

# THE ORGANIC FERTILIZER REVOLUTION

## *(Enhancing Soil Nutrient Dynamics)*

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### ABSTRACT

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*A sustainable and ecologically acceptable method of enhancing soil nutrient dynamics is the organic fertilizer revolution. These organic fertilizers provide the soil and plants with a number of advantages. They are made from natural sources such as compost, animal waste, plant waste, and other organic materials. By securing soil particles together, they enhance the structure and texture of the soil by forming aggregates that enhance water penetration and retention. This improves the structure of the soil, encourages the growth of roots, and makes more nutrients available to plants. By encouraging the development of advantageous microbes that break down organic matter into simpler forms and lessen the need for chemical pesticides, organic fertilizers help support long-term soil fertility. A balanced nutritional profile provided by organic fertilizers lowers the danger of nutrient shortages or toxicities while promoting healthy plant development by including a wide variety of critical elements needed for plant growth. Utilizing waste materials like agricultural waste and animal manure, they also lessen trash disposal issues and recycle important nutrients back into the soil, all of which contribute to overall sustainability. Farmers and researchers are realizing more and more how important organic fertilizers are to improving soil health, lowering environmental impacts, and increasing crop productivity. As a result, the organic fertilizer revolution has gained traction in a variety of agricultural systems, including conventional farming, organic farming, and sustainable agriculture. Compost and animal dung are examples of organic fertilizers that are not only rich in vital nutrients but also improve soil structure and water-holding ability. This promotes healthier root development in plants and reduces the need for synthetic fertilizers, thus reducing chemical runoff into water bodies. Moreover, the use of organic fertilizers encourages the growth of beneficial microorganisms in the soil, which further improves nutrient availability and plant resilience to pests and diseases. Overall, embracing organic fertilizers in different agricultural practices is a significant step towards achieving long-term sustainability in food production.*

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**Keywords:** Soil, Organic fertilizers, Soil fertility, Soil nutrient, Organic farming.

## INTRODUCTION

In the 1940s, an organic movement began in response to agriculture's increasing reliance on synthetic fertilizers and pesticides. The present renaissance of organic farming may be traced back to the first part of the twentieth century, when there was a rising reliance on these new synthetic, non-organic technologies [5]. Plant- or animal-based resources, such as animal dung and composted organic materials, are used in organic fertilizers. Organic fertilizers are carbon-based substances that boost plant productivity and growth quality. The vast majority of organic fertilizers can be made locally or on the farm. The use of organic fertilizers ensures that the food produced has no harmful chemicals [1]. Organic fertilizers included elements that were leftovers from plants, animals, or minerals as opposed to chemical fertilizers (Tadesse, S., and Assefa, S. 2019). These natural decomposition sources release nutrients and minerals into the soil as they decompose. One benefit of organic fertilizer is that its nutrients are related more slowly than those of chemical fertilizers [8]. This more progressive approach allows the plant to take the fertilizer more organically and avoids overfertilization, which might be harmful to the plant. Furthermore, the drainage and air circulation of the soil may be improved. In addition to increasing soil texture, water retention, and erosion resistance, organic fertilizers increase the amount of organic matter in the soil. It thereby contributes to the enhancement of the soil's physiological and physical structure. Consequently, this encourages more robust root growth and

general plant growth [7]. Zhou et al. (2022) state that using organic fertilization techniques can improve soil quality and crop productivity in a number of ways. All things considered, organic farming improves not just the soil and individual plants but also the sustainability and general health of the ecosystem. Organic farming lowers the chance of hazardous chemicals getting into the food chain and helps prevent the polluting of water sources by not using synthetic pesticides and fertilizers. Furthermore, crop rotation and cover crop practices that enhance water retention and reduce soil erosion are frequently prioritized by organic farms. Moreover, organic farming increases the soil's capacity to store carbon dioxide, which makes it an effective weapon in the battle against global warming. Furthermore, organic farming lowers the carbon footprint associated with the production and distribution of synthetic inputs by relying on natural, renewable resources. Additionally, by avoiding the use of genetically modified organisms (GMOs) and industrial pesticides, organic farming supports biodiversity [1]. Organic farms draw beneficial insects, birds, and other species that aid in pollination and pest management by establishing a natural and varied ecosystem. This helps preserve the delicate balance of the food chain in addition to the ecosystem's general health. On the other hand, conventional agricultural practices frequently result in the extinction of beneficial species and a loss of biodiversity, both of which can have detrimental long-term effects on the ecosystem.

## **IMPROVING SOIL AND ORGANIC FERTILIZER EFFICIENCY DEPENDS ON MAINLY FOUR FACTORS.**

### ***Why and how to identify soil fertility?***

Testing your soil is the first step towards choosing the best organic fertilizer. Identifying soil fertility involves assessing various factors such as nutrient content, pH levels, organic matter content, soil texture, biological activity, and plant performance. Soil testing through laboratory analysis is a common method used to evaluate nutrient levels and other parameters influencing soil fertility. By understanding the fertility status of the soil, farmers and gardeners can implement appropriate management practices to optimize plant growth and productivity.

### ***Which type of fertilizer is required in the soil at a given time to improve fertilizer efficiency?***

The best organic fertilizer may be chosen when you are aware of the compounds that your plants require to flourish. **Johnson, M., & Koenig, R. (2011)**. Finding out more about the plants you are cultivating, including what kind of soil they like, is also advised. This is due to the fact that each plant has unique requirements and preferences.

### ***Which type of nutrients are needed in the soil at a time to improve nutrient efficiency?***

It's critical to realize that various fertilizers will supply the soil with various kinds of nutrients. Specifically, fish meal, green sand, shellfish meal, animal and bird manures, blood and bone meal, and rock phosphate are all considered forms of organic fertilizer. Plant residue and agricultural byproducts, such as green manure, kelp, seaweed,

cottonseed meal, cover crops, and even compost tea, are used to make plant-based fertilizers. They decompose quickly and supply a variety of nutrients to your garden and lawn, promoting soil regeneration and plant growth. They are an excellent option for poor soil that needs assistance with moisture retention and drainage. Animal manure and leftovers from animal slaughter, such as bone and blood meal, are used to make fertilizers based on animals. Compared to plant-based solutions, these fertilizers enrich the soil with higher concentrations of nitrogen. They work best on leafy plants as a result. Cow manure is the most widely used animal-based organic fertilizer because of its balanced nutritional value, which makes it ideal for lawns, gardens, and vegetable plots.

### ***Which type of process is used in organic fertilizer to increase soil fertility?***

Organic materials can be put in a narrow band on top of the soil or under it, or they can be spread out over the surface and tilled or irrigated into the soil. Little amounts of organic fertilizer can typically be applied effectively using a standard fertilizer spreader [4]. There are two primary kinds of broadcast applications that are accessible: the rotary spreader and the drop spreader. The route spread is restricted to the unit's width, which is typically between 18 inches and three feet, even though most drop spreaders may apply a broad variety of rates. Compared to drop spreaders, rotary spreaders offer less rate control and consistency when dispersing organic materials in a route that is 5 to 10 feet wide. If big particles need to be removed, filter the substance before spreading.

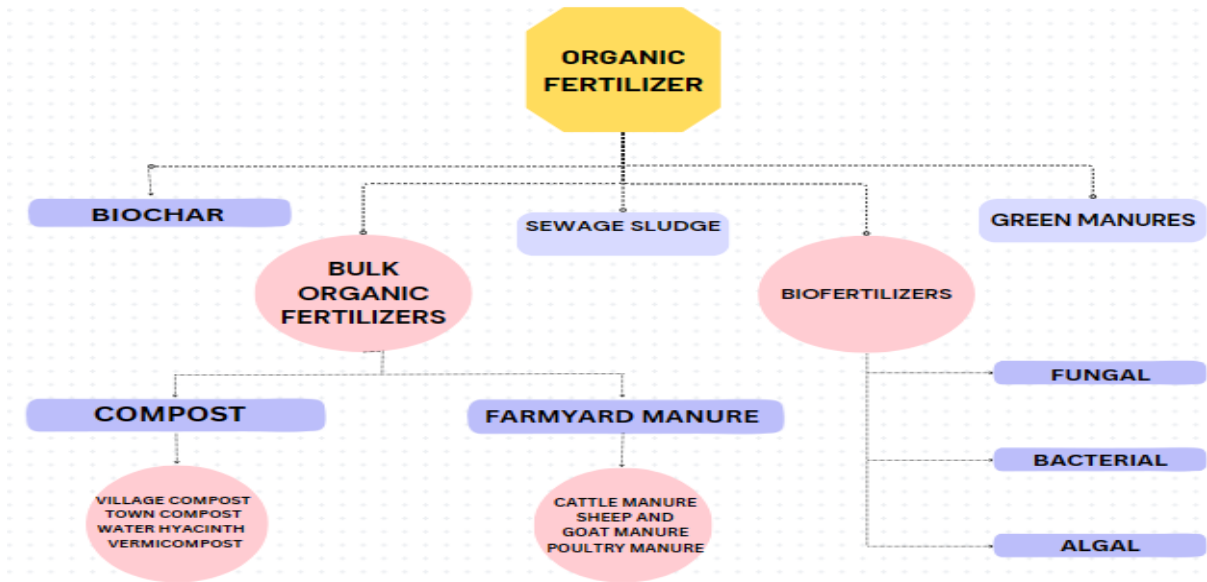


Diagram. 01 Classification of organic Fertilizer

**Compost:** Compost is a byproduct of microorganisms' biodegradation of organic materials, including food scraps, yard trash, and animal dung. It has been utilized for agriculture since ancient times and enhances the qualities of the soil. Conversely, manure has advantages such as micronutrients, enhanced soil nutrient availability, and better soil structure, but it also has drawbacks such as poor nutrient content and delayed decomposition.

**Vermicompost:** Vermicomposting is a quick-decomposition and stabilization method for nutrient-rich organic material. By turning solid waste into plant nutrients for sustainable land restoration techniques, it reduces trash pollution in metropolitan areas.

**Biochar:** Thermal breakdown of biomass resources, such as food processing leftovers, solid waste, animal waste, and municipal sludge, occurs in this technique in an oxygen-free atmosphere. Because biochar enhances soil's moisture content, oxygen concentration, and water-holding capacity, it improves the soil's physical properties. Furthermore,

chemical properties are improved, such as the capacity to remove impurities and store carbon.

**Sewage Sludge:** The amount of industrial waste rising might provide soil with organic materials. A by-product of sewage treatment, sewage sludge is rich in organic matter and nutrients. Applying it to crops and gardens increases soil fertility. The origin of the wastewater affects the characteristics and chemical composition. Ash from sewer sludge can be used to fertilize mixtures.

**Bio fertilizer:** The soil microorganisms known as biofermenters are created by algae, fungus, or bacteria and increase the availability of nutrients to plants through their root systems. They are less expensive, nontoxic, easier to apply, and environmentally favorable than chemical fertilizers. Crop production, soil fertility, and organic farming are all helped by biofertilizers. The worldwide market is dominated by biofertilizers that solubilize nitrogen, whereas biofertilizers that solubilize phosphates improve the efficiency with which inorganic phosphates are utilized.

## BENEFITS OF ORGANIC FERTILIZERS FOR SOIL NUTRIENT DYNAMICS

The main advantages of organic fertilizers for fertility and soil health.

1.	<b>Better Soil Structure</b>	<b>By strengthening soil aggregates, organic fertilizers encourage more robust plant development.</b>
2.	Enhanced Microbial Activity	By releasing nutrients in a manner that is favorable to plants and reducing soil-borne illnesses, organic matter encourages beneficial microbial activity
3.	Slow Nutrient Release	By releasing nutrients gradually, organic fertilizers help to balance out nutrient levels.
4.	Enhanced Nutrient Retention	By improving the soil's ability to exchange cations, organic matter increases the amount of nutrients that can be retained.
5.	Enhanced Soil Fertility	The wide range of nutrients found in organic fertilizers supports healthy soil and balanced plant nutrition.
6.	Decrease in Soil Erosion	More organic matter and better soil structure both lessen soil erosion.
7.	Environmental Benefits	Using organic fertilizers shields water bodies from nutrient excess and reduces the likelihood of water contamination.
8.	Sustainability	By recycling organic waste and fostering biodiversity, organic fertilizers help to promote sustainable agriculture practices.

### CONCLUSION

The organic movement emerged in the 1940s to counter synthetic fertilizers and pesticides in agriculture. Organic fertilizers, made from leftover materials from plants, animals, or minerals, break down organically, providing nutrients and minerals to the soil. This gradual approach prevents over fertilization, enhances soil air circulation and drainage, and traps carbon, reducing greenhouse effects and global warming. Organic fertilizers are carbon-based substances, typically made locally or on farms, and offer numerous benefits for sustainable agriculture, including increased soil organic matter content, reduced chemical inputs, improved plant development, soil biodiversity, enhanced nitrogen utilization, water use efficiency, reduced farming effects, increased crop resistance to erosion, and increased resource efficiency. To

choose the best organic fertilizer, test the soil and determine plants' nutritional needs and soil type. Apply organic materials using rotary and drop spreaders, filtering the substance before spreading to remove large particles. Fertilizers are crucial for plant growth and crop yield, with organic and synthetic types available. Organic fertilizers improve soil health, offer environmental benefits, are cost-effective, and can be made from various sources like food waste, agricultural residues, and animal manure. Synthetic fertilizers release nutrients quickly, have higher nutrient content, and are widely available. However, they have environmental concerns, high costs, and a lack of soil health benefits. Organic fertilizers are biodegradable, non-toxic, and promote soil biodiversity, while synthetic fertilizers can pollute soil, air, and water,



contribute to greenhouse gas emissions, and are often more expensive. They can eventually cause soil deterioration and decreased

fertility, and they offer no advantages to soil health. You should consider using organic fertilizers in your own gardens and farms.

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