



Rebuilding Soil Organic Carbon Through Farmyard Manure

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Soil organic carbon (SOC) is essential for maintaining soil health and sustainable crop production. Farmyard manure (FYM) is an important organic resource that improves soil fertility and enhances SOC. This study assessed farmers' awareness and adoption of FYM management practices in three villages of Raipur district, Chhattisgarh. Data were collected from 150 farmers through a structured survey. The study found limited awareness of scientific FYM management despite good knowledge of its benefits. The findings highlight the need for awareness programmes to promote scientific FYM management and sustainable soil health.

Keywords: Soil Organic Carbon, Farmyard Manure, Soil Health, Sustainable Agriculture

Introduction

Soil is the foundation of agricultural productivity and its health determines the sustainability of farming systems. Among the various indicators of soil quality, Soil Organic Carbon (SOC) is considered one of the most important because it influences soil fertility, nutrient availability, water-holding capacity, microbial activity, and crop productivity. However, continuous cultivation, intensive tillage, residue burning, imbalanced fertilizer use, and insufficient application of organic manures have significantly reduced SOC levels in many agricultural soils. The depletion of SOC results in poor soil structure, declining productivity, reduced nutrient use efficiency, and increased vulnerability to erosion and drought. Farmyard manure (FYM), prepared from cattle dung, urine, bedding materials, and crop residues, is an economical and sustainable source of organic matter. Regular application of well-decomposed FYM replenishes soil organic matter, improves soil physical, chemical, and biological properties, and contributes to rebuilding soil organic carbon. Despite its benefits, many farmers still rely on traditional manure management practices and lack awareness of scientific FYM preparation and application. Therefore, assessing farmers' awareness and adoption of scientific FYM management practices is essential for designing effective strategies to restore soil organic carbon and promote sustainable agriculture.

Soil organic carbon: Concept and significance

Soil Organic Carbon is the carbon component of soil organic matter formed through the decomposition of plant residues, animal wastes, microorganisms, and other organic materials. It serves as a key indicator of soil health because it directly influences soil structure, nutrient cycling, moisture retention, and biological activity. Soils rich in organic carbon possess better aggregation, higher infiltration rates, improved aeration, and greater resistance to erosion. Maintaining adequate SOC is essential for sustainable agriculture. It enhances fertilizer use efficiency, improves crop resilience to climatic stress, and supports beneficial soil microorganisms that drive nutrient mineralization. Increasing SOC also contributes to carbon sequestration, thereby helping mitigate climate change while improving long-term agricultural productivity.

Farmyard manure as a sustainable strategy for rebuilding soil organic carbon

Farmyard manure has been used for centuries as an important organic amendment for improving soil fertility. It supplies essential nutrients, along with stable organic matter that gradually decomposes and enriches the soil carbon pool. Regular application of FYM improves soil aggregation, increases cation exchange capacity, enhances water-holding capacity, and stimulates microbial activity. The decomposition of FYM releases nutrients slowly, ensuring a continuous nutrient supply to crops while minimizing nutrient losses. Long-term application enhances soil organic carbon, improves soil biodiversity, and reduces dependence on chemical fertilizers. Integrating FYM with balanced nutrient management practices therefore represents a sustainable strategy for restoring degraded soils and maintaining agricultural productivity.

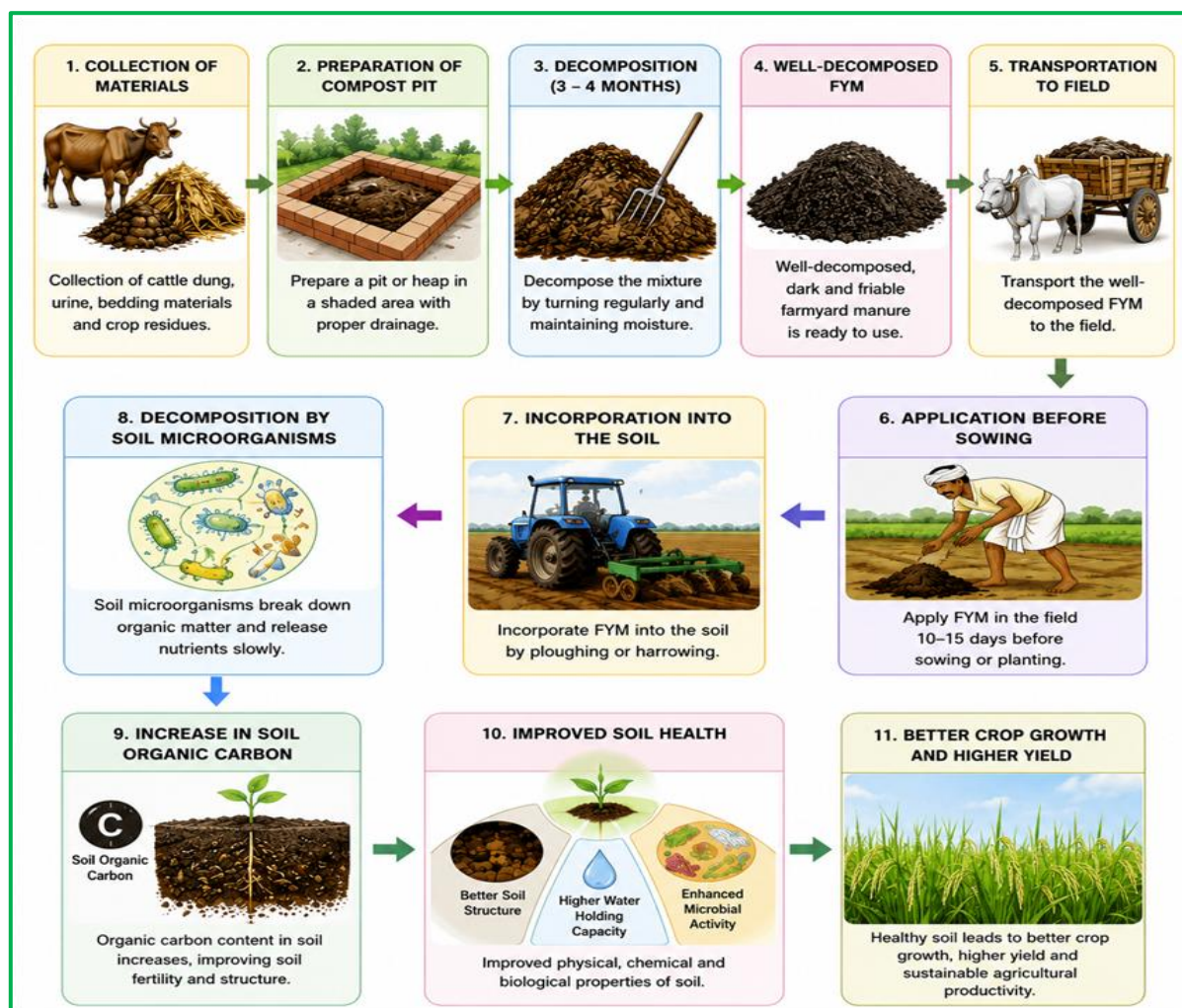


Fig.1 Flow chart of Farm Yard Manure application for rebuilding soil organic carbon

Study Area and Assessment Methodology

The study was conducted among rural farming households in Pirda, Dharampura, and Nakti villages of Raipur district, Chhattisgarh, to assess farmers' awareness and adoption of FYM-based soil organic carbon management practices. Information was collected through personal interviews, structured questionnaires, field observations, and group discussions with farmers involved in crop cultivation and livestock rearing. The assessment focused on farmers' knowledge of soil organic carbon, scientific FYM preparation, composting methods, manure storage, timing and method of application, perceived benefits, and constraints affecting adoption. The collected information provided valuable insights into existing knowledge gaps and highlighted the need for targeted interventions. The selected villages represent typical farming systems of the Chhattisgarh Plains, where crop cultivation and livestock rearing are the primary livelihood activities.



Fig. 2: Open FYM storage pit



Fig. 3: Compost prepared in bags

Farmers' Knowledge and Existing Management Practices

The survey indicated that most farmers recognized the importance of FYM in improving soil fertility; however, awareness regarding soil organic carbon and scientific composting techniques remained limited. Traditional methods of FYM preparation and direct field application without adequate decomposition were commonly observed. Many respondents were unaware of nutrient losses occurring during improper storage and handling of manure. Only a small proportion of farmers practiced compost pit preparation, moisture management during decomposition, or integrated use of FYM with recommended fertilizer doses. These findings highlight the need for regular capacity-building programmes and practical demonstrations to improve scientific manure management.

Activities for Promoting Soil Organic Carbon Management

Awareness campaigns, farmer meetings, training programmes, field demonstrations, and group discussions play a significant role in enhancing farmer's knowledge and adoption of improved FYM practices. These activities help disseminate scientific information on compost preparation, nutrient conservation, and soil health management. Demonstrations on compost pit construction, proper decomposition techniques, residue recycling, and balanced nutrient management encourage farmers to adopt sustainable practices. Distribution of educational pamphlets, soil health awareness programmes, and promotion of Soil Health Cards further strengthen farmers' understanding of soil organic carbon management. Collaboration among agricultural universities, Krishi Vigyan Kendras, and other agricultural agencies can accelerate technology dissemination and improve the adoption of scientific FYM management practices.

Challenges and Strategies for Promoting Scientific Farmyard Manure Management

Although farmyard manure (FYM) is widely recognized for its role in improving soil health, several factors limit its scientific management. Farmers commonly face constraints such as limited livestock availability, labour shortages, transportation difficulties, inadequate composting facilities, and insufficient technical knowledge. Financial limitations and limited access to advisory services further reduce the adoption of recommended FYM practices. Overcoming these challenges requires a combination of farmer awareness, capacity building, and institutional support. Training programmes, village-level demonstrations, promotion of compost pits, and recycling of crop residues can encourage improved manure management. Strengthening soil testing services, expanding the use of Soil Health Cards, and enhancing collaboration among agricultural universities, Krishi Vigyan Kendras, government departments, and farmers can improve awareness and adoption of scientific FYM practices. Such coordinated efforts will contribute to rebuilding soil organic carbon, improving soil fertility, and promoting sustainable agricultural development.

Conclusion

Rebuilding soil organic carbon through farmyard manure is a practical and sustainable approach to improving soil health and agricultural productivity. Although farmers recognize the importance of FYM, scientific knowledge regarding its preparation and application remains limited. Promoting awareness, farmer training, and improved manure management practices can enhance soil organic carbon, improve soil fertility, and reduce dependence on chemical fertilizers. Wider adoption of scientific FYM management will contribute to sustainable agriculture, climate resilience, and improved rural livelihoods.