

Waste to Resource: A Review on Real-Life Success Through Vermicomposting

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ABSTRACT

The increasing use of pesticides and chemical fertilizers to increase food production has damaged soil health, reduced crop resistance to diseases, and affected human health. To solve these problems, organic farming methods like vermicomposting are becoming popular. In vermicomposting earthworms was used to turn organic waste into nutrient-rich compost that recovers soil quality and decreases the need for chemical fertilizers. This paper presents real life examples from different parts of India where farmers, women, and small entrepreneurs have successfully adopted vermicomposting and has given their contribution towards improving soil health. These case studies show how simple, low-cost techniques can improve soil health, increase crop production, manage waste, and provide additional income. Vermicomposting is a useful and eco-friendly solution for encouraging sustainable farming and protecting the environment.

Keywords: *Vermicomposting, Earthworms, Organic waste management, Vermiculture.*

1. INTRODUCTION

In recent years, the rapid increase in the global population has led to a rising demand for food production.^[1] According to the Food and Agriculture Organization (FAO)

of the United Nations, feeding the projected world population of approximately 9.1 billion by 2050 will require a significant increase in food production, estimated at around 70% compared to 2005–2007.^[2] To meet this requirement, there has been a wide and often undifferentiating use of agrochemicals aimed at enhancing crop yields.^[3] However, this practice has accidentally weakened the natural biological resistance of crops, rendering them more vulnerable to diseases and pests. Moreover, the excessive application of these chemicals has disrupted beneficial soil microflora, adversely affected soil health and diminished its natural fertility.^[4] However, the human health is also at risk due to the consumption of chemically grown food products.^[5]

To address these concerns, the incorporation of organic matter such as agricultural residues, animal manure, human waste, sewage sludge, food waste, and compost into agricultural practices has been shown to significantly improve plant growth, crop yield, and soil fertility.^[6] Several studies have established that the adoption of organic amendments not only enhances soil structure but also promotes the long-term sustainability of agricultural systems.^[7]

Among various organic farming approaches, biological processes such as composting and vermicomposting have gained considerable recognition for their role in transforming

organic waste into nutrient rich soil conditioners.^[8] Vermicomposting, in particular, employs earthworms to decompose organic material, producing a highly nutritious product known as vermicompost or vermicast. This eco-friendly process improves soil fertility, enhances soil structure, and significantly reduces the dependence on synthetic fertilizers. Earthworms function as natural soil engineers, mechanically fragmenting organic matter, altering its physical, chemical, and biological properties, and substantially lowering its carbon to nitrogen (C: N) ratio.^[9] This fragmentation process increases the surface area of organic material, making it more accessible to microbial colonization and accelerating decomposition.^[10,11] The vermicomposting process is driven by a cooperative interaction among earthworms (such as *Eisenia fetida*, *Eudrilus eugeniae*, and *Perionyx excavatus*) and beneficial microorganisms, resulting in a stable, homogenous, humus like product enriched with nutrients and microbial activity.^[12]

In light of these promising outcomes, we are conducting a comprehensive review of successful case studies where vermicomposting and organic modifications have been effectively implemented. These real-world examples demonstrate the potential of such sustainable practices to improve agricultural productivity, restore soil health, and contribute to environmental conservation.

2. SUCCESSFUL CASE STUDIES

2.1 Case study 1: Mrs. Harshada Rajendra Palaye, Kondye village, in Lanja tehsil of Ratnagiri district.

Mrs. Harshada Rajendra Palaye, a 38-year-old woman from Kondye village in Ratnagiri district, Maharashtra, transformed her life through vermicomposting and nursery farming. With limited formal education and a background in traditional subsistence farming, she faced low income and limited opportunities. After attending a five-day vocational training on vermicomposting at KVK Ratnagiri, she received technical guidance and a government subsidy of ₹30,000 to set up a vermicomposting unit using the bed method. Utilizing *Eisenia fetida* earthworms and organic waste like cow dung and kitchen scraps, she started small but expanded her production to over 100 tons annually, earning ₹13.5 lakh turnover with ₹6 lakh net profit. She also established a nursery business with ₹19.75 lakh turnover and ₹8.4 lakh profit, securing a total annual profit of ₹14.04 lakh. The use of vermicompost improved soil health and crop growth while reducing dependence on chemical fertilizers. Today, Mrs. Palaye stands as a role model for rural women, proving how skill development, organic farming, and government support can make women self-reliant and economically empowered. For her contribution, Mrs. Harshda Palaye and her SHGs has bestowed with Sevavrati Shinde Guruji Smruti Purskar (2019-2020) from Kunabi Seva Sangh, Dapoli- an NGO and Best Women Farmer Award from NGO-Late Tatyia Deshmukh Shetinsitha Sanstha, Lanja Dist. Ratnagiri.^[13]



Fig. 2.1 Mrs. Harshda Palaye and her colleagues, starting agribusiness start-up along with Vermicomposting in Ratnagiri district

2.2 Case study 2: Sri Ravuri Suresh Kumar, Narakullapaadu village in Guntur district (Andhra Pradesh)

Sri Ravuri Suresh Kumar, a B. Com graduate from Narakullapaadu village in Guntur district of Andhra Pradesh, turned to agriculture and made vermicomposting a successful business. After facing losses in chilli cultivation due to Gemini virus, he adopted organic farming practices with the help of KVK Lam and started vermicompost production in 2012. Initially setting up one unit, he expanded to a large-scale commercial enterprise with four units producing over 700 tons of enriched vermicompost annually using *Eisenia fetida* earthworms. He followed the bed method of composting, ensuring proper aeration,

moisture, and raw materials like cow dung and vegetable waste. Suresh introduced value addition by mixing biocontrol agents like *Trichoderma viride*, *Pseudomonas fluorescens*, PSB, and *Azospirillum*, improving compost quality and raising its price to ₹7 per kg. His venture generated a net income of ₹19,00,350 against an investment of ₹8,99,650 with a benefit-cost ratio of 2.1:1. Despite challenges like maintaining optimal conditions and preventing ant attacks, he managed to establish a sustainable and profitable vermiculture business. He now shares his knowledge with fellow farmers, promoting self-reliance and organic manure production across Guntur and beyond.^[14]



Fig. 2.2 Ravuri Suresh Kumar Narakullapaadu village in Guntur district (Andhra Pradesh)

2.3 Case study 3: Chandranna: From Nursery to Vermicompost Champion

In the arid, degraded landscapes of Tumkurlahalli village, located in Karnataka's Chitradurga district, where agriculture is fraught with challenges and seasonal migration is a harsh reality, one farmer has emerged as a symbol of resilience and innovation Chandranna. In a community where annual household incomes rarely exceed ₹15,000, Chandranna has remarkably earned ₹1.4 lakhs over a span of three years through the production and sale of vermicompost and earthworms. Once known as *Nursery Chandranna*, he is now widely recognized as *Vermicompost Chandranna*, a testament to his inspiring journey from adversity to success. His

transformation began with training in nursery development under the Karnataka Watershed Development (KAWAD) project. It was during a session at BIRD-K in the year 2000 that his curiosity was piqued by the concept of vermicomposting. Determined to explore its potential, he began rearing earthworms and producing organic compost on his modest farm. Despite owning just three acres of land, of which one acre remains barren, and having been compelled to discontinue formal education due to poverty, Chandranna's perseverance turned these limitations into stepping stones. Over the course of three years, he successfully raised 15,000 seedlings annually and became a role model within the watershed development initiative.

Today, Chandranna's achievements stand as an inspiring example for farmers across the region, where depleted soils, erratic rainfall, and unproductive monocropping practices have undermined agricultural sustainability.

His story is a powerful illustration of how curiosity, innovation, and unwavering self-belief can transform even the most challenging landscapes into hubs of opportunity and growth.^[15]



Fig. 2.3 Chandranna preparing compost, Karnataka

2.4 Case study 4: Mr. Gurjinder Singh and Mr. Jaswinder Singh, Sangrur District, Punjab

Mr. Gurjinder Singh, a former taxi driver who spent 25 years working in Dubai, and Mr. Jaswinder Singh, a retired Army Havildar, exemplify how determination and innovation can redefine livelihoods in rural India. Upon returning to their native village in Sangrur district, Punjab, they chose to chart a new course by venturing into sustainable agriculture. In June 2023, they leased four acres of land and established a scientifically managed vermicomposting enterprise. With technical training, setup assistance, and ongoing support from Speed Contract Farming, a private agri-enterprise, the duo collectively invested ₹10 lakh to initiate the project. Today, they successfully

operate 650 vermibeds, utilizing cow dung and organic farm waste to produce high-quality vermicompost through the action of earthworms. Their enterprise currently generates an income of approximately ₹90,000 per month, with the initial investment expected to be recovered within the first year of operations.

Encouraged by their success, they plan to expand the venture to 1,000 vermibeds and integrate fruit tree cultivation to further diversify their income. Their story stands as a compelling example of how returning migrants and retired defence personnel can embrace sustainable agriculture, foster self-reliance, and contribute to rural economic development through innovative, eco-friendly practices.^[16]



Fig. 2.4 Gurjinder Singh and Jaswinder Singh at their vermicompost farm fields, Punjab

2.5 Case study 5: Sumit Giri, from Haryana

Sumit Giri, an electrical engineer from Haryana, left his well-paying marketing job due to health issues caused by constant travel and lifestyle changes. Seeking stability and time for family, he explored entrepreneurial options and found vermicomposting appealing due to its low investment and consistent demand.

In 2022, after professional training from the Maharashtra Department of Agriculture, Sumit launched Urjaa Agro Farm in Yamunanagar, Haryana, starting with 60-70 vermicompost beds on leased land. Despite initial challenges, including the death of many earthworms during transportation, his first batch yielded 49 tonnes of vermicompost, earning him Rs 3.5 lakh.

Over time, Urjaa Agro Farm expanded significantly:

- By 2023: 100 beds, producing 70 tonnes per cycle, generating Rs 4 lakh every 3-4 months.
- By 2024: 160-170 beds, output increased to 90-120 tonnes per cycle, with revenue of Rs 6-7 lakh per cycle.

Apart from vermicompost, Sumit also sells earthworms at Rs 100 per kg, adding Rs 10-12 lakh annually. He provides training to aspiring vermicompost entrepreneurs, further contributing to his income.

In FY25, Urjaa Agro Farm achieved an annual revenue of Rs 45 lakh, with a profit of around Rs 20 lakh, and Sumit aims to increase profits to Rs 30 lakh by 2026. His goal is to expand operations and grow his customer base across North India.^[17]



Fig. 2.5 (a) Urjaa Agro Farm Vermiompost certificate



Fig.2.5 (b) Sumit Giri receiving his training

3. COLLECTIVE VIEW OF CASE STUDIES

Parameters	Case study 1	Case study 2	Case study 3	Case study 5	Case study 6
Name	Mrs. Harshada Rajendra Palaye	Sri Ravuri Suresh Kumar	Mr. Chandranna	Mr. Gurjinder Singh and Mr. Jaswinder Singh	Mr. Sumit Giri
Region	Kondye village, in Lanja tehsil of Ratnagiri district	Narakullapaadu village in Guntur district (Andhra Pradesh)	Tumkurlahalli village, Molakalmuru Taluka of Chitradurga District of Karnataka.	Sangrur district, Punjab	Haryana
Materials	Cow dung Chopped dry leafy materials (agricultural	Cow dung, Organic Mixture of vegetables	Cow dung Chopped dry leafy materials (agricultural	Cow dung, organic farm waste	Cow dung, organic farm waste

	residues) Onion peels, vegetables (kitchen residues)		residues)		
Methods	Bed Method	Bed method	Pit Method	Bed Method	Bed method
Earthworm Species	<i>Eisenia fetida</i>	<i>Eisenia fetida</i>	<i>Eisenia fetida</i>	<i>Eisenia fetida</i>	<i>Eisenia fetida</i>
Profits	Rs.13.50 lakh turnover from vermicompost units and Rs. 19.75 lakh from the nursery unit. Rs. 14.04 lakh profit per year	Rs. 19,00,350/- per annum	Turnover is Rs.1.4 lakh from vermicompost units in three years	₹90,000 per month	45 lakh per Annum
Challenges & Solutions	Pest infestation, Temperature, Moisture Imbalance, Foul Odor	Optimum moisture level, Temperature, Ants	Temperature, Moisture Imbalance	Temperature control, Moisture Imbalance, Pest infestation	Sumit Giri struggled with employing labour that he could trust. He spent a significant amount of time in the unit and trained the labourers
Innovations/Unique Practices	Ornamental, fruit and forest crop nursery	Use biocontrol agents to increase net production	Applying vermicompost with groundnut culture	Contract-based vermicompost farming	Urjaa Agro Farm is a vermicompost startup in Haryana, by Sumit Giri in 2022

CONCLUSION

The present review highlights the potential of vermicomposting as an eco-friendly, low-cost solution for sustainable agriculture and waste management. The documented case studies demonstrate how individuals across India have improved soil health, crop yields, and livelihoods through vermiculture. This practice reduces reliance on chemical fertilizers while generating income and empowering rural communities. The achievement of these initiatives underscores the importance of skill development, government support, and community involvement in promoting organic farming and environmental conservation.

Declaration by Authors

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