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Sustainable Farmyard Manure Production: A Technical Framework for Efficient Composting and Application

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ABSTRACT:

This project focuses on developing a technically sound and sustainable ecosystem for the efficient production of Farm Yard Manure (FYM) using livestock waste and organic farm residues. It aims to transform agricultural waste into a valuable resource by promoting scientific composting methods, improving soil health, and reducing reliance on chemical fertilizers. The initiative includes infrastructure development, farmer training, and quality control mechanisms to ensure high-grade manure production. By addressing environmental concerns and enhancing resource efficiency, the project supports circular agriculture, rural employment, and climate-resilient farming. The model is scalable, eco-friendly, and aligned with national goals for organic and sustainable agriculture.

INTRODUCTION:

The proposed project aims to establish a sustainable and technically feasible ecosystem for the production of Farm Yard Manure (FYM), a vital organic input in agriculture. The present research work is going on at Gadgebaba Gaurakshan Charitable Trust, Mahuli (Dhande) Tq Daryapur Dist - Amravati under the guidance and supervision of Prof. Gajanan Bharsakle. The Ecosystem cycle considered for the present case is of eleven (11) months. In India, the vast livestock population generates large volumes of organic waste, which, if managed properly, can be transformed into nutrient-rich manure. This project focuses on scientific methods of collection, decomposition, and application of FYM to enhance soil fertility, reduce chemical fertilizer dependency, and promote eco-friendly farming. By integrating technology with traditional practices, the initiative will empower rural communities, support waste-to-wealth solutions, and contribute to sustainable agricultural development across diverse agro-climatic regions.

BACKGROUND OF THE PROJECT:

India, with one of the world's largest agrarian and livestock economies, produces over 1.8 billion tonnes of agricultural waste annually. Yet, much of this organic waste remains underutilized or poorly managed, leading to environmental pollution, methane emissions, and loss of valuable nutrients. Simultaneously, the overuse of chemical fertilizers has degraded soil health, reduced biodiversity, and affected crop productivity.

METHODOLOGY:

The production of Farm Yard Manure (FYM) involves a systematic process using cattle dung, urine, and farm residues. The process begins with the daily collection of these materials, which are then layered in compost pits or heaped above ground in a shaded, well-drained area. Moisture is maintained at 50–60% by regular watering. The heap is allowed to decompose anaerobically for 30–60 days, during which microbial activity breaks down the organic matter. Turning is done once or twice to improve aeration and uniform decomposition. The process is repeated for 11 months, after an additional 30–45 days of maturation, the compost is screened to remove undecomposed materials and packed for use or sale. Optional enrichment with beneficial microbes or nutrients like rock phosphate can improve its quality. The final FYM is rich in organic carbon and nutrients, has an earthy smell, and is applied to fields 2–3 weeks before planting to enhance soil fertility and support sustainable agriculture**.**

RESULTS AND DISCUSSION:

Based on the provided **vermicompost test report** from the Department of Soil Science, Dr. PDKV, Akola, we will compare the results with standard/reference values from scientific literature (ICAR, NCOF, and other research publications) to analyze the compost quality. Here's a detailed **comparative analysis**:

Table: comparative analysis

Particulars	Standard range from Literature	Nutrient Content from Sample -1 Gaurakshan Sansthan	Nutrient Content from Sample -2 Gaurakshan Sansthan
pH	**6.5 - 7.49**	**7.78**	**7.97**
EC	**< 4**	**0.89**	**0.51**
Total Carbon	**9-20**	**30.38**	**29.39**
Total Nitrogen (N %)	**0.5 -1.5**	**1.22**	**1.19**
Total Phosphorous (P%)	**0.3-0.9**	**1.11**	**1.24**
Total Potassium (K %)	**0.4-1.2**	**1.16**	**1.17**
Total Zinc	**50-100**	**141.32**	**143.12**
Total Iron	**300-500**	**567.51**	**571.33**
Total Manganese	**50-100**	**119.11**	**121.31**
Total Copper	**10-50**	**27.17**	**28.47**

OBSERVATIONS AND INTERPRETATION:

a. pH and EC

- pH values are slightly alkaline (ideal: neutral), which is acceptable for most crops.
- Electrical conductivity (EC) is low, indicating low salinity and no toxicity risk for plants.

b. Macro-nutrients

- **Total Carbon** is significantly high (>30%), suggesting high organic matter content—excellent for soil structure and microbial activity.
- **Nitrogen, Phosphorus, and Potassium (NPK)** are all at the upper end or above standard ranges, indicating very good fertility potential of the compost.

c. Micro-nutrients

- Zinc, Iron, Manganese, and Copper are all present in sufficient to high concentrations.
- These levels can support micronutrient deficiencies in Indian soils, especially in degraded or sandy areas.

d. Balance

- The C:N ratio (calculated from the data) is approximately 24–25:1, which is slightly above ideal compost (20:1 or lower) but still good for slow-release nutrient availability.

CONCLUSION

- The compost samples tested from Gadgebaba Gaurakshan Charitable Trust, Mahuli (Dhande) project demonstrate **excellent quality vermicompost**, exceeding many standard nutrient benchmarks. High organic carbon, balanced NPK, and rich micronutrient content suggest it is highly beneficial for organic farming and soil rehabilitation.
- Although pH is slightly alkaline and a few micronutrients are on the higher side, these are within tolerable limits for most crops and soil types. Such compost can improve soil fertility, boost microbial life, and reduce dependency on synthetic fertilizers.

REFERENCES:

1. Indian Council of Agricultural Research (ICAR). (2017). *Handbook of Organic Manures*.
2. Ministry of Agriculture and Farmers Welfare, Government of India. (2020). *Operational Guidelines for Organic Farming Schemes*.
3. Tandon, H.L.S. (2005). *Organic Fertilizers and Their Technology*. Fertilizer Development and Consultation Organization.
4. National Centre of Organic Farming (NCOF) – http://ncof.dacnet.nic.in
5. FAO (2019). *Compost and Manure Management for Organic Farming*.
6. NABARD Model Bankable Projects – https://www.nabard.org