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A Review on Comparative Analysis of Organic Waste management in Rural Communities of Paratwada for Windrow and Sheet Composting Methods

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ABSTRACT: Since composting and recycling organic waste—such as food scraps and vegetation—reduces the quantity of waste that ends up in landfills, this industry is expanding quickly. After the collected biopat was separated from the composting process, the leftover compost was described as a stable, humus-like, disinfected material that was rich in organic matter and free of unpleasant aromas. Since letting organic waste leak into landfills has detrimental effects on the environment and the economy, recycling is generally seen as environmentally helpful. The two types of household waste that are most frequently collected for recycling are food and garden waste, which have significant energy and financial advantages. One of the most cost-effective and alluring solutions to the issues of garbage disposal and the requirement to raise the amount of organic matter in the soil is the utilization of waste from composting household waste. The natural process of composting involves the controlled aerobic biological breakdown of organic materials. Composting is a substance that resembles soil and nutrients that are produced by the biological breakdown of organic materials like livestock and vegetal waste. Composting can boost soil output, reduce plant disease, save water, and improve fertilizer range and soil fertility. A pilot project at Paratwada, Amravati, is part of this study on the sustainability and composting of organic waste in rural areas in the Amravati region.

KEYWORDS: organic waste, fertilizers, Amravati, Recycling

I. INTRODUCTION

Composting, or the recycling of organic waste, like food scraps and vegetation, lowers the quantity of garbage that ends up in landfills and is consequently a rapidly expanding industry. The stable, humus-rich, and disinfected material that remains after the composting process for collecting biodegradables has been characterized as residual compost. Because letting organic waste choose landfills has detrimental effects on the ecosystem and the economy, recycling is meant to have a broad positive impact on the environment. Garden trash and food waste recycling are the most frequently collected household waste components for recycling. Applying composted household garbage to the ground can be one of the most affordable and appealing solutions for two issues: waste removal and the requirement to raise the soil's organic matter content. The natural process of composting involves the controlled aerobic biological breakdown of organic materials. Similar to nutrient-rich soil, compost is produced when organic materials like cattle feed and vegetal waste break down biologically. Soil fertility, fertilizer extension, water conservation, plant disease suppression, and soil performance can all be enhanced by composting. In any rural community, organic waste can make up a significant amount of the current organic waste. Furthermore, agricultural households produce a lot of manure, which, if improperly managed because of nutrient excess, can endanger the environment, particularly water courses. The direct application of raw manure to agricultural land has historically raised significant concerns about the quality of the air, water, and soil. The need for animal producers to switch to environmentally sustainable manure nutrients is growing.

A. Organic Waste

Any biodegradable material originating from plants or animals is considered organic waste. Organic material that breaks down into carbon dioxide, methane, or simple organic compounds is known as biodegradable trash. Green waste, food waste, food paper, non-hazardous wood waste, landscape and pruning trash, and green waste are all examples of organic waste. Because our landfills are overflowing with rubbish. As a result, this study will examine composting as a substitute waste management technique. The physical and chemical characteristics of organic waste



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during composting processes were thoroughly examined by the researchers. Three categories of organic waste were established for the revised studies: culinary waste, municipal organic waste, and farm waste.



Fig 1 Organic Waste

II. STATE OF DEVELOPMENT

Mohd Huzairi Mohd Zainudin et. al. (2024)

Achieving sustainable food safety and safety goals requires efficient waste management techniques. Sustainable waste management can help create resilient agricultural systems that can meet the food needs of current and future generations, particularly in light of a changing climate, by placing a high priority on soil health, water quality, and resource efficiency. Organic products from agriculture, livestock, and animal breeding, such as crop leftovers, food scraps, manure, and bed materials, are referred to as agricultural and livestock waste. These materials need to be appropriately handled in order to support sustainable agricultural practices. Composting could be a sustainable method of managing livestock and agricultural waste that recycles organic materials produced by farming operations and transforms them into beneficial soil additives.

Emma Rahmawati et. al. (2022)

Waste is a prevalent issue in many places, particularly in rural areas, where a large portion of waste is not managed. Because there are more people living in villages than in cities, a larger share of waste is produced there. However, if the town can manage it effectively, there is an economic potential behind the trash problem. Some villages have succeeded in managing their garbage in a way that allows them to operate an inclusive economy. Thus, the goal of this study is to create a village waste management model for the adoption of an inclusive economy. This study employed in-depth interviews, focus group discussions, and observation to gather descriptive qualitative data. The findings demonstrated that the village's waste management strategy encompasses technology, funding, use, cooperation, processing plan, and management equipment. This village waste management strategy includes a number of components and village communities' involvement, with the goal of lowering poverty and delays in the town.

K.M.C. Fernando et. al. (2021)

Food production and waste management are two of the biggest issues facing humanity in the twenty-first century due to the world's population expansion. Chemical fertilizers enhance crop growth, vigor, and performance that meet food security standards, but they also deplete ecosystems and environmental quality. Recycling organic waste is seen to be a workable way to improve soil nutrients and health while also reducing waste management issues. Reviewing the existing research on vermicomposting as a means of recycling various organic waste materials and using them as an organic amendment to enhance soil qualities and as organic fertilizers to boost crop growth and performance is the aim of this article. Furthermore, ideas were put out to enhance vermicomposting education as a way to manage organic waste among farmers, students, government agencies, and the general public, as well as to grow into a community-



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based microbusiness. The process by which earth worms turn organic waste into humus is known as vermicomposting. It has been studied all throughout the world with consideration for its usefulness. Vermicomposting has been shown to be a good source of micronutrients, macronutrients, and growth regulators like acetic acid, humic acid, and knee. Vermicomposting enhances the quality of vermic because the microorganisms that reside in the earthworms' food pathway. Vermicompost can also remove human diseases such Salmonella species, fecal coliforms, Shigella species, Enterobacter Aerogenes, Enterobacter sewer, and helmon eggs while absorbing heavy metals from the ground and water. Vermicomposting has the potential to be an effective method for turning organic waste into a quality organic fertilizer, according to the updated literature. Furthermore, this analysis recommends vermicompost manufacturing as a microenterprise that might be utilized to ensure the development of sustainable crops while improving the economic empowerment of underprivileged resources.

Modupe Stella Ayilara, et. al. (2020)

The appropriate management of trash through composting, various composting techniques, factors influencing composting, long-term composting, the mechanism underlying it, current composting trends, and viewpoints are all examined in this paper. Composting procedures can be significantly improved by the extraction of compost mono-fertilizers, the creation of strips to demonstrate the presence of heavy metals and pathogens, and an odor capture method. By adding activators to basic materials, compost's nutritional value can be raised. Additionally, this analysis suggests that the degradable organic material in which composts are found should be gradually assessed based on their capacity to mineralize gradually, which may make them beneficial for biennial or perennial crops. Compost can be made better by adding viricides, fungicides, anti-negotodes, and antibacterials from organic or plant sources. Enhancing the composting time will also be beneficial.

Aditi Lanke et. al. (2020)

Approximately 65% of India's population lives in rural areas. One of the fundamental services that must be well planned for the development of rural regions is the management of solid waste and effective garbage disposal. Due to growing populations and commercial activity, waste production rises in rural areas. According to DDWS-UNICEF (2008), 0.3 to 0.4 million tons of solid waste are produced daily in rural regions. Rural waste has a higher organic content than urban waste, however as time has gone on, biodegradable waste such as polyethylene, plastic, thermocol, paper, bottles, glass, and other materials have made their way into rural areas. The majority of rural India lacks a trash collection and management system. In rural locations, improper solid waste management and disposal result in periodic combustion or unlawful storage on the village's outskirts, both of which have a direct and detrimental effect on the environment. In rural places, managing hard trash has become a practical necessity but also a prevalent challenge. It was necessary to introduce the Swachh Bharat initiative, which provides rural India with a sustainable and effective waste management system. Documenting solid waste production regimes, classifying solid waste, establishing waste management strategies, recycling, and identifying rural waste to energy potential are the main topics of the essay. In order to guarantee that solid waste produced in rural areas is collected, separated, treated, and destroyed in the most environmentally friendly manner possible, the contribution aims to address the guidelines and actions implemented for sustainable stationary waste management.

Alessandra Bonoli et. al. (2019)

60% of the organic part of household garbage is recycled by the machinery run by the Agricultural Cooperative Company Al Jalameh, lowering the quantity of waste that ends up in landfills. According to estimates, 800 tonnes of compost are produced annually, compared to 1425 m³/year needed for local agriculture. The composting equipment has a competitive edge because the majority of their compost is sourced from Israel. About 28,215 kg of plastic leaves from the greenhouse are collected annually for recycling in order to boost revenues, which results in a steady receipt of 5625.00 JOD annually. Local farmers buy the compost made in the hamlet, making it more widely available at a reasonable cost. The creation of compost encourages farmers financially and may help address the issue of organic waste while also ensuring a form of "own production" of fertilizer that is beneficial for regional farming. Other villages in Jenin and other developing nations where agriculture is the primary occupation could also benefit from this program.

Florin - Constantin Mihai et. al. (2019)

A crucial issue in rural Romania is the exposure of rural populations to unlawful lining practices linked to inadequate or subpar trash collection systems prior to the closure of rural landfills in accordance with EU laws, as well as the efficiency of collection at that time. There are a significant number of unsubscribed households for a natural



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environment that are not included in the official statistics of rural landfills, according to this study. Even though waste collection has been extended to rural regions since 2010, the issue of unlawful disposal practices persists. To combat this unethical practice, it is required to increase the effectiveness of collection, enforce the law more strictly, and oversee environmental agencies involved in environmental awareness and education. Particularly in less developed places, the circular economy concept needs to be implemented in rural areas through distinct collection programs and enhance affordable alternatives such composting houses and conventional and innovative reuse techniques.

Mirza Hussein Sabk et. al. (2018)

Reviewing the economic viability (EF) of two distinct composting systems—the In-Cé and Windrow systems—that are used in a number of industrialized and developing nations is the goal of this study. Both capital and operating costs for the two composting systems were taken into account in the study. Based on prospective compost sales and waste tilting savings, the return on investment (ROI) for both composting systems is calculated. This summary gives a clearer picture of both composting systems' suitability and usability as landfill alternatives. It is anticipated that the evaluation of different composting methods will be highly beneficial in advancing sustainable composting technology in underdeveloped nations.

Vivek Saini, et. al. (2017)

The usage of municipal organic waste for composting is summed up in this article. The output of municipal waste keeps increasing, depleting resources and raising environmental hazards. Soil filling and open dumping will harm the ecology and spread dangerous diseases. The most practical and cost-effective way to deal with the issue caused by municipal waste is to compost. Composting has emerged as one of the most effective waste treatment techniques in India, where 1.54 lakh metric tonnes of waste are produced daily, with organic waste accounting for 50% of the total. Composting lowers the amount of trash produced, gives plants nutrition, and aids in waste segregation at the source. In terms of the composting factor, temperature, pH, moisture content, and the carbon's nitrogen ratio are the primary determinants of composting efficiency. In order to illustrate the issues of environmental contamination, this page provides information about composting as a waste management technique. Compost has also received a lot of attention lately due to the addition of chemicals, which intensify the rate of deterioration.

Mr. Kale Tejas Sunil, et. al. (2016)

This essay examines the management of organic waste in Gotkhindi Village, which is close to Islampur. For rural local organisms in responsibility of managing organic waste produced in the village, the prevalence of open discharge and the lack of trustworthy data about waste generation and categorization have created a challenging scenario. The organic waste samples that were gathered from a landfill and examined for physical characteristics were used in this investigation. The city's waste's physical characteristics verify that the biological composting method is appropriate for use. The waste characterisation emphasizes how crucial it is to separate garbage before transferring waste parts to various waste treatment technologies, such as composting and landfills. Uncontrolled discharge that results in contamination is the most prevalent waste processing procedure. The environment and public health may suffer if garbage is allowed to grow out of control. Thus, organic waste continues to be a significant issue in this rural region. We have suggested using the Bangalore composting process to address these issues.

Mr. Priyank Shah., (2015)

One of the most significant issues facing our environment today is the management of solid waste, which has grown to be one of the largest issues. The issue is widespread and affects every aspect of the ecosystem, resulting in harmful pollution. One of the major issues facing developing nations is the management of solid waste in both urban and rural locations. The aesthetic harm that solid waste causes to the environment is the most evident. In this document, we have examined the management of organic and liquid waste in seven villages. The air pollution from burning insufficient garbage poses a more significant risk, as does the transmission of contamination to groundwater and the earth. The characteristics of organic and liquid waste are becoming more varied, and if the trash is not managed properly, it may have a negative effect on public health and the environment. Organic waste is still a significant issue in these rural areas as a result. We have suggested using vermicomposting to get over these issues. Keywords: liquid waste that is vermic-filled and organic. Overview of liquid and organic waste management.



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Pravash Chandra Moharana, et. al. (2012)

The contemporary world is a "throw" society. In a world that produces almost 450 million tons of waste a year, the maxim "reduce, reuse, re-cycle" is still just rhetoric. Given the growing concern over the amount of garbage generated, both organic and liquid, waste management has emerged as one of the fundamental ideas of sustainable development, which is founded on practices and regulations. The amount of organic garbage is growing, and if it is disposed of carelessly, it may have a negative effect on the environment and public health. To protect public health and the environment, these wastes must be managed effectively. Environmental sanitation needs to be addressed in order to raise the standard of living for people living in rural areas. The time has come to advance, reap the rewards of more environmental cleaning measures, and capitalize on the current momentum to reach significant benchmarks in the push for "more sanitation" in the direction of comprehensive waste management in every hamlet.

Abduli, M. A. et. al. (2008)

The province of Bushehr is situated north of the Persian Gulf in southern Iran. The aim of this study was to manage organic waste in Bushehr villages. 21 dispersed peoples from across the province were chosen for this study. According to field research, several villages produce about 646 grams of household organic waste per person each day. In the selected communities, there are 322 stores, and the daily total of commercial garbage is about 3565 kilos. On average, each hygienic unit produces 7.8 kg of medical waste. The waste's composition in the chosen villages is: Construction and demolition: 11.7%; paper and cardboard: 8.77%; plastics: 8.24%; wood: 6.90%; metal: 6.08%; glass: 5.89%; rubber and leather: 5.1%; textile: 4.83%; and putrescible materials: 42.49%. This study indicates that the unbiased garbage collection in the rural area is the primary barrier to the recycling program. It is advised that dry waste (paper, plastics, and metals) and bulk materials be included in the separation of origin for the first five years of the program. The second five-year program can be used to separate the sources of other components, including textile, rubber, glass, and wood. Economically speaking, incineration combined with energy recovery is not a viable option for getting rid of farm waste in the Bushehr area.

Saleh Ali Tweib, et. al. (2011)

In order to increase soil fertility and structure, composting has been utilized to recycle organic materials in the soil. Concerns about pollution and the need to find ecologically friendly ways to dispose trash have drawn a lot of attention to the composting process in recent years. The amount of waste produced keeps rising, which results in resource depletion and elevated environmental hazards. Both open and sanitary landfills are crucial for getting rid of trash, however it has been demonstrated that disposing of biodegradable waste degrades the ecosystem primarily by producing methane gas and extremely toxic leaching. Concerns about environmental pollution are addressed by the compound aim. Alabama, Raj Parmar, et al. Due to insufficient funding and a lack of knowledge, it is discovered that the municipal management of organic waste in cities and medium-sized towns is ignored. The government is doing a good job of cleaning up places and managing organic trash.

Raj Parmar, et. al.

Due to insufficient funding and a lack of knowledge, it is discovered that the municipal management of organic waste in cities and medium-sized towns is ignored. The government is doing a good job of managing organic waste and cleaning up regions. Gram Panchayats are now required to set up an operational waste management system as a result of the Swachh Bharat initiative. Currently, only a small number of SWM and GPS (Gram Panchayat) units in Gujarat, Rajasthan, West Bengal, Kerala, and Tamil Nadu are effectively managing their organic waste. In 2016, 0.3 to 0.4 million metric tons of organic waste were produced daily in rural India. About 25% of Gujarat's 14459 panchayats have started collecting organic garbage from households door to door, after the collection of open spills. Situated in the western part of Gujarat state, Jetpur Town's organic waste management situation is examined in this document. With 1,18,302 residents, Jetpur is a middle city on a scale. The city's current data on organic waste management has been gathered. The Lagoon in the city's organic waste management system has been detected through the study of these data. According to calculations, the city generates 0.338 kg of waste per resident every day. Both the amount of organic waste that is wise and the population's outlook for the future have been calculated. Furthermore, the city's SWOT (strength, weakness, opportunities, and threats) analysis.



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III. CONCLUSION

- Upon examining every research paper on our topic, we find something that none of them have addressed.
- Why Local farmers buy the compost made in the town, expanding access to compost at a reasonable cost. Producing compost can help farmers financially by addressing the issue of managing organic waste while also ensuring a form of "self-production" of beneficial fertilizers for regional farming.
- Create suggestions for the Pollution Control Board regarding the possibility of preventing pollution of surface and groundwater for the sake of our citizens' health, safety, and well-being as well as the environment in order to efficiently supply manure to the farm.

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