



K.R. MANGALAM UNIVERSITY

THE COMPLETE WORLD OF EDUCATION

Sustainable
Campus
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Tomorrow

— ANNUAL REPORT —

FOOD WASTE MANAGEMENT & UTILIZATION

ACADEMIC YEAR
2024 – 25

From Food Waste to a Sustainable Future



PEOPLE | PLANET | PROGRESS

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Reporting period: Academic Year 2024–25 (July 2024–June 2025).

1. University Profile & Introduction

1.1 About K.R. Mangalam University

K.R. Mangalam University (KRMU), Gurugram, Haryana, is committed to providing quality higher education while promoting responsible, sustainable and environmentally conscious practices across its academic and campus operations. The University recognizes that a modern educational institution has a responsibility not only to impart education but also to demonstrate sustainable practices through the effective management of resources, waste, energy and the campus environment.

As part of its broader commitment towards environmental sustainability, resource conservation and green campus development, the University has adopted measures for the systematic management of biodegradable waste, particularly food waste generated from the Hostel Mess, University Canteen/Cafeteria and other food-service activities.

Food waste management is particularly significant in a residential university environment because food is prepared and served to a substantial number of students on a regular basis. Accordingly, the University emphasizes the principles of prevention, segregation, measurement, utilization and resource recovery rather than treating food waste merely as general solid waste.

1.2 Campus Food Service Profile – Academic Year 2024–25

During the Academic Year 2024–25, the University had approximately 1,300 students residing in the University hostels. The Hostel Mess provided four meal services every day, comprising breakfast, lunch, evening snacks and dinner.

Accordingly, the hostel food-service system catered to a maximum of approximately 5,200 meal-service opportunities per day:

$1,300 \text{ Hostellers} \times 4 \text{ Meal Services} = 5,200 \text{ Meal-Service Opportunities per Day}$

In addition to residential students, the University had a total student population of 6,129 students forming the potential user base for its canteen and other campus food facilities. Based on the University's operational estimate, approximately 25% of the student population visited the University Canteen daily, representing an indicative daily footfall of approximately 1,532 students.

Food Service Indicator	Academic Year 2024–25
Total Students	6,129
Hostel Residents	1,300
Meals Served in Hostel Mess	4 times daily
Maximum Meal-Service Opportunities	5,200 per day
Estimated Daily Canteen Participation	25%
Indicative Canteen Footfall	Approx. 1,532 students/day
Major Food Waste Sources	Hostel Mess, Canteen/Cafeteria & Food Service Areas
On-campus Food Waste Utilization	Biogas Plant

Facility	
Reported Biogas Plant Food-Waste Capacity	15 kg

1.3 Need for Food Waste Management

The scale of food-service operations within the University makes systematic food waste management an important component of campus sustainability.

Food waste may arise at different stages of food-service operations, including preparation of meals, trimming and processing of vegetables and other ingredients, surplus prepared food, serving operations and food left on plates after consumption. For effective monitoring, the University considers both pre-consumer food waste and post-consumer/plate waste within its food waste management framework.

The University's food-waste utilization framework provides for systematic collection, segregation and processing of food waste. The existing mechanism includes separate collection of food waste, transportation for processing, pre-processing, anaerobic digestion, utilization of generated biogas and use of digestate/slurry as organic fertilizer. Food-Waste-Utilization-Report

This approach enables the University to move beyond conventional disposal towards a resource-recovery and circular-economy model.

1.4 University's Approach to Food Waste Management

The University's food waste management strategy is based on the principle that food waste should first be prevented and reduced, and unavoidable biodegradable waste should be utilized as a resource wherever feasible.

The overall institutional approach can be represented as:

PREVENT → REDUCE → SEGREGATE → MEASURE → UTILIZE → RECOVER → MONITOR

Under this approach, food waste generated from identified campus food-service areas is segregated from non-biodegradable waste. The quantity of waste can then be recorded through the Food Waste Management Logbook, categorized according to its source and type, and directed towards the most appropriate utilization route.

The University has adopted/identified multiple utilization pathways, including:

- On-campus processing through the Biogas Plant for suitable biodegradable food waste;
- utilization of the resulting organic slurry/digestate for campus horticulture;
- beneficial utilization of suitable segregated food waste through Gaushala arrangements; and
- utilization of appropriate food waste through Piggery arrangements, subject to applicable requirements.

The University's documented piggery arrangement provides for collection of food waste generated from the University Canteen, Hotel Management Food Lab and Hostel Mess for beneficial utilization. समझौता ज्ञापन फूड वेस्ट

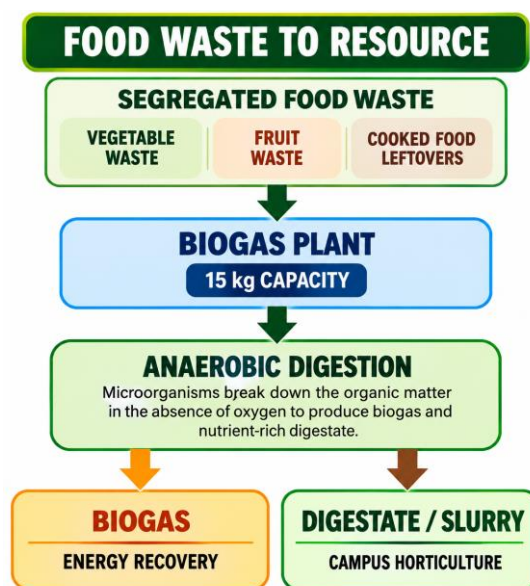
Note: The attached Piggery MoU is dated 1 August 2026 and therefore should be presented as evidence of the University's subsequently formalized food-waste utilization mechanism, rather than as documentary evidence for AY 2024–25 itself.

1.5 On-Campus Biogas Initiative

An important component of the University's sustainable food waste management system is its Biogas Plant. The facility provides an on-campus mechanism for converting suitable biodegradable food waste into useful resources.

The University's existing food-waste utilization document describes a process in which segregated food waste is collected and transported for processing, ground and mixed with water to prepare a slurry, and subsequently subjected to anaerobic digestion. The resulting biogas is intended for useful energy applications, while the digestate can be utilized as organic fertilizer in campus gardens. Food-Waste-Utilization-Report

For the present annual report, the University has reported a food-waste processing capacity of 15 kg for the biogas facility.



The initiative therefore supports the concept of a circular campus, where waste generated from one campus operation is converted into a resource for another.

1.6 Monitoring and Documentation

The University recognizes that effective food waste management requires not only infrastructure but also measurement, documentation and periodic review.

Accordingly, a Food Waste Management Logbook provides a mechanism for recording important parameters such as:

food prepared → food consumed/served → pre-consumer waste → post-consumer waste → total waste → method of utilization → quantity handed over

Such documentation enables the University to monitor food waste at the source, identify trends, assess the effectiveness of waste reduction measures and maintain evidence of food waste utilization.

The logbook-based approach also provides a basis for developing measurable indicators such as food waste per meal, percentage of prepared food wasted, quantity diverted for beneficial utilization and year-on-year reduction in food waste.

1.7 Sustainability Perspective

The University's food waste management initiative is intended to create an integrated relationship between responsible food consumption, waste reduction, renewable energy generation, resource recovery and environmental awareness.

The University's existing biogas report identifies the establishment of a formal collection, segregation and processing system, utilization of biogas and reduction of food waste sent for conventional disposal among the objectives of the initiative. Food-Waste-Utilization-Report

Through this integrated approach, K.R. Mangalam University seeks to progressively minimize avoidable food waste, maximize beneficial utilization of unavoidable biodegradable waste, improve documentation and monitoring, and strengthen its overall green and sustainable campus practices.

2. Purpose of the Report

The Annual Food Waste Management & Utilization Report for Academic Year 2024–25 has been prepared to document and evaluate the practices adopted by K.R. Mangalam University, Gurugram, for the systematic management, monitoring and beneficial utilization of food waste generated from its Hostel Mess, University Canteen/Cafeteria and other food-service areas.

Considering the scale of food-service operations on campus, including approximately 1,300 hostel residents receiving four meal services daily, the University recognizes the importance of managing food waste through an organized and environmentally responsible system. The report therefore provides a consolidated framework for documenting food waste from the point of generation to its final utilization.

The University's existing food-waste framework emphasizes a formal system for the collection, segregation and processing of food waste, utilization of food waste for biogas generation, and reduction of waste requiring conventional disposal. Food-Waste-Utilization-Report

2.1 Objectives of the Report

The key purposes of this report are to:

1. Document Food Waste Sources: Identify the major sources of food waste generated within the University, particularly the Hostel Mess, Canteen/Cafeteria and other food preparation/service areas.
2. Establish a Monitoring Framework: Provide a structured mechanism for recording the quantity of food prepared, food served/consumed, pre-consumer waste, post-consumer or plate waste, and total food waste generated.
3. Promote Source Segregation: Ensure that biodegradable food waste is segregated from plastics, packaging and other non-biodegradable waste at the point of generation.
4. Document Food Waste Utilization: Record the methods adopted for beneficial utilization of suitable food waste, including the Biogas Plant and other identified utilization channels such as Piggery and Gaushala arrangements.

5. **Promote Waste-to-Resource Practices:** Encourage conversion of biodegradable food waste into useful resources. The University's documented biogas mechanism includes processing of food waste through anaerobic digestion, utilization of generated biogas and use of slurry/digestate as organic fertilizer. Food-Waste-Utilization-Report
6. **Reduce Conventional Disposal:** Minimize the quantity of biodegradable food waste requiring disposal by maximizing segregation, utilization and resource recovery.
7. **Strengthen Documentation:** Maintain systematic records through the Food Waste Management Logbook, including the quantity of food waste generated and the method/quantity of waste handed over or utilized.
8. **Support Continuous Improvement:** Use recorded data to identify food-waste trends and opportunities for better meal planning, portion management, food preparation and consumption practices.
9. **Create Environmental Awareness:** Sensitize students, staff, mess workers and food-service personnel towards responsible food consumption and the importance of minimizing food wastage.
10. **Support Campus Sustainability:** Strengthen the University's broader commitment to sustainable campus operations through responsible waste management, renewable energy and circular-resource practices.

2.2 Overall Purpose

The report is not limited to recording the quantity of food waste generated. Its broader purpose is to establish a complete food-waste management cycle:

Food Procurement & Preparation → Consumption → Segregation → Measurement → Recording → Utilization → Resource Recovery → Monitoring & Improvement

Through this approach, the University aims to progressively shift from a conventional “waste disposal” model to a “waste utilization and resource recovery” model.

2.3 Expected Outcomes

Implementation and documentation of the food waste management system are expected to contribute to:

Area	Expected Outcome
Food Waste Reduction	Reduction in avoidable food wastage

Segregation	Improved separation of biodegradable and non-biodegradable waste
Monitoring	Availability of systematic food-waste records
Biogas Utilization	Conversion of suitable food waste into renewable energy
Organic Resource Recovery	Utilization of digestate/slurry for horticultural purposes
External Utilization	Beneficial utilization of appropriate food waste through identified channels
Campus Hygiene	Improved collection and handling of food waste
Awareness	Greater responsibility among students and food-service personnel
Sustainability	Strengthening of green and circular campus practices

3.4 Sources of Food Waste

Considering the nature of the University's food-service operations, food waste may be generated at different stages. For monitoring purposes, the principal streams are classified as follows:

Waste Stream	Typical Source	Classification
Food preparation residues	Kitchen/Mess/Canteen	Pre-Consumer Waste
Vegetable and fruit preparation waste	Kitchen preparation	Pre-Consumer Waste
Unserved prepared food	Mess/Canteen	Pre-Consumer/Surplus Food
Food remaining after serving	Dining/service areas	Post-Consumer Waste
Food left on plates	Mess/Canteen dining areas	Plate Waste

This distinction is important because it enables the University to identify whether food waste is primarily arising from food preparation, production planning, serving practices or consumer behaviour.

3.5 Food Waste Generation Points

The operational food-waste flow can be represented as:



The University's existing food-waste utilization framework also identifies food waste arising from the Hostel Mess and provides for systematic collection, segregation and processing. Food-Waste-Utilization-Report

3.6 Food Waste Monitoring Parameters

To strengthen the monitoring of these food-service operations, the Food Waste Management Logbook is designed around the following parameters:

Monitoring Parameter	Purpose
Food Prepared (kg)	Records total quantity prepared
Food Served/Consumed (kg)	Assesses actual utilization
Pre-Consumer Waste (kg)	Identifies preparation/production waste
Post-Consumer/Plate Waste (kg)	Identifies consumer-level waste
Total Food Waste (kg)	Measures overall food waste
Method of Utilization	Records final utilization route
Quantity Handed Over (kg)	Provides quantitative utilization evidence
Remarks & Signature	Supports verification and accountability

3.7 Food Service and Waste Management Linkage

The food-service profile provides the basic operational context for the University's food waste management system. With 1,300 residential students receiving four meal services daily and an

indicative 1,532 daily student visits to the canteen, systematic food planning and waste monitoring are important components of sustainable campus management.

The University's approach therefore connects food-service operations directly with waste management:

FOOD SERVICE → WASTE PREVENTION → SEGREGATION → MEASUREMENT → UTILIZATION → RESOURCE RECOVERY

The University's documented biogas mechanism further provides for segregation, transportation, pre-processing and anaerobic digestion of suitable food waste, followed by utilization of the generated biogas and organic slurry. Food-Waste-Utilization-Report

Through this integrated approach, the University aims to ensure that the scale of its food-service operations is supported by an equally structured system for food-waste prevention, monitoring and environmentally responsible utilization.

4. Food Waste Management Framework

K.R. Mangalam University follows an integrated approach to the management of food waste generated from its Hostel Mess, University Canteen/Cafeteria and other food-service activities. The framework focuses on minimizing avoidable food waste and ensuring that unavoidable biodegradable food waste is segregated, measured, documented and appropriately utilized.

The University's existing food-waste utilization mechanism provides for systematic collection and segregation, transportation, pre-processing, anaerobic digestion, biogas utilization and slurry utilization. Food-Waste-Utilization-Report

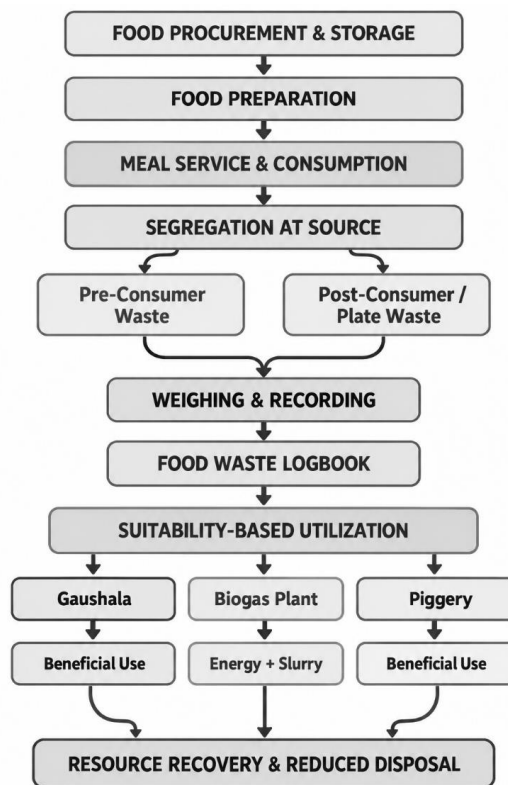
The overall framework is based on the following hierarchy:

PREVENT → REDUCE → SEGREGATE → MEASURE → UTILIZE → RECOVER → MONITOR

This approach supports the University's objective of moving from conventional waste disposal towards a circular and resource-recovery-oriented food waste management system.

4.1 Food Waste Management Model

The University's food waste management framework can be represented as:



RESOURCE RECOVERY & REDUCED DISPOSAL

4.2 Key Components of the Framework

The framework consists of interconnected stages covering the entire food-waste cycle.

Stage	Component	Key Activity
1	Prevention	Meal planning and controlled preparation
2	Reduction	Portion control and reduction of avoidable leftovers
3	Segregation	Separation of biodegradable food waste from other waste
4	Classification	Pre-consumer and post-consumer waste identified separately
5	Measurement	Food waste weighed in kilograms
6	Documentation	Daily entries maintained in the Food Waste Logbook
7	Internal Utilization	Suitable biodegradable waste processed through the Biogas Plant

8	External Utilization	Suitable food waste directed through identified Gaushala/Piggery arrangements
9	Resource Recovery	Biogas and organic slurry/digestate generated
10	Monitoring	Periodic review of quantities, utilization routes and waste trends

4.3 Prevention and Reduction at Source

The first priority of the framework is to prevent unnecessary generation of food waste. Resource recovery is important, but prevention of avoidable waste remains preferable to processing waste after it has been generated.

Food preparation can therefore be aligned, as far as practicable, with factors such as hostel occupancy, expected meal participation, historical consumption patterns and demand.

Particular attention is given to identifying excessive waste associated with specific meals or stages of food preparation. Data generated through regular monitoring can subsequently assist the food-service team in improving planning.

4.4 Segregation at Source

- Source segregation forms the foundation of the University's food waste management framework.
- Biodegradable food waste is required to be kept separate from materials such as plastic, packaging, glass, metal and other non-biodegradable waste so that suitable food waste can be safely directed towards appropriate utilization routes.
- The University's existing mechanism specifically provides for food waste to be collected separately and non-biodegradable waste to be placed separately.

4.5 Classification of Food Waste

For better analysis, food waste is divided into two principal categories:

A. Pre-Consumer Food Waste

This refers to waste generated before food is served to consumers. It may include food preparation residues and surplus/unserved food recorded by the concerned food-service unit.

B. Post-Consumer / Plate Waste

This refers to food remaining after serving and consumption, particularly food left on plates or returned from dining areas.

Why Separate the Two?

Pre-Consumer Waste

→ Helps evaluate food preparation and production planning.

Post-Consumer Waste

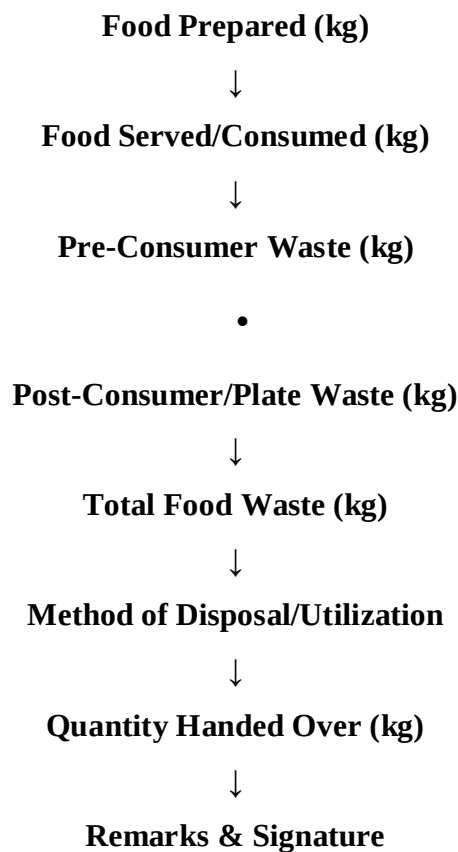
→ Helps evaluate serving practices and consumption behaviour.

Separating these categories makes the logbook more useful for identifying the actual stage at which food wastage occurs.

4.6 Measurement and Recording

After segregation, food waste is measured and recorded through the Food Waste Management Logbook.

The proposed monitoring system captures:



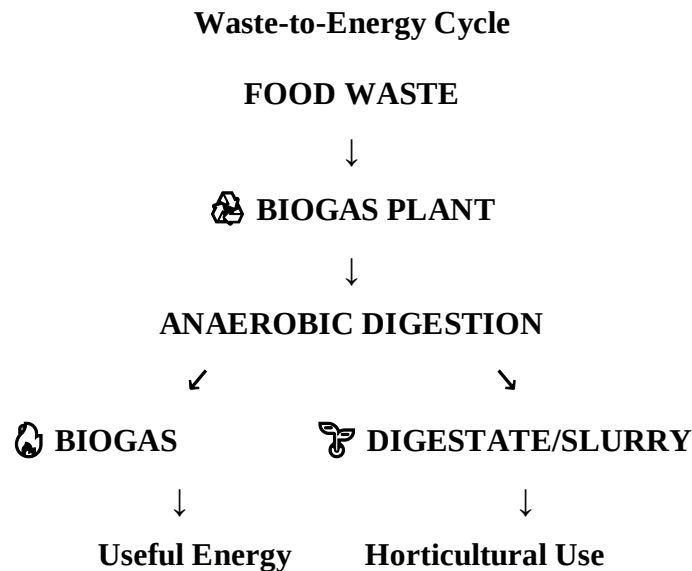
This provides a traceable record from the point of food preparation to the final utilization of generated waste.

4.7 On-Campus Utilization Through Biogas Plant

Suitable biodegradable food waste can be directed towards the University's Biogas Plant for resource recovery.

The University's existing report describes a process involving transportation of segregated food waste, grinding and mixing with water to form a uniform slurry, anaerobic digestion, production of biogas and utilization of the resulting slurry as organic fertilizer. Food-Waste-Utilization-Report

For the present report, the University has indicated a 15 kg food-waste processing capacity for the biogas facility.



This mechanism enables organic waste to be converted into useful resources within the campus ecosystem.

4.8 Utilization Through Piggery and Gaushala Arrangements

Food waste that is appropriate for beneficial external utilization may be segregated and handed over through identified Piggery and Gaushala arrangements, subject to suitability and applicable requirements.

The University's attached piggery MoU establishes a formal mechanism for food waste generated from the Canteen, Hotel Management Food Lab and Hostel Mess to be collected for utilization at the piggery.

The agreement further provides that collection and transportation are undertaken by the receiving party at its own resources and expense and that collection should be undertaken in a manner that avoids hygiene or health-related problems on campus.

For annual reporting, quantities transferred through each utilization route should be supported by the corresponding Food Waste Management Logbook/handing-over records.

4.9 Monitoring and Accountability Framework

Effective food waste management requires clearly defined responsibilities at different operational stages.

Activity	Monitoring Requirement
Food preparation	Quantity prepared to be monitored
Meal service	Consumption/service pattern to be observed
Waste segregation	Biodegradable waste kept separate
Waste weighing	Quantity recorded in kg
Logbook maintenance	Daily/periodic entries maintained
Biogas utilization	Quantity directed for processing recorded
External handover	Quantity handed over recorded
Verification	Remarks/signature maintained
Monthly review	Waste trends consolidated and reviewed
Annual review	Performance summarized in Annual Report

4.10 Monthly Review Mechanism

At the end of each month, food-waste records may be consolidated to determine:

Total Food Prepared → Total Food Waste Generated → Pre-Consumer Waste → Plate Waste → Waste Processed in Biogas Plant → Waste Handed Over for Beneficial Utilization

This monthly consolidation enables the University to compare food-waste performance across different periods and identify areas requiring intervention.

A useful performance indicator is:

Food Waste Rate (%)

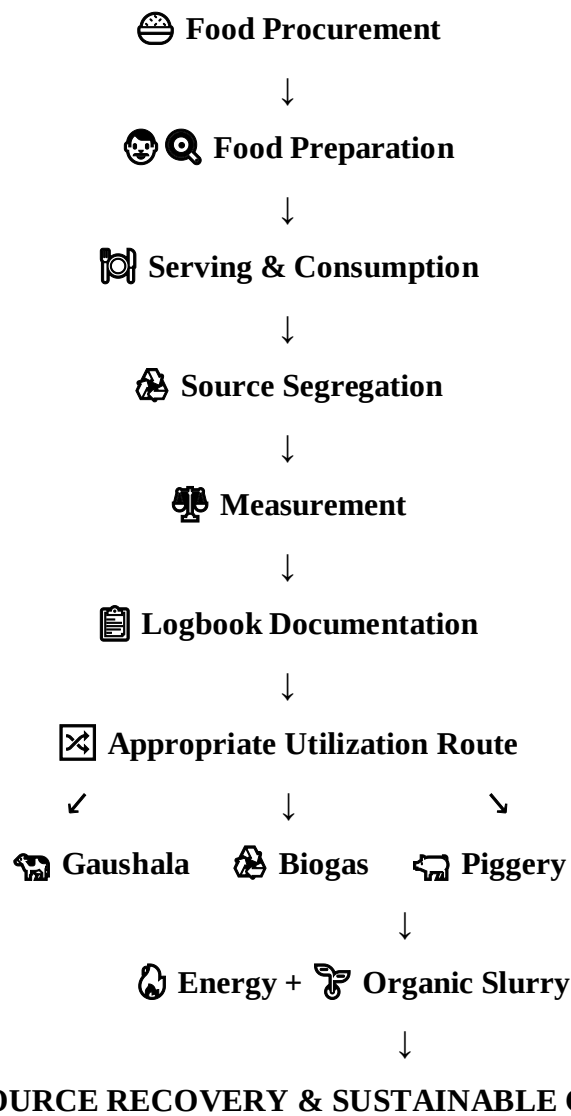
$$\text{Total Food Waste Generated (kg)} \div \text{Total Food Prepared (kg)} \times 100$$

Where adequate logbook data are available, the University can use this indicator to establish an annual baseline and subsequently set measurable reduction targets.

4.11 Integrated Circular Food Waste Framework

The overall University model may be summarized through the following infographic:

KRMU CIRCULAR FOOD WASTE MANAGEMENT MODEL



Through this framework, K.R. Mangalam University seeks to establish a systematic, measurable and resource-oriented approach to food waste management, with emphasis on prevention and reduction at source, segregation, documented utilization and recovery of useful resources from unavoidable biodegradable food waste.

8. Food Waste Utilization Methodology

K.R. Mangalam University adopts a **resource-recovery-oriented methodology** for the utilization of segregated food waste generated from its food-service operations. The methodology is intended to ensure that suitable biodegradable food waste is not treated merely as refuse but is, wherever practicable, converted or redirected into a useful resource.

The University's documented food-waste utilization mechanism specifically provides for **collection and segregation, transportation, pre-processing, anaerobic digestion, biogas utilization and slurry utilization**. Food-Waste-Utilization-Report

For the annual reporting framework, food waste utilization is organized around three principal routes:

The appropriate route is selected according to the **nature, condition and suitability of the segregated food waste**.

8.1 Food Waste Utilization Approach

The overall utilization methodology follows the sequence:

GENERATE → SEGREGATE → WEIGH → RECORD → ASSESS SUITABILITY → UTILIZE → DOCUMENT

The purpose of this methodology is to maximize the beneficial utilization of food waste while maintaining proper records of the quantity and destination of the waste.

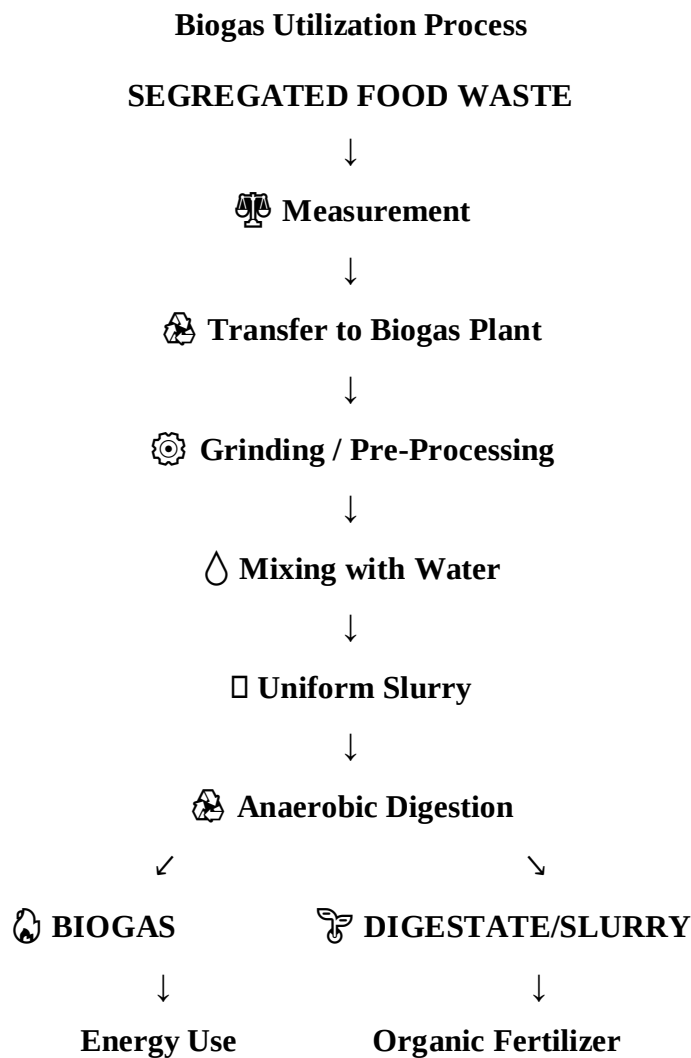
Stage	Activity	Purpose
1	Food Waste Generation	Identify waste from food-service operations
2	Source Segregation	Separate biodegradable food waste
3	Classification	Identify pre- and post-consumer waste
4	Measurement	Record quantity in kg
5	Suitability Assessment	Determine appropriate utilization route
6	Internal Utilization	Process suitable waste through Biogas Plant
7	External Utilization	Route suitable material through identified Piggery/Gaushala arrangements
8	Recording	Record quantity processed/handed over
9	Verification	Verify utilization through logbook/records
10	Review	Consolidate data for monthly and annual reporting

8.2 Utilization Route I – Biogas Plant

The **on-campus Biogas Plant** represents an important internal food-waste utilization mechanism of the University.

Suitable biodegradable food waste is segregated and transferred for processing through anaerobic digestion. The University's existing report describes the following process: food waste is collected separately, transported for processing, ground and mixed with water in a **1:1 ratio to form a uniform slurry**, and then fed into the digester. The document states that biogas and digestate are generated through the digestion process. Food-Waste-Utilization-Report

For the present annual report, the University has indicated a food-waste processing capacity of **15 kg** for the biogas facility.



The University's source report specifically identifies **cooking/renewable-energy demonstrations** as uses of the generated gas and **campus gardens** as a utilization route for the resulting slurry. Food-Waste-Utilization-Report

8.3 Utilization Route II – Piggery

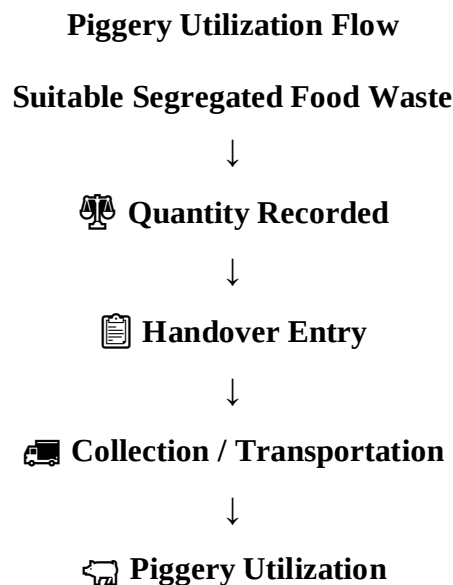
Suitable food waste may also be directed through the University's identified **Piggery utilization arrangement**.

The attached MoU establishes a mechanism under which food waste from the University's **Canteen, Hotel Management Food Lab and Hostel Mess** is collected by the receiving party for
Food Waste Management & Utilization • AY 2024–25 | Planning estimate

utilization at its piggery. The agreement states that the food waste is intended to be used at the piggery as animal feed.

Under the documented arrangement:

- food waste is collected daily or as required;
- the quantity depends upon actual availability;
- collection and transportation are undertaken by the receiving party using its own resources;
- timely collection is required to avoid cleanliness and health-related problems; and
- applicable government/local-body requirements relating to collection, transportation and utilization are to be followed. समझौता ज्ञापन फूड वेस्ट



Reporting Note: The attached Piggery MoU is dated **1 August 2026** and therefore should not be described as an AY 2024–25 agreement unless an earlier applicable agreement is available.

8.4 Utilization Route III – Gaushala

The University has also identified **Gaushala** as a route for beneficial utilization of suitable segregated food material.

Under this methodology, only food material considered appropriate for the identified utilization purpose should be separated and handed over through the designated arrangement. The quantity handed over should be recorded in the Food Waste Management Logbook or supporting handover record.

Gaushala Utilization Flow

Suitable Food Material



 Separate Collection



 Weighing



 Recording



 Handover



 Gaushala

Documentary Note: The currently attached files do not contain the Gaushala MoU. Therefore, the name of the Gaushala, date of agreement, tenure and specific terms should be inserted in the final annual report only from the applicable supporting document.

8.5 Selection of Appropriate Utilization Route

Not all food waste is necessarily suitable for the same utilization method. Therefore, the methodology requires selection of the utilization route according to the characteristics of the segregated waste.

Food Waste Stream	Preferred/Applicable Route
Suitable biodegradable kitchen/food waste	Biogas Plant
Suitable food material identified for Gaushala	Gaushala
Suitable food waste under applicable arrangement	Piggery
Biogas digestate/slurry	Campus horticulture
Material unsuitable for beneficial utilization	Appropriate authorized waste-management route

This route-based approach allows the University to maximize beneficial utilization while maintaining separate records for each waste stream.

8.6 Utilization of Biogas

Biogas generation represents the **energy-recovery component** of the University's food-waste management methodology.

The University's existing utilization report states that biogas generated through anaerobic digestion can be used for **cooking and renewable-energy demonstrations**. Food-Waste-Utilization-Report

The process therefore creates a direct relationship between food waste and renewable energy:



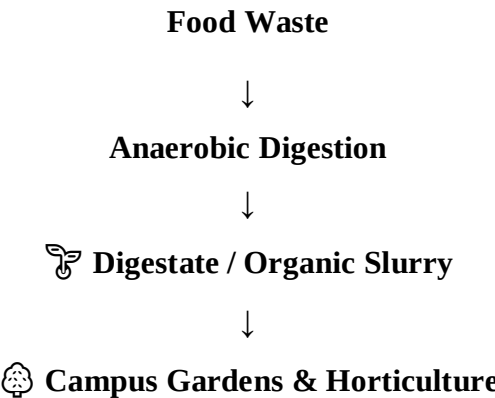
This supports the University's objective of demonstrating how biodegradable waste can be converted into a useful energy resource rather than being sent directly for disposal.

8.7 Utilization of Digestate/Slurry

Anaerobic digestion produces not only biogas but also a nutrient-containing residual slurry or digestate.

The University's documented methodology provides for this material to be utilized as **organic fertilizer in campus gardens**. Food-Waste-Utilization-Report

Accordingly:



This creates an additional resource-recovery pathway and strengthens the circular nature of the University's food-waste management system.

8.8 Documentation of Food Waste Utilization

The utilization methodology is supported by systematic documentation through the **Food Waste Management Logbook**.

For each utilization activity, the following information should be recorded:

Parameter	Record

Date	Date of generation/handover
Source	Mess/Canteen/other unit
Food Waste Category	Pre-consumer/Post-consumer
Total Food Waste	kg
Utilization Route	Biogas/Piggery/Gaushala/Other
Quantity Utilized/Handed Over	kg
Remarks	Operational observations
Verification	Signature of responsible person

This provides a traceable link between **food waste generation and its final utilization**.

8.9 Utilization Performance Indicators

Where complete logbook records are available, the University may assess the effectiveness of its food-waste utilization system through the following indicators:

Food Waste Utilization Rate

Food Waste Utilization Rate (%) = Beneficially Utilized Food Waste ÷ Total Food Waste Generated × 100

Biogas Processing Share

Biogas Processing Share (%) = Food Waste Processed through Biogas Plant ÷ Total Food Waste Generated × 100

External Utilization Share

External Utilization Share (%) = Food Waste Handed Over for Beneficial Utilization ÷ Total Food Waste Generated × 100

These indicators should be calculated from **actual logbook and handover records** rather than assumed quantities.

8.10 Integrated Food Waste Utilization Model

KRMU – FOOD WASTE TO RESOURCE

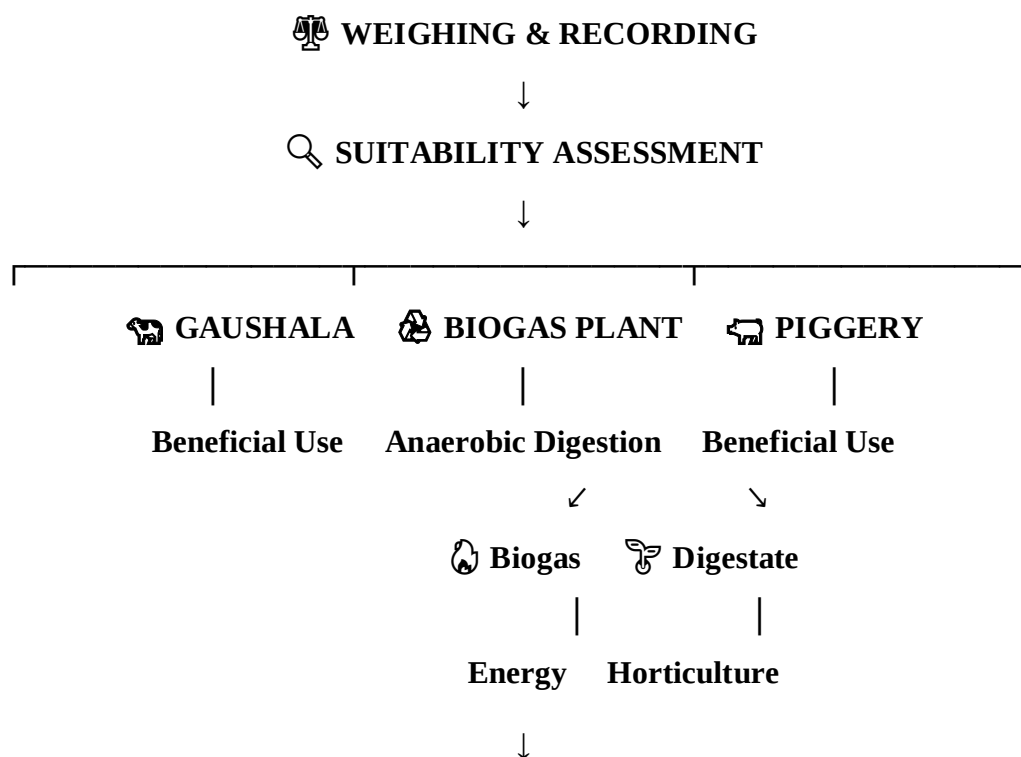
 **HOSTEL MESS + UNIVERSITY CANTEEN**



 **SOURCE SEGREGATION**



Food Waste Management & Utilization • AY 2024–25 | Planning estimate



RESOURCE RECOVERY • WASTE DIVERSION • CIRCULAR CAMPUS

Through this multi-route methodology, K.R. Mangalam University seeks to ensure that suitable food waste generated from its food-service operations is **systematically segregated, measured, documented and directed towards beneficial utilization**, thereby supporting resource recovery and reducing dependence on conventional disposal.

9. Biogas Plant – Waste-to-Energy Initiative

As part of its commitment to sustainable campus operations and responsible management of biodegradable waste, **K.R. Mangalam University has established a Biogas Plant for the utilization of segregated food waste generated from campus food-service operations**. The initiative provides an on-campus mechanism for converting food waste into useful resources through **anaerobic digestion**.

The University's Food Waste Utilization Report describes the biogas initiative as an approach for collecting and utilizing food waste from the Hostel Mess for the production of **biogas and organic manure**, in alignment with the University's sustainability and green-campus objectives.

Food-Waste-Utilization-Report

For the purpose of the present Annual Report, the University has reported the plant as having a **15 kg food-waste processing capacity**.

9.1 Objective of the Biogas Initiative

The primary objective of the Biogas Plant is to establish a **waste-to-resource mechanism** within the campus by processing suitable biodegradable food waste rather than directing it towards conventional disposal.

The initiative aims to:

- utilize segregated biodegradable food waste generated from campus food-service operations;
- reduce the quantity of organic waste requiring conventional disposal;
- recover renewable energy in the form of **biogas**;
- generate **digestate/slurry** that can be utilized as an organic resource;
- promote source segregation and systematic food-waste collection;
- demonstrate a practical model of circular resource management on campus; and
- strengthen student and staff awareness regarding waste-to-energy and sustainable practices.

The University's existing report specifically identifies the development of a formal collection, segregation and processing system, utilization of generated biogas, and reduction of food waste sent to landfill as key objectives. Food-Waste-Utilization-Report

9.2 Biogas Plant Profile

Parameter	Details
Facility	Biogas Plant
Location	K.R. Mangalam University Campus
Primary Feedstock	Segregated biodegradable food waste
Reported Food-Waste Processing Capacity	15 kg
Technology/Process	Anaerobic Digestion
Primary Output	Biogas
Secondary Output	Digestate/Organic Slurry
Biogas Utilization	Cooking / renewable-energy demonstration
Digestate Utilization	Organic fertilizer for campus gardens
Primary Purpose	Food Waste-to-Energy & Resource Recovery

01 Executive Summary and Reporting Basis

K.R. Mangalam University, Gurugram, maintains a campus food-waste management framework addressing the Hostel Mess, University Canteen/Cafeteria and related food-service activities. The framework covers prevention, source segregation, weighing, logbook documentation, appropriate utilization and resource recovery.

During AY 2024–25, the University reported 6,129 enrolled students and approximately 1,300 hostel residents. Hostel operations provided four food-service opportunities daily, while the Canteen was estimated to serve 25% of the total student population on an indicative day.

Headline indicator	AY 2024–25
Total student enrolment	6,129
Hostel residents	1,300
Potential hostel services per day	5,200
Estimated daily canteen visits	1,532.25
Annual food waste	20,656.43 kg / 20.66 tonnes
Hostel share of modelled waste	75.5%
Canteen share of modelled waste	24.5%

Reporting standard and limitation

The 20.66-tonne figure is an indicative estimate, not a verified annual food-waste total. The attached source report contains blank monthly logbook templates rather than measured monthly totals. Accordingly, this report does not claim measured diversion, food-waste reduction, biogas output or month-to-month performance. These indicators require signed source records.

02 Institutional Food Service Profile

The two primary food-service streams considered in this analysis are the residential Hostel Mess and the University Canteen/Cafeteria. Hostel residents are included in the total student population; therefore the two populations must not be added to produce a distinct headcount.

Parameter	Documented / indicative value
Total students	6,129
Hostel residents	1,300 (21.2% of enrolment)
Hostel meal services	Breakfast, lunch, evening snacks, dinner
Hostel maximum daily service opportunities	$1,300 \times 4 = 5,200$

Canteen daily participation assumption	25% of 6,129
Canteen indicative daily footfall	1,532.25 (~1,532)
Primary waste streams	Pre-consumer preparation/surplus; post-consumer plate waste
Biogas processing capacity as reported	15 kg; operating time basis not specified

Interpretation of food-service counts

The 5,200 hostel figure represents potential service opportunities, not proof of meals actually eaten. Similarly, 1,532.25 canteen visits per day is an operational planning estimate rather than an audited transaction count. Both figures are used consistently as model inputs, with actual attendance and consumption subject to future verification.

Scope

Food waste is considered at preparation, serving and consumption stages. The model excludes staff, visitors, special events and Hotel Management Food Lab quantities because separate quantified data for those groups were not supplied.

03 Waste Estimation Methodology

Input	Hostel Mess	Canteen
Population / visits per day	1,300 residents $\times$ 4 = 5,200 opportunities	6,129 $\times$ 25% = 1,532.25 visits
Assumed operating days	300	220
Assumed waste per service	10 g (0.010 kg)	15 g (0.015 kg)
Estimated annual service volume	1,560,000	337,095
Estimated waste (kg)	15,600.00	5,056.425

Calculation

Hostel: $1,300 \times 4 \times 300 \times 0.010 \text{ kg} = 15,600.00 \text{ kg}$.

Canteen: $6,129 \times 0.25 \times 220 \times 0.015 \text{ kg} = 5,056.425 \text{ kg}$.

Total: $15,600.00 + 5,056.425 = 20,656.425 \text{ kg} = 20,656.43 \text{ kg}$ (rounded), equivalent to 20.66 metric tonnes.

Boundary conditions

The waste factors represent total estimated waste per service opportunity or canteen visit, not measured plate waste alone. The scenario does not separately apportion kitchen preparation waste

and plate waste. Because operating days and participation are assumed, the result should not be represented as an audited waste inventory.

4 Annual Quantitative Results and Analysis

Source	Estimated waste (kg)	Metric tonnes	Share
Hostel Mess	15,600.00	15.60	75.5%
University Canteen	5,056.43	5.06	24.5%
TOTAL	20,656.43	20.66	100.0%

Student- and service-normalized indicators

Indicator	Calculated result	Interpretation
Hostel per resident / model year	12.00 kg	15,600 ÷ 1,300
Canteen per enrolled student / model year	0.825 kg	5,056.425 ÷ 6,129; population-normalized
Campus waste per enrolled student	3.37 kg	20,656.425 ÷ 6,129; contextual ratio
Hostel waste per service opportunity	10 g	Selected low scenario assumption
Canteen waste per indicative visit	15 g	Selected low scenario assumption
Average per calendar month	1,721.37 kg	Annual ÷ 12; not observed monthly data

Annual interpretation

The Hostel Mess contributes about three-quarters of the modelled annual quantity because it offers four daily services to residents across the assumed 300-day period. The Canteen contributes the remaining quarter under the assumed 220-day operating period. These shares reflect model structure and cannot independently establish actual source-wise waste generation.

A reduction of 1 g per hostel service opportunity would correspond to 1,560 kg less modelled annual waste. A reduction of 1 g per canteen visit would correspond to 337.10 kg less modelled annual waste. These are scenario sensitivities rather than achieved reductions.

5 Food Waste Collection and Utilization

The University’s management approach follows the sequence: prevent and reduce waste; segregate biodegradable material; classify it as pre-consumer or post-consumer; weigh and record; determine suitability; and route it for appropriate utilization or disposal.

Stage	Operational control	Record
Preparation	Plan quantities; segregate vegetable and kitchen residues	Kitchen waste entry
Service and consumption	Encourage appropriate portions; collect plate leftovers separately	Dining waste entry
Weighing	Measure waste in kg and identify source	Daily signed logbook
Internal utilization	Direct suitable biodegradable waste to biogas processing	Plant input record
External utilization	Record suitable handover to authorized recipient	Dated receipt / handover log
Verification	Reconcile generation with utilization and residual disposal	Monthly summary

Biogas and resource recovery

The source report describes an on-campus biogas mechanism involving segregation, pre-processing, anaerobic digestion, biogas production and digestate/slurry utilization for horticulture. It states a processing capacity of 15 kg without identifying whether this is per batch or per day. Therefore, annual throughput or utilization percentage cannot be inferred from that capacity.

External channels and historical evidence

The source report identifies Gaushala and Piggery utilization pathways. However, the cited Piggery MoU is dated 1 August 2026, after the reporting year. It is not treated here as evidence of quantities transferred during AY 2024–25. Any such historical claim requires period-specific handover documentation.

06 Environmental Performance and Improvement

Food-waste prevention and responsible handling contribute to improved resource efficiency, campus hygiene and circular-resource practices. Biogas and digestate utilization are potential

beneficial outcomes of the documented process, but no measured biogas yield, fertilizer output, greenhouse-gas savings or diversion rate is available for the reporting period.

Practical reduction priorities

Priority	Recommended measure	Monitoring indicator
Meal planning	Align preparation with attendance and demand	Prepared quantity vs. served quantity
Portion control	Use adjustable serving portions and second helpings	Plate waste kg per meal
Segregation	Separate food residues from packaging at source	Contamination observations
Daily weighing	Maintain scales and dated, signed entries	Daily kg by source and category
Utilization	Track biogas inputs and external handovers separately	kg processed / handed over
Monthly review	Examine seasonal and menu-related variations	Monthly kg and kg per service

Suggested next-year improvement target

A prospective planning target of 5% below the low-scenario estimate would be 19,623.60 kg annually, equivalent to an illustrative reduction of 1,032.82 kg. This is a proposed target for future planning only, not an achievement for AY 2024–25. Actual targets should be reset once verified baseline records are available.

07 Monitoring, Evidence and Conclusion

Annual evidence checklist

Performance indicator	AY 2024–25 evidence status
Measured total food waste (kg)	Not available in attached report
Measured monthly waste by source	Blank templates only
Pre-consumer / post-consumer split	Not quantified
Biogas feedstock actually processed	Not quantified
Gaushala / Piggery quantities for AY 2024–25	Not quantified
Beneficial utilization / diversion rate	Cannot be calculated from supplied records
Low-scenario modelled annual estimate	20,656.43 kg (planning estimate)

Recommended annual reconciliation

Each month, reconcile total weighed food waste with pre-consumer and plate-waste subtotals, then with quantities processed through the biogas plant, transferred for suitable external use and remaining for other disposal. The sum of all final routes should equal the measured total after adjustment for documented storage or measurement differences. Obtain verification from the Mess/Canteen In-charge and the designated sustainability/administrative authority.

Conclusion

Based on the documented student population and the University-selected low-waste assumptions, the indicative food-waste generation for AY 2024–25 is 20,656.43 kg (20.66 tonnes), comprising 15,600.00 kg from the Hostel Mess and 5,056.43 kg from the University Canteen. This quantification provides a transparent planning baseline and a framework for monitoring, but it is not a substitute for actual waste weighing and signed annual logbook consolidation.

The **Annual Food Waste Management & Utilization Report for Academic Year 2024–25** reflects K.R. Mangalam University's systematic approach towards the responsible management of food waste generated through its campus food-service operations. With **6,129 students**, including **1,300 hostel residents**, and regular food services through the Hostel Mess and University Canteen, effective management of food waste forms an important component of the University's sustainability framework.

The University's approach is based on the principle:

PREVENT → REDUCE → SEGREGATE → MEASURE → UTILIZE → RECOVER → MONITOR

Through source-level segregation, food waste is differentiated into **pre-consumer and post-consumer/plate waste**, measured in kilograms and documented through the **Food Waste Management Logbook**. This monitoring mechanism provides a basis for understanding food-waste generation patterns, identifying opportunities for reduction and tracking the subsequent utilization of segregated waste.

A significant component of the University's approach is the **Biogas Plant**, which provides an on-campus waste-to-energy pathway for suitable biodegradable food waste. The documented process includes segregation, transportation, pre-processing, preparation of slurry and anaerobic digestion, resulting in the production of **biogas and digestate**. Biogas is identified for cooking/renewable-energy demonstration, while the resulting slurry is utilized as an organic fertilizer in campus gardens.

The University's broader framework also recognizes external beneficial-utilization pathways such as **Piggery and Gaushala arrangements**, thereby complementing internal processing and strengthening the concept of resource recovery. The available Piggery MoU establishes a formal mechanism for regular collection, safe transportation and beneficial utilization of food waste from identified University food-service areas. As this particular MoU is dated **1 August 2026**, it should be treated as evidence of the University's subsequently formalized mechanism and not as documentary evidence of AY 2024–25 operations.

The initiative also contributes to the University's broader sustainability objectives through **responsible consumption, reduction of mixed waste, renewable-energy recovery, beneficial utilization of biodegradable resources and improved campus cleanliness**. In particular, the framework demonstrates strong alignment with **SDG 12 – Responsible Consumption and Production**, along with contributions to **SDG 2, SDG 7, SDG 11, SDG 13 and SDG 15**.