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Campus Food Waste Tracking at Amrita Vishwa Vidyapeetham, Amritapuri Campus

1. Introduction

Food waste has emerged as one of the most pressing sustainability challenges of the 21st century. Globally, nearly one-third of all food produced is lost or wasted each year, leading to not only economic losses but also significant environmental and ethical implications. Universities, with their large campus populations and multiple dining facilities, are microcosms of broader society and play a crucial role in modeling sustainable consumption patterns.

Amrita Vishwa Vidyapeetham, under the divine guidance of *Sadguru Sri Mata Amritanandamayi Devi (Amma)*, integrates sustainability into every facet of its operations. As part of its commitment to the **United Nations Sustainable Development Goals (SDGs)**, particularly **SDG 12: Responsible Consumption and Production**, the university has initiated a systematic program to **measure, monitor, and mitigate food waste** generated within the Amritapuri campus. This report documents the methods used for food waste tracking, the findings from data collection, and the ongoing initiatives to reduce food waste and promote sustainable food management.

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2. Objectives and Scope

The **primary objective** of this study is to quantify the amount of food waste generated in the Amritapuri campus's dining facilities and identify areas where interventions can minimize wastage.

Specific objectives include:

1. To measure daily and monthly food waste volumes generated from dining halls, cafeterias, and hostels.
2. To identify key sources and types of food waste (pre-consumer and post-consumer).
3. To analyze behavioral and operational factors contributing to food waste.
4. To develop a baseline for continuous monitoring of waste reduction.
5. To recommend practical and sustainable interventions for waste minimization and recycling.

Scope

The study covers all major food service areas in Amritapuri Campus, including:

- Central student dining halls (North Indian and South Indian messes)
- Faculty and staff cafeterias
- Hostel kitchens
- Student canteen and refreshment stalls

The tracking was conducted over a period of one month, representing typical operational conditions during a regular academic semester.

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3. Methodology

A **three-stage approach** was used to assess food waste generation and management practices on campus:

Stage 1: Mapping of Food Flow

An initial survey was carried out to map the food supply chain within the campus—from procurement and meal preparation to serving and disposal. Stakeholder discussions were held with mess managers, cooks, and hostel representatives to understand existing practices.

Stage 2: Waste Measurement

Food waste was classified into two main categories:

- **Pre-consumer waste**: Food discarded during preparation (e.g., vegetable peels, spoiled ingredients, rejected cooked food).
- **Post-consumer waste**: Food left uneaten on plates by students and staff.

For each dining facility, waste bins were labeled and weighed using digital scales. Measurements were taken:

- **Twice daily** (lunch and dinner)
- Over a **30-day period**
- Using standardized containers (20 kg capacity)

Average waste quantities were calculated in **kilograms per meal** and **kilograms per capita per day**.

Stage 3: Data Compilation and Analysis

The collected data was compiled in Microsoft Excel and analyzed to determine:

- Daily waste generation (kg)
- Per capita waste (g/person/day)
- Waste composition and seasonal variation
- Trends and potential areas for reduction

Additionally, qualitative data was obtained through short interviews and observation sessions to understand behavioral causes and food management inefficiencies.

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4. Findings

4.1. Quantitative Results

Dining Facility	Average Meals Served/Day	Total Waste Generated (kg/day)	Per Capita Waste (g/person/day)
South Indian Mess	3,000	120	40
North Indian Mess	2,800	135	48
Faculty Canteen	400	12	30
Refreshment Stalls	500	8	16
Total (Average)	**6,700**	**275 kg/day**	**~41 g/person/day**

Over the 30-day observation period, the **average total food waste generated** across all facilities was approximately **8,250 kg/month**.

- **Pre-consumer waste:** 35% (mainly from vegetable peels, spoiled raw materials, and surplus cooking)
- **Post-consumer waste:** 65% (primarily plate waste)

4.2. Waste Composition

- Cooked rice and curries formed nearly **45%** of the total waste.
- Vegetable leftovers contributed around **25%**.
- Chapati and bread waste accounted for **10%**, while others (snacks, fruits, etc.) made up **20%**.

4.3. Key Observations

1. Food waste was significantly higher during weekends and special menus.
2. Lack of portion control and fixed meal servings led to uneaten food.
3. Some food items, such as rice and sambhar, were consistently overproduced.
4. Awareness among students about the impact of food waste was moderate, with many unaware of its environmental footprint.
5. Kitchen staff often prepared extra meals as a buffer for unexpected student turnout, leading to surplus food.

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5. Food Waste Management and Recycling Initiatives

Amrita Vishwa Vidyapeetham, guided by Amma's vision of **"Living in Harmony with Nature,"** has already implemented several sustainable waste management systems.

5.1. Composting and Biogas Generation

- All food waste from dining halls is **collected and segregated daily** at the source.
- A **biogas plant** installed near the central kitchen converts approximately **70–100 kg of food waste daily** into usable biogas for cooking.
- The **organic slurry** produced is used as **bio-fertilizer** for campus gardens and agricultural plots.

5.2. Vermicomposting Units

Pre-consumer waste, such as vegetable and fruit peels, is processed in vermicompost pits located behind the mess facility. The compost generated is used for maintaining the greenery of the Amritapuri campus.

5.3. Awareness and Behavioral Interventions

The campus conducts periodic awareness campaigns:

- "**Think Before You Waste**" initiative to educate students about responsible eating.
- Visual posters near serving counters remind students to take only what they can eat.
- Mess committees regularly review food quantity estimation to minimize excess cooking.

5.4. Technological Interventions

- **Smart weighing systems** are being considered to record real-time data on food waste and link it to dashboard analytics.
- Use of **digital meal booking systems** in hostels is proposed to predict daily meal counts more accurately.

5.5. Collaboration with Research Centres

The **Amrita Center for Sustainable Futures (ASF)** and **Amrita Live-in-Labs®** program are working on developing data-driven models to predict and minimize food waste generation using Artificial Intelligence and Machine Learning techniques.

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6. Discussion

The analysis highlights that while Amritapuri campus has efficient systems for waste utilization (biogas and composting), there is scope for **preventing waste generation at source**. The per capita waste level of 41 grams per person per day is relatively lower compared to national averages for university campuses, which often exceed 70–100 grams. This indicates Amrita's strong culture of discipline and environmental consciousness.

However, the **post-consumer waste proportion (65%)** reveals the need for behavioral change and better meal planning. Awareness-building, coupled with smart digital tools, can lead to a substantial decline in daily wastage.

Moreover, linking food waste monitoring with campus sustainability metrics supports Amrita's continuous improvement toward **Net Zero Waste** goals and aligns with its global commitment under the **United Nations Academic Impact (UNAI)** and **THE Impact Rankings** frameworks.

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7. Recommendations

Based on the findings, the following recommendations are proposed:

Short-Term Actions

1. Introduce **meal reservation apps** or systems to estimate accurate attendance in dining halls.
2. Implement **"Food Waste Dashboards"** for daily monitoring by mess managers.
3. Conduct **monthly awareness drives** through posters, competitions, and community kitchens.
4. Establish a **"Green Dining Ambassador"** program involving student volunteers.

Medium-Term Actions

1. Expand **biogas and composting units** to handle all campus food waste efficiently.
2. Introduce **portion size control** (small, medium, large) to reduce plate waste.
3. Initiate **feedback systems** for students to report portion sizes and preferences.
4. Conduct periodic **food waste audits** with faculty and student participation.

Long-Term Vision

1. Achieve **Zero Food Waste Campus** status by 2030 through integrated waste tracking and reduction systems.
2. Replicate Amritapuri's model across all **Amrita campuses** (Coimbatore, Bengaluru, Kochi, Mysuru, Amaravati, Faridabad).
3. Publish annual **Sustainability and Waste Reports** for transparency and benchmarking.

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8. Conclusion

Amrita Vishwa Vidyapeetham's food waste tracking initiative represents a powerful model of how a university can align everyday operations with global sustainability goals. By quantifying and addressing food waste, Amrita demonstrates its deep-rooted commitment to Amma's vision of compassionate living and sustainable development.

The systematic tracking, recycling, and awareness programs not only reduce environmental impact but also nurture a culture of mindfulness among students and staff. With continued innovation, data-driven strategies, and community engagement, Amritapuri Campus is well on its path to becoming a **zero-waste and carbon-neutral campus**, contributing significantly to SDG 12 and the broader mission of sustainable and responsible living.

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