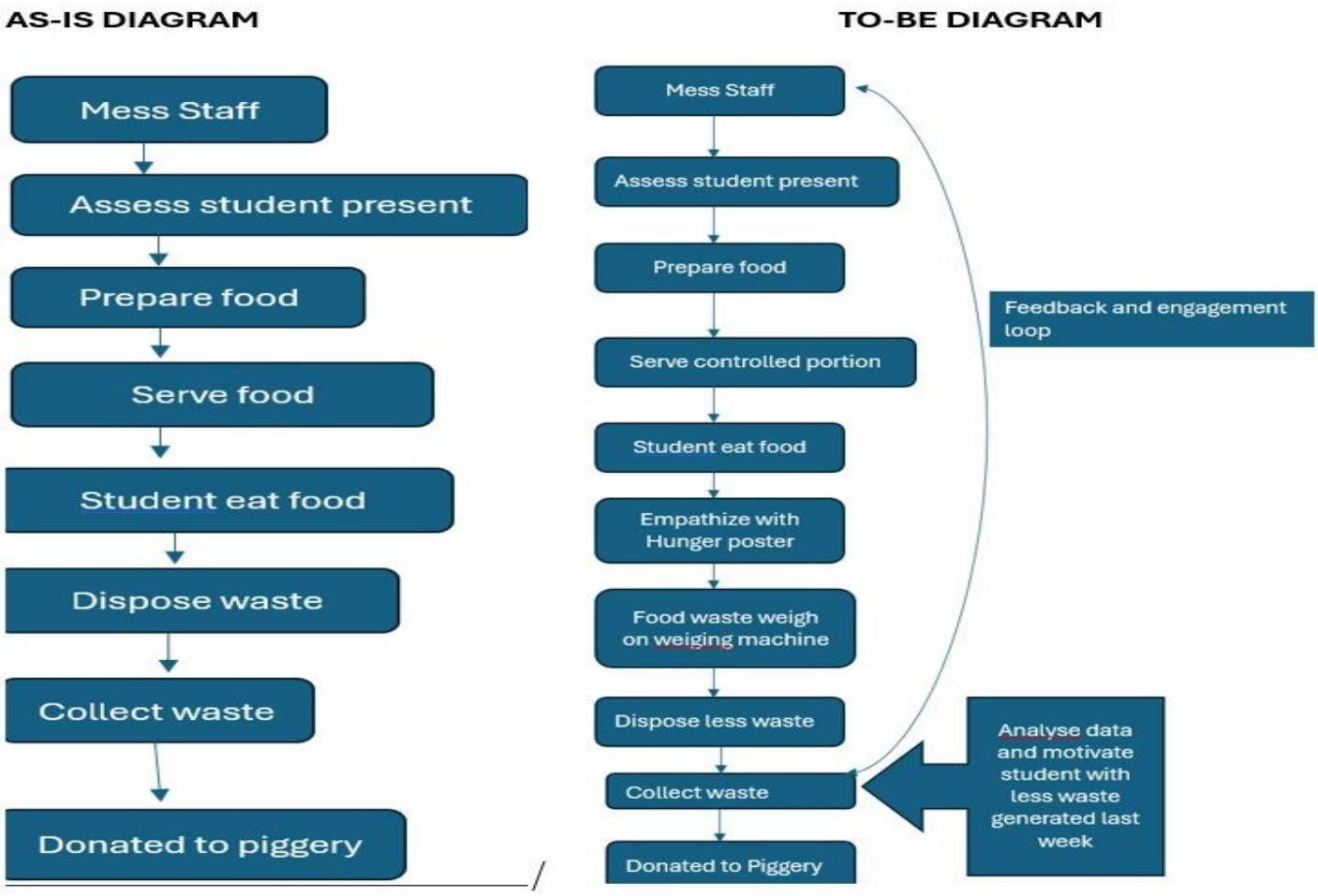
Current State (AS-IS):

- High food wastage due to large portions and lack of waste monitoring.
- No utilization of food waste for energy.
- Limited student awareness of food wastage issues.

Desired State (TO-BE):

- Significant reduction in food waste through portion control, waste monitoring, and biogas conversion.
- Food waste is measured daily, and data is used to improve processes.
- Students are aware and actively participating in waste reduction.

GAP ANALYSIS



BUSINESS REQUIREMENTS

Functional Requirements

Food Waste Reduction System

Actor Name	Actor Type	Actor Role	Comments
College Administration	Primary Stakeholder	Provide funding and support for the project	Funding approval and strategic guidance
Students in hostel and colege	Secondary Stakeholder	Participate in waste reduction practices	Active involvement in waste measurement and reduction
Mess Staff	Operational	Implement and use waste measurement systems	Daily use of digital weighing scales and data logging systems
Data Analyst team-Analytics students	Support	Analyze waste data and generate reports	Use data analytics to identify trends and areas for improvement
Graphic Design Team Martech and Analytics students	Support	Create educational materials for awareness campaigns	Develop engaging posters, flyers, and social media content

Awareness and Education Campaigns

Actor Name	Actor Type	Actor Role	Comments
Students in hostel and in college	Primary Stakeholder	Participate in awareness campaigns	Attend workshops, engage in social media campaigns
Mess Staff	Operational	Support and promote awareness activities	Assist in organizing workshops and distributing materials
Graphic Design Team-Martech and Analytics students	Support	Develop educational materials	Design posters, flyers, and social media content
Marketing Team-Martech and Analytics students	Support	Promote campaigns through various channels	Utilize college communication channels and social media platforms

Non-Functional Requirements

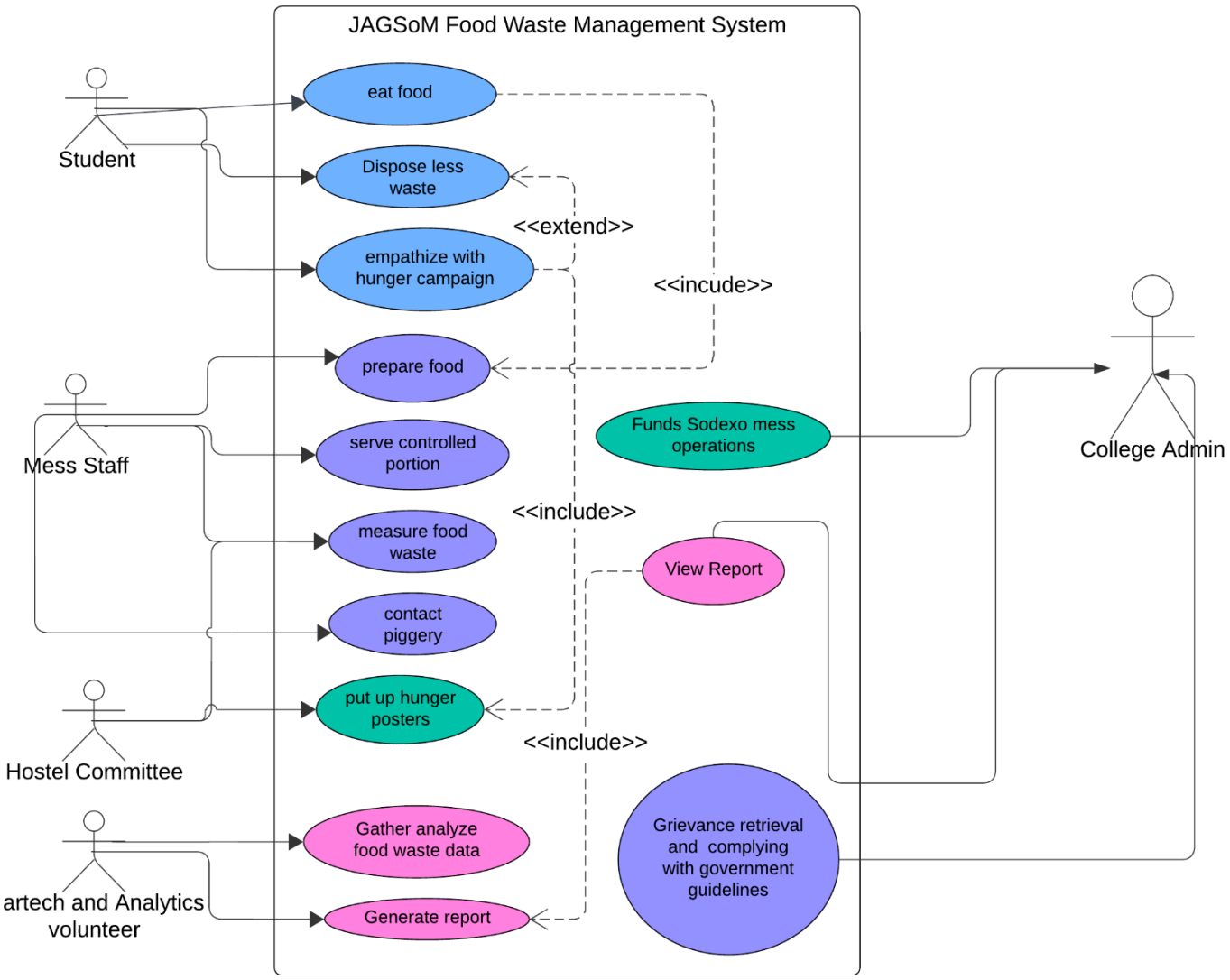
Food Waste Reduction System

- **Reliability:** The system should be reliable and accurate in measuring and recording food waste data.
- **Scalability:** The system should be scalable to accommodate future growth and changes in waste management practices.
- **User-Friendly:** The system should be easy to use and understand for mess staff, with clear instructions and training provided.
- **Data Security:** Ensure the security and confidentiality of waste data, complying with relevant data protection regulations.
- **Integration:** The system should integrate with existing college systems and processes seamlessly.

Awareness and Education Campaigns

- **Engagement:** The campaigns should be engaging and interactive to sustain student interest over time.
- **Effectiveness:** Measure the effectiveness of campaigns through surveys, feedback, and waste data analysis.
- **Sustainability:** Promote sustainable practices not only in waste reduction but also in the materials used for campaign promotion (e.g., use of recycled paper for posters).
- **Inclusivity:** Ensure that campaign materials and activities are inclusive and accessible to all students, regardless of background or ability.

USE CASE DIAGRAM



USE CASE 1: DESCRIPTION

Attribute	Food Waste Reduction System
Use Case ID & Name	UC-1: Waste Audit
Created by	Rhytham Jain and Team
Date created	13 June 2024
Primary Actor	Mess Staff
Secondary Actor	Hostel students
Brief Description	Install weighing machines to measure daily food waste and monitor the reduction over time. This system will help track the effectiveness of waste reduction initiatives.
Performance goal	Establish baseline data for waste reduction
Trigger	Formal interaction with mess staff
Performance Measures	Accuracy of data collection, Identification of baseline waste levels
Preconditions	Digital weighing scales installed
Postconditions	Baseline waste data recorded
Scenario	Audit conducted, Data analyzed
Extension point	N/A
Alternate scenario	1. Use manual methods if weighing machine fails. 2. Correct data entry errors through periodic reviews.
Related requirements	N/A
Related roles	N/A
Priority	High
Business rules	Complying with hostel rules and regulations

USE CASE 2: DESCRIPTION

Attribute	Awareness and Education Campaigns
Use Case ID & Name	UC-2: Hunger Poster Awareness Campaign
Created by	Rhytham Jain and Team
Date created	13 June 2024
Primary Actor	Social Awareness Team, College

Secondary Actor	Hostel students, Mess Staff
Brief Description	Implement a strategy to raise awareness about food waste through hunger posters. These posters will be placed strategically to remind students of the consequences of food waste and encourage responsible food consumption.
Performance goal	Raise awareness about food waste through hunger posters
Trigger	Poster creation and placement in front of food dustbins
Performance Measures	Visibility of posters, Impact on student behavior
Preconditions	Hunger posters created and ready for placement
Postconditions	Posters effectively convey message about food waste
Scenario	Posters designed and placed in front of food dustbins
Extension point	N/A
Alternate scenario	1. Regular replacement of campaign materials. 2. Trying different engagement methods based on feedback.
Related requirements	Poster design and printing
Related roles	Mess Staff
Priority	High
Business rules	Posters must be informative and impactful, Complying with hostel rules and regulations

FEASIBILITY ANALYSIS

The ROCE (Return on capital employed) calculation measure the efficiency of a company at deploying capital to generate sustainable, long-term profits.

Two solutions - campaign with weighing machine under garbage bin, three weighing machines cost Rs 15000 and posters would be Rs 4000. This project is taken because food wastage is a problem in college and hostel mess per day food waste amounts to Rs 3800 which is Rs 1387000 per year.
ROCE calculated:

1. Food Waste Reduction System:

- Assumption: Let's assume that the cost savings from reducing food waste will be considered as the net operating profit. Assuming a 30% reduction in food waste due to the implementation of the waste measurement system, which translates to an annual cost saving of Rs 416,100 (30% of Rs 1,387,000).

- Capital Employed:
  - Cost of three weighing machines: Rs 15,000
  - Total cost of posters: Rs 4,000
  - Total Capital Employed: Rs 19,000

$$ROCE_{FoodWasteReductionSystem} = \frac{NetOperatingProfit}{CapitalEmployed} \times 100\%$$
$$ROCE_{FoodWasteReductionSystem} = \frac{Rs416{,}100}{Rs19{,}000} \times 100\%$$
$$ROCE_{FoodWasteReductionSystem} = 2190.79\%$$

2. Awareness and Education Campaigns:

- Assumption: The net operating profit is calculated based on the projected increase in student engagement and reduced food waste due to the campaign. Let's assume a 20% reduction in food waste, leading to an annual cost saving of Rs 277,400 (20% of Rs 1,387,000).

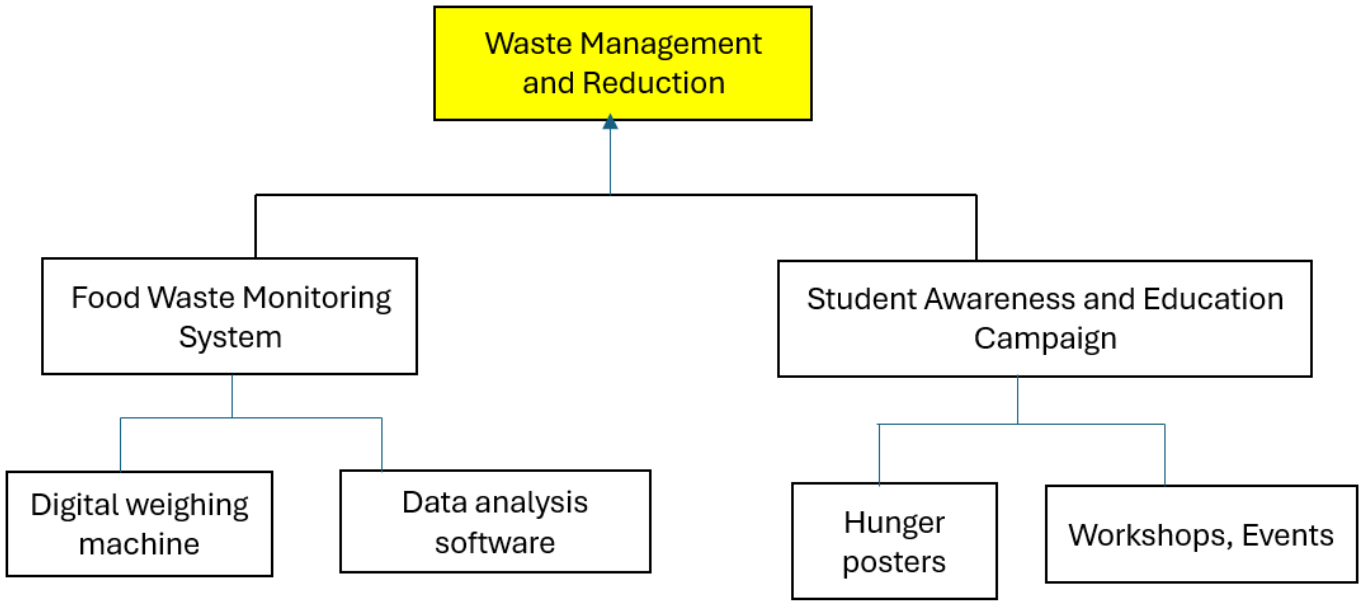
- Capital Employed:
  - Cost of three weighing machines under garbage bins: Rs 15,000
  - Total cost of posters: Rs 4,000
  - Total Capital Employed: Rs 19,000

$$ROCE_{AwarenessandEducationCampaigns} = \frac{NetOperatingProfit}{CapitalEmployed} \times 100\%$$
$$ROCE_{AwarenessandEducationCampaigns} = \frac{Rs277{,}400}{Rs19{,}000} \times 100\%$$
$$ROCE_{AwarenessandEducationCampaigns} = 1460.00\%$$

These calculations show the Return on Capital Employed for each solution based on the assumptions made regarding cost savings from reduced food waste and the initial capital investment.

For the Food Waste Reduction System, the net operating profit is ₹416,100, and the capital employed is ₹19,000, resulting in a ROCE of 2190.79%. For the Awareness and Education Campaigns, the net operating profit is ₹277,400, and the capital employed is also ₹19,000, resulting in a ROCE of 1460.00%.

WASTE MANAGEMENT AND REDUCTION TAXONOMY



AGILE APPROACH

The project will be built using an agile approach, which involves iterative and incremental development. The project will be broken down into smaller, manageable chunks, and each chunk will be developed and tested in a short iteration. This approach allows for continuous feedback and adjustments, ensuring that the solutions meet the needs of the users and stakeholders. The agile approach also promotes collaboration and communication among the team members, leading to a more efficient and effective development process.

Waste Monitoring Solution

1. **Develop a Minimum Viable Product (MVP):** This initial version should focus on core functionalities. In this case, the MVP could include:
    - **Digital weighing scales:** Install scales in key waste generation areas (e.g., cafeterias) to measure food waste.

    - **Logging software:** Develop a simple system to record waste data from the scales.
2. **Gather and Analyze Data:** Monitor and collect waste data over a period. Analyze this data to identify:
    - The amount of food waste generated.
    - The types of food being wasted most frequently.
    - Any patterns or trends in waste generation.
3. **Iterate on the Solution:** Based on your findings, enhance the system with features like:
    - Reporting tools to visualize waste trends.
    - Analytics to identify root causes of food waste.
4. **Continuous Improvement:** Regularly collect feedback from users (e.g., dining staff) and analyze waste data. Use this information to continuously refine the system for better waste management.

Student Engagement Solution

1. **Develop a Minimum Viable Product (MVP):** Create basic educational materials on food waste reduction. These could include:
    - Posters or flyers with key facts and statistics.
    - Informational handouts on food waste prevention tips.
2. **Pilot Program and Gather Feedback:** Implement the MVP with a small group of students. This could involve distributing the materials in cafeterias or common areas. Collect feedback through surveys or discussions to understand student reception and knowledge gain.
3. **Iterate on the Program:** Based on the feedback, expand the program with more engaging elements such as:
    - Interactive workshops on food waste reduction strategies.
    - Events like competitions or campaigns to promote awareness.
4. **Continuous Improvement:** Track student participation and monitor waste data to measure the program's effectiveness. Use this data to refine your approach and make the program more engaging for students.

SOLUTION PROTOTYPES

Picture: Food wastage bin will be kept on weighing scale near it

Picture: Hunger poster (similar posters will be pasted in front of food wastage bins)

CONCLUSION

This document outlines the requirements and processes necessary to reduce food wastage in the college hostel mess. By implementing these measures, the college aims to achieve substantial cost savings and promote sustainability. The success of this initiative relies on the cooperation of all stakeholders, including students, mess staff, and the college administration. Regular monitoring, evaluation, and adaptation will ensure the continuous improvement of the system.

APPENDICES

Appendix A: Project Timeline

- **Phase 1**: Initial Planning and Assessment (1 month)
- **Phase 2**: Procurement and Installation of Equipment (2 months)
- **Phase 3**: Training and Pilot Implementation (1 month)
- **Phase 4**: Full Implementation and Monitoring (6 months)
- **Phase 5**: Evaluation and Adjustment (ongoing)

Appendix B: Budget Estimates

- **Weighing Machines**: Rs.15,000
- **Educational Campaigns**: Rs.4000

Appendix C: Vendor Evaluation Criteria

- **Experience and Expertise**: Vendor should have a proven track record in installing and managing waste reduction systems.
- **Cost-effectiveness**: Solutions offered should provide value for money and be within budget.
- **Support and Maintenance**: Vendor must provide ongoing support and maintenance services.
- **Regulatory Compliance**: Solutions should comply with all relevant environmental regulations.
- **References and Case Studies**: Vendor should provide references and case studies of similar successful projects.

APPROVAL DOCUMENT

- The BRD (draft1) submitted aligns with the previously approved business case and solutions presented to Dr. Sundar. It details the implementation of the two chosen solutions viz., **Hunger Posters:** Raising awareness about hunger and food waste reduction, **Digital Weighing Scales:** Measuring food waste at designated disposal points. This were selected out of four initial options: hunger poster, weighing machine, biogas plant, resizing plates.

We opted for these solutions based on their:

- **Cost-effectiveness:** Both options require minimal investment compared to a biogas plant or plate resizing.
- **Measurable Impact:** The weighing scales will provide quantifiable data on waste reduction, while hunger posters can be evaluated through surveys or focus groups.
- **Feasibility:** These solutions can be implemented quickly with minimal disruption to current operations.

POINT OF CONTACT

For any Technical and Organizational inquiries:

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