



K.R. MANGALAM UNIVERSITY
THE COMPLETE WORLD OF EDUCATION



**विकसित भारत
अभियान**
1947 TO 2047

**Project Report on “Sustainable Organic waste Management in
Collaboration with Dr. Bhagat Farms” at Dr. Bhagat Farms,
Sohna, Gurugram**

Submitted By

Goutam Sharma (2113820009)

Bachelor of (Hons.) Agriculture

In

School of Agricultural Sciences

Under the guidance of

Dr. Jay Nath Patel (Assistant Professor, SOAS) &

Dr. C.M. Bhagat (M.D., Dr. Bhagat Farms, Sohna, Gurugram)



School of Agricultural Sciences

K. R. Mangalam University, Gurugram-122103



K.R. MANGALAM UNIVERSITY
THE COMPLETE WORLD OF EDUCATION



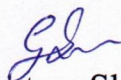
**विकसित भारत
अभियान**
1947 TO 2047

SCHOOL OF AGRICULTURAL SCIENCES

Project Report

On

**“Sustainable Organic waste Management in Collaboration with
Dr. Bhagat Farms” at Dr. Bhagat Farms, Sohna, Gurugram**


Submitted By: Goutam Sharma

Roll No.: 2113820009


Submitted To: Dr. Jay Nath Patel

Assistant Professor, SOAS

**K. R. Mangalam University
Gurugram, Haryana- 122103**



DECLARATION

I hereby declare that this submission is my original work and accurately represents my own ideas and research. Where the work of others has been incorporated, appropriate citations and references have been provided in accordance with academic standards. I affirm that I have upheld the principles of academic honesty and integrity, refraining from any form of misrepresentation, fabrication or falsification of ideas, data, facts or sources.

I understand that any breach of these standards may lead to disciplinary action by the Institute and may also result in penalties related to improper citation or failure to obtain necessary permissions. I accept full responsibility for any infringement of intellectual property rights or copyright arising from this submission and I absolve my supervisor and the university of any liability in such matters.

Name: Goutam Sharma

Roll No.: 2113820009

Date: 06 June 2025


(Signature)



ACKNOWLEDGEMENT

Acknowledgment is not merely a formality but a crucial aspect for the successful fruition of my project in sustainable organic waste management. When I embarked on this journey, navigating through unfamiliar territory posed challenges. The intricacies of organic waste recycling methods and sustainable management practices initially seemed daunting, especially in terms of practical implementation. However, despite the initial hurdles, I am deeply grateful for the unwavering support and encouragement extended to me by the university. Completing this training and acquiring hands-on knowledge about sustainable organic waste management would not have been feasible without the invaluable assistance of our faculty members and peers. We extend our sincere appreciation and admiration to all those who supported us throughout this endeavor.

Our heartfelt thanks go to Dr. Jay Nath Patel, Dr. Anjali Tomar and Dr. Ambika Bhandari for generously sharing their time and expertise with us. Additionally, we owe a special debt of gratitude to Dr. J. S. Yadav, the Dean of the School of Agriculture Sciences, K.R. Mangalam University, for his tireless efforts and for entrusting us with this opportunity to delve into the realm of “Sustainable Organic Waste Management in Collaboration with Dr. Bhagat Farms” at Dr. Bhagat Farms, Sohna, Gurugram.

Place: K.R. Mangalam University

Date: 06 June 2025

Name of students

Goutam Sharma



CERTIFICATE



August 07, 2025

To Whomever, It May Concern

This is certify that Mr. Gautam, a student of the B.Sc. (Hons.) Agriculture VIII Semester from School of Agricultural Sciences (SOAS), K.R. Mangalam University, Gurugram, Haryana has successfully completed his Project Work with Dr. Bhagat Farms from 2nd May 2025 to 2nd June 2025 under the supervision of Dr. C.M. Bhagat, M.D., Dr. Bhagat Farms and Dr. Jay Nath Patel, Assistant Professor, School of Agricultural Sciences.

He completed his Project Work entitled Project on "Sustainable Organic Waste Management in Collaboration with Dr. Bhagat Farms" at Dr. Bhagat Farms, Sohna, Gurugram.

We commend Mr. Gautam for his hard work during his Project Work and wish him all the best for his future.

Dr. C.M. Bhagat
M.D., Dr. Bhagat Farms

Dr. Jay Nath Patel
Assistant Professor, SOAS

Prof. (Dr.) J.S. Yadav
Dean, SOAS



TABLE OF CONTENTS

S.N.	Particular	Page No.
1.	Introduction	1-2
2.	Objectives	2
3.	Significance of Project	3-4
4.	Literature Review	5
5.	Methodology	6-7
6.	Interpretation and Analysis	8-9
7.	Conclusions	10
8.	References	11
9.	Photos	12-16

INTRODUCTION

Organic waste consists of biodegradable materials from plants and animals, such as food scraps, crop residues, garden trimmings and animal excreta. It is generated in homes, farms and industries, making up a significant portion of total waste worldwide. When not managed properly, organic waste can cause environmental issues like bad odors, pests and harmful greenhouse gas emissions, especially methane from landfills. However, organic waste is also a valuable resource. Through natural processes like composting and vermicomposting, it can be converted into nutrient-rich compost that improves soil health and fertility. This helps reduce the need for chemical fertilizers and supports sustainable agriculture. Managing organic waste responsibly minimizes pollution, promotes recycling and contributes to a healthier environment. As urbanization and waste generation grow, adopting effective organic waste management practices is crucial for ecological balance and long-term sustainability.

Sustainable organic waste management involves the controlled decomposition of biodegradable materials- such as crop residues, animal excreta and kitchen waste (without synthetic chemicals). Techniques like composting, vermicomposting, and anaerobic digestion improve soil health, enhance microbial activity and reduce reliance on chemical fertilizers. More importantly, sustainable organic waste management helps clean areas where such waste accumulates.

India has a rich tradition of organic waste recycling in agriculture, but increased urbanization and industrial waste challenges have complicated waste management. Growing awareness among farmers and communities about environmental and soil health issues has driven renewed interest in sustainable organic waste management. This approach offers an affordable, resource-efficient and eco-friendly solution, especially suited for small farmers and semi-urban areas and also supports circular agriculture and environmental sustainability. Proper waste segregation and community involvement are key to its success.

Sustainable organic waste management delivers multiple benefits, *e.g.*- it reduces health risks by limiting untreated waste and chemical pollution, cuts disposal expenses, enhances soil fertility through compost application, and maximizes the use of biodegradable materials. Additionally, it improves soil texture, increases moisture retention, and supports better aeration, which promotes healthy root growth and enriches the soil's physical and chemical qualities. Overall, this method fosters environmentally responsible farming, decreases pollution and supports long-term ecological stability and food security.

Sustainable organic waste management delivers multiple benefits: it reduces health risks by preventing untreated waste buildup and chemical exposure, lowers disposal costs, and enriches soil fertility with nutrient-rich compost. It improves soil structure, water retention, and aeration, promoting robust root growth and healthier crops. By adopting these practices, farmers protect the environment, promote eco-friendly farming, and conserve natural resources. Ultimately, it is essential for sustaining soil health, ensuring food security, and maintaining ecological balance.

This one-month project, entitled **Project on “Sustainable Organic waste Management in Collaboration with Dr. Bhagat Farms”** was conducted at Dr. Bhagat Farms, Sanp Ki Nangli village, Sohna, Gurugram with the following objectives:

OBJECTIVES

- ❖ To design and implement a small-scale sustainable organic waste management system.
- ❖ To highlight the environmental and social benefits of organic practices.
- ❖ To evaluate the environmental and economic benefits of organic waste recycling methods.
- ❖ To train farm staff in effective and sustainable organic waste handling techniques.
- ❖ To promote awareness and integration of sustainable waste practices in daily farm operations.

SIGNIFICANCE OF PROJECT

This project holds significant importance from both environmental and agricultural perspectives. It demonstrates how small-scale farms can adopt eco-friendly, low-cost methods to manage organic waste effectively, while also improving overall farm productivity and sustainability.

✚ Environmental Sustainability

The project contributes directly to environmental conservation by promoting the recycling of organic waste through composting. This reduces harmful practices such as open dumping and burning, which are major contributors to air and soil pollution. The system implemented helps in:

- Lowering greenhouse gas emissions
- Enhancing soil health and biodiversity
- Reducing landfill burden and environmental contamination

✚ Resource Optimization

By converting organic waste into nutrient-rich compost, the project showcases how farms can reduce their dependence on synthetic fertilizers. This not only minimizes input costs but also supports a circular approach to farming, where waste is reused as a resource, thus promoting sustainable resource utilization.

✚ Educational and Training Value

The project served as a practical learning platform for both students and farm workers. It bridged the gap between theoretical knowledge and field-level application. Training sessions and hands-on involvement helped farm staff develop skills in waste segregation, composting techniques, and sustainable farming practices.

✚ Model for Replication

The waste management system (vermicomposting unit) developed during this project is simple, scalable and cost-effective. It can serve as a model for other small and medium-scale farms, rural households, and educational institutions. The success of this project can encourage wider adoption of similar systems, thereby creating a ripple effect in promoting organic waste recycling across agricultural communities.

Economic Benefits

The project highlighted the economic feasibility of organic waste recycling. The compost produced reduced the need for chemical fertilizers, leading to significant cost savings. Over time, such practices can improve crop yield, enhance product quality, and open avenues for organic certification and premium market access.

Social and Community Impact

This initiative also has a social dimension. By involving farm workers and creating awareness, the project fostered a culture of sustainability and responsibility. It empowered individuals with knowledge and practices that can be applied beyond the farm, contributing to cleaner and healthier rural environments.

LITERATURE REVIEW

The sustainable treatment of organic waste, particularly through various composting and related techniques, is increasingly acknowledged as an effective way to improve soil fertility, reduce environmental harm, and support circular agricultural systems.

Sharma *et al.* (2019) highlighted that applying organic wastes to land after stabilizing them through methods like vermicomposting, composting and anaerobic digestion produces high-quality organic fertilizers such as compost, which enhance soil fertility and increase crop yields. This approach also offers environmental advantages, including lower greenhouse gas emissions, conservation of land by reducing waste sent to landfills, and the replacement of chemical fertilizers. From an economic perspective, using organic wastes in agriculture cuts costs related to waste disposal, transportation and the production or import of chemical fertilizers, while also creating job opportunities in rural areas.

Prateek *et al.* (2021) asserted that vermiculture represents a promising and sustainable technology for organic waste treatment, with significant potential in the field of waste management. Their work emphasizes vermicomposting, a process in which non-toxic organic residues from plant and animal sources are utilized as substrates to produce nutrient-rich vermi cast. This method not only offers an eco-friendly solution for managing biodegradable waste but also contributes to soil health and sustainable agriculture, making it a key area of interest in current organic waste management practices.

Thirunavukkarasu *et al.* (2022) stated that vermicomposting provides a sustainable method for breaking down organic wastes and converting them into nutrient-rich organic manures. They also emphasized that emerging research in this field holds potential for developing successful business models within sustainable organic waste management practices.

Hajam *et al.* (2023) claimed that vermicomposting is among the safest and most sustainable methods for managing organic waste. This eco-friendly bioremediation process, facilitated by earthworms, efficiently converts organic waste into compost in an environmentally responsible way.

Bansode *et al.* (2023) reported that vermicomposting is an efficient way to recycle organic waste into valuable compost. The process involves collecting materials like food scraps and plant residues, which are broken down by earthworms. As they digest the waste, earthworms produce nutrient-rich compost containing essential minerals. This compost greatly improves soil fertility and promotes plant growth.

METHODOLOGY

All the activities were performed in a Project timeline like:

- Week 1: Initial assessment and planning
- Week 2: Data collection and identifying waste problems
- Week 3: Establishment of vermi beds and training
- Week 4: Management of vermibeds, evaluation and awareness creation

The methodology for the one-month project combined practical implementation, field observation, staff training and continuous monitoring at Dr. Bhagat Farms, with the aim of establishing an effective and sustainable organic waste management system. The key steps followed were:

- ❖ **Preliminary Survey and Waste Assessment for Planning and Design of the Waste Management System:** A preliminary survey was conducted to assess the type and quantity of organic waste available for vermicomposting, as well as to evaluate site conditions such as shade, drainage, and space under the mango trees. Based on this assessment, the planning and design of the waste management system were carried out. This included deciding on the size and location of the vermicomposting bed, selecting appropriate materials such as plastic sheets, gunny bags, and greenhouse netting and determining the process flow for waste collection, composting, and maintenance.
- ❖ **Setup of Vermicomposting Unit:** A shaded spot under the mango trees was chosen that was well-drained and protected from direct sunlight and heavy rain. The plastic sheet was laid on the ground to act as a moisture barrier and to prevent worms from burrowing into the soil. To avoid water accumulation and improve drainage and airflow, the higher place from normal surface was selected for this. The bedding was prepared by layering dry leaves and then moistening the material until it felt like a wrung-out sponge. On top of this bedding, a 6-inch-thick layer of partially decomposed cow dung mixed with kitchen waste such as fruit and vegetable scraps was added. About 500 to 1000 earthworms per square meter were introduced by gently spreading them over the organic waste, allowing them to burrow down naturally. The entire bed was covered with a moist gunny bag to retain moisture, block light and allow airflow, making sure the bag stayed damp but not waterlogged. A bamboo frame was erected around the vermi beds, and the net of greenhouse was draped over the frame to protect the compost from pests, birds, and wind, while allowing ventilation and light diffusion. The unit was maintained by regularly checking moisture levels to keep the bedding damp, ensuring the temperature stayed between 20 to 30 degrees Celsius, and feeding small amounts of organic waste weekly without overfeeding.

- ❖ **Monitoring and Management:** Regular checks were conducted to monitor the progress of composting by observing physical parameters such as temperature, moisture, and the decomposition rate. The system was also monitored daily for signs of pest infestation, unpleasant odors, and the health of the earthworms. Moisture levels through watering, aeration and temperature through covering the net shade in the vermicomposting beds were maintained to ensure healthy worm activity and efficient waste breakdown.
- ❖ **Integration and Awareness:** To promote awareness and train farm staff in effective and sustainable organic waste handling techniques, talk sessions were conducted during their leisure time. The integration of vermicomposting into daily farm practices was encouraged to ensure long-term sustainability. Awareness of the environmental and economic benefits of vermicomposting was created among farm workers and management through these sessions.
- ❖ **Training and Capacity Building:** During the project, training sessions were conducted for farm staff focusing on vermicomposting principles, waste segregation, unit maintenance, and harvesting of vermicompost. Visual aids were provided on the smartphones of the farm staff, along with step-by-step guidelines to assist them in managing the vermicomposting system effectively.

INTERPRETATION AND ANALYSIS

The one-month project on “Sustainable Organic Waste Management in Collaboration with Dr. Bhagat Farms” aimed to explore the practical implementation of organic waste management techniques and assess their environmental, economic, and social impacts. The methodology successfully addressed the key objectives of the project through a well-structured and integrated approach combining practical setup, continuous monitoring, training and awareness creation.

1. Designing and Implementing a Small-Scale Sustainable Organic Waste Management System:

The preliminary survey and detailed planning ensured that the vermicomposting unit was appropriately designed to suit the local conditions under the mango trees, with suitable materials like plastic sheets and greenhouse netting used to optimize moisture retention, drainage and pest control. The practical implementation of the vermicomposting bed, with careful attention to worm density and organic input, demonstrated a functional and replicable system. The two rows of the vermicomposting beds were set-upped, which measured length of 15 m and width of 1 m each. The choice of a raised bed was selected to improve drainage and the use of natural materials reflected an effective sustainable design adapted to the farm environment.

2. Highlighting Environmental and Social Benefits of Organic Practices: Through monitoring and management, the project showcased the environmental benefits such as reduction in organic waste, improved soil health *via* vermicompost production, mulching and minimized chemical fertilizer dependency. The talk sessions and awareness campaigns fostered social engagement and encouraged farm workers to appreciate the positive impact of organic waste recycling on both the ecosystem and community health. The integration of vermicomposting and mulching into daily practices also emphasized a shift towards more eco-friendly farming culture.

3. Evaluating Environmental and Economic Benefits of Organic Waste Recycling: The consistent monitoring of parameters such as temperature, moisture and decomposition rate provided valuable demonstration of the efficiency of vermicomposting in converting organic waste into nutrient-rich compost. This process not only reduced waste volume but also generated a valuable input that could reduce costs related to chemical fertilizers. The economic advantage was evident as the farm staff were trained to manage the system effectively, ensuring sustainability and cost-efficiency over time. The use of the on-farm vermicompost can surely reduce the cost of chemical fertilizers application because the vermicompost provided almost all the essential macro and micro nutrients (Although amount is very less than the chemical fertilizers) instead of using single chemical fertilizers for one or more nutrients only.

4. Training Farm Staff in Effective and Sustainable Organic Waste Handling Techniques:

Training sessions equipped farm workers with essential knowledge and skills related to vermicomposting, including waste segregation, unit maintenance and compost harvesting. The use of visual aids and stepwise guidelines on smartphones enhanced accessibility and ongoing learning. This capacity building fostered ownership and improved the quality of waste management practices, contributing to the longevity and success of the system.

5. Promoting Awareness and Integration of Sustainable Waste Practices in Daily Farm Operations: The project emphasized awareness through regular talk sessions and by embedding vermicomposting into everyday farming routines. This approach facilitated behavioral change among workers and management alike, promoting sustainability as a core value on the farm. The visible benefits and ongoing support encouraged broader adoption of organic waste management practices, positioning vermicomposting as a vital component of the farm's environmental stewardship.

CONCLUSIONS

This project successfully established a small-scale sustainable vermicomposting unit at Dr. Bhagat Farms, demonstrating an effective approach to organic waste management tailored to local conditions. Through comprehensive training and awareness programs, farm staff gained essential skills and knowledge in sustainable waste handling, ensuring proper maintenance and long-term operation of the vermicomposting unit. Moreover, the project successfully fostered integration of vermicomposting into daily farm practices, promoting environmentally friendly habits and strengthening the farm's commitment to sustainable agriculture.

This project highlights the importance of sustainable organic waste management in boosting soil health, conserving resources and promoting eco-friendly farming. It lays a foundation for wider adoption and improvement, supporting resilient agriculture. The initiative also advances SDG 12 by reducing waste and improving resource use, SDG 13 by cutting greenhouse gas emissions and SDG 15 by restoring soil and protecting ecosystems.

REFERENCE

- Bansode, B. Singh, A. Rathore, S. Singh, R. Tiwari, S. (2023). An Integrated Approach for Organic Waste Management in India. *International Journal of Innovative Research in Technology*, 9(11): 1010-1012.
- Hajam, Y.A., Kumar, R. and Kumar, A. (2023). Environmental waste management strategies and vermi transformation for sustainable development. *Environmental Challenges*, 13: 1-19.
- Pareek, S., Mishra, M. and Raj, S. (2021). Sustainable Organic Waste Management by Vermicomposting. *Indian Journal of Pure & Applied Biosciences*, 9(1): 519-526.
- Sharma, B., Vaish, B., Monika, Singh, U. K., Singh, P., & Singh, R. P. (2019). Recycling of organic wastes in agriculture: An environmental perspective. *International Journal of Environmental Research*, 13: 409-429.
- Thirunavukkarasu, A., Sivashankar, R., Nithya, R., Sathya, A.B. Priyadharshini, V., Kumar, B.K., Muthuveni, M. and Krishnamoorthy, S. (2022). Sustainable organic waste management using vermicomposting: a critical review on the prevailing research gaps and opportunities. *Environmental Science Processes & Impacts*, 25: 364-381.



Photo-1. Picture at Dr. Bhagat Farms Gate along with Faculty



Photo-2. Picture at Dr. Bhagat Farms during waste monitoring



Photo-3. Photo with Faculties at Dr. Bhagat Farms during Project



Photo-4. Dry wastes monitoring at Dr. Bhagat Farms during Project



Photo-5. Session with Dr. C.M. Bhagat at Dr. Bhagat Farms



Photo-6. Conversation about waste management with Dr. J.S. Yadav & Dr. C.M. Bhagat at Dr. Bhagat Farms



Photo-7. Vermi beds (Vermicomposting Unit) set up at Dr. Bhagat Farms during Project



Photo-8. Moisture in vermi beds at Dr. Bhagat Farms during Project



Photo-9. Observations of earthworm at Dr. Bhagat Farms during Project



Photo-10. Observations of Vermi beds by Faculty organizer & participants at Dr. Bhagat Farms during Project