

Natural Farming Today for a Greener Tomorrow

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INTRODUCTION

Agriculture faces multiple challenges in the modern era, including declining soil fertility, climate change, water scarcity, increasing input costs, and environmental pollution. Excessive use of chemical fertilizers and pesticides has contributed to soil degradation, loss of beneficial microorganisms, and ecological imbalance. Therefore, sustainable agricultural approaches are required to maintain productivity while protecting natural resources. Natural farming is an environmentally friendly farming system based on ecological principles and the use of locally available natural inputs. It promotes harmony between plants, soil organisms, animals, and the surrounding ecosystem. Unlike conventional agriculture, natural farming minimizes external inputs and focuses on improving natural soil processes.

The concept of natural farming emphasizes that healthy soil produces healthy crops. By enhancing soil biological activity, conserving moisture, and promoting biodiversity, natural farming contributes to sustainable food production and climate change adaptation.

2. Concept of Natural Farming

Natural farming is a low-cost, chemical-free agricultural system that relies on natural processes and biological inputs for crop production. It aims to reduce dependence on synthetic fertilizers, pesticides, and external resources while maintaining soil fertility and productivity.

The major principles of natural farming include:

- Use of locally available natural resources
- Enhancement of soil microbial activity
- Recycling of farm residues
- Minimum soil disturbance
- Conservation of biodiversity
- Integration of crops, livestock, and ecological processes

Natural farming considers the farm as a living ecosystem where plants, microorganisms, animals, and natural resources interact to maintain balance.



3. Principles of Natural Farming

3.1 Soil as a Living System

Natural farming recognizes soil as a dynamic biological system containing microorganisms, organic matter, minerals, and plant roots. Healthy soil organisms improve nutrient cycling, decomposition, and plant growth. Practices such as organic matter addition and microbial inoculation enhance soil fertility naturally.

3.2 Use of Natural Inputs

Natural farming promotes the preparation and application of biological inputs using locally available farm resources. These inputs enhance soil microbial activity, improve nutrient availability, and support healthy crop growth. Important natural inputs include Beejamrit for seed treatment, Jeevamrit and Ghanjeevamrit for soil enrichment, compost and farmyard manure for organic matter addition, and botanical extracts for natural pest management. These practices maintain ecological balance and reduce dependence on chemical inputs.

3.3 Minimal External Inputs

Natural farming reduces dependence on costly external agricultural inputs by utilizing locally available farm resources. It encourages the recycling of natural materials such as cow-

based products, crop residues, green biomass, and farm waste to maintain soil fertility and crop productivity. This approach lowers production costs, improves resource-use efficiency, reduces environmental pollution, and promotes self-sufficient and sustainable farming systems.

4. Major Components of Natural Farming

4.1 Beejamrit (Seed Treatment)

Beejamrit is a natural seed treatment formulation prepared using cow dung, cow urine, lime, and soil. It contains beneficial microorganisms that improve seed health and protect seeds from harmful pathogens. Beejamrit enhances seed germination, promotes early plant growth, and provides protection against seed-borne diseases. Its use supports healthy crop establishment and reduces dependence on chemical seed treatments in sustainable natural farming systems.

4.2 Jeevamrit

Jeevamrit is a fermented microbial culture prepared from cow dung, cow urine, jaggery, pulse flour, and water. It acts as a natural bio-enhancer by increasing the population and activity of beneficial microorganisms in the

soil. Jeevamrit improves nutrient availability, enhances soil biological activity, promotes plant growth, and strengthens soil fertility. Regular application supports healthy soil ecosystems and improves the sustainability of natural farming systems.

4.3 Ghanjeevamrit

Ghanjeevamrit is a solid form of Jeevamrit prepared using organic materials and microbial-rich ingredients. It provides a slow and sustained release of beneficial microorganisms and nutrients into the soil. It is easy to store, transport, and apply compared to liquid formulations. Ghanjeevamrit improves soil microbial activity, enhances nutrient cycling, and supports better soil health and sustainable crop production in natural farming systems.

4.4 Mulching

Mulching is a natural farming practice that involves covering the soil surface with plant residues, crop wastes, or other organic materials. It helps conserve soil moisture by reducing evaporation losses and improves soil conditions for plant growth. Mulching suppresses weed growth, increases soil organic matter, and regulates soil temperature. This practice enhances soil fertility, improves microbial activity, and supports sustainable crop production under changing climatic conditions.

4.5 Waaphasa Principle

The Waaphasa principle in natural farming emphasizes maintaining an appropriate balance between soil moisture and air spaces for healthy plant growth. According to this concept, well-structured soil should contain sufficient moisture along with adequate aeration to support root development and microbial activity. Proper soil aeration improves root respiration, enhances nutrient uptake, and promotes better soil structure. Waaphasa helps create a favorable soil environment for sustainable crop production.

5. Benefits of Natural Farming

5.1 Improvement in Soil Health

Natural farming improves soil physical, chemical, and biological properties by promoting natural nutrient cycling and increasing biological activity. It enhances soil organic carbon, microbial diversity, nutrient availability, and soil structure. Increased organic matter and beneficial microorganisms improve soil fertility, water-holding capacity, and root growth. Healthy soils developed through natural farming support sustainable crop production and maintain long-term agricultural productivity.

5.2 Reduction in Chemical Pollution

Natural farming reduces environmental pollution by minimizing the use of synthetic fertilizers and chemical pesticides. This approach helps decrease soil contamination, prevents water pollution caused by chemical runoff, and reduces harmful chemical residues in agricultural products. By promoting biological nutrient management and natural pest control methods, natural farming protects ecosystems, improves environmental quality, and supports the production of safer and healthier food.

5.3 Climate Change Mitigation

Natural farming contributes to climate change mitigation by reducing greenhouse gas emissions and enhancing carbon storage in agricultural systems. It increases soil carbon sequestration through the addition of organic matter and improves soil health. Reduced dependence on chemical fertilizers lowers emissions associated with fertilizer production and application. Efficient use of natural resources, improved nutrient cycling, and sustainable farming practices help create climate-resilient agricultural systems.

5.4 Biodiversity Conservation

Natural farming promotes biodiversity by creating a balanced and healthy agricultural ecosystem. It encourages the growth and activity of beneficial insects, soil

microorganisms, and diverse crop species. Increased biological diversity improves natural pest regulation, nutrient cycling, and ecosystem stability. By maintaining ecological balance and reducing chemical disturbances, natural farming supports long-term sustainability and enhances the resilience of agricultural systems.

5.5 Economic Benefits

Natural farming provides economic advantages by reducing dependence on costly external agricultural inputs such as chemical fertilizers and pesticides. The use of locally available resources lowers production expenses and improves farm profitability. Reduced fertilizer and pesticide costs, along with efficient resource utilization, help farmers achieve better economic returns. Natural farming also promotes long-term sustainability by maintaining soil productivity and reducing input dependency.

6. Natural Farming and Climate Resilience

Climate change has increased the occurrence of extreme weather events such as droughts, floods, heat waves, and irregular rainfall patterns, creating serious challenges for agricultural productivity. Natural farming enhances crop resilience by improving soil health, conserving natural resources, and strengthening ecological processes. Healthy soils with higher biological activity and organic matter content help crops better withstand environmental stresses and maintain stable productivity under changing climatic conditions.

Improved Water Conservation

Natural farming practices increase soil organic matter, which improves soil structure and water-holding capacity. Organic matter-rich soils retain more moisture, reduce evaporation losses, and help crops survive drought conditions. Practices such as mulching and residue recycling further conserve soil moisture and improve water-use efficiency.

Enhanced Soil Carbon Storage

Natural farming contributes to soil carbon sequestration by increasing organic matter accumulation and improving microbial activity. Higher soil organic carbon enhances soil fertility, improves nutrient cycling, and supports long-term productivity while helping mitigate climate change.

Stress Tolerance

Healthy soils, diverse cropping systems, and improved biological activity strengthen plant growth and stress resistance. Natural farming enhances crop tolerance against drought, heat, nutrient stress, and other environmental challenges, making agricultural systems more resilient to climate variability.

7. Integration of Natural Farming with Modern Technologies

Natural farming can be further strengthened by integrating modern agricultural technologies with traditional ecological practices. The combination of digital tools, biotechnology, and precision farming techniques can improve productivity, resource-use efficiency, and sustainability while maintaining the basic principles of natural farming.

7.1 Digital Agriculture

Digital agriculture provides advanced tools to support decision-making in natural farming systems. Weather-based advisory services help farmers plan crop operations according to climatic conditions. Soil monitoring technologies provide information about soil moisture, nutrient status, and biological activity, enabling better crop management decisions. Digital platforms can also improve knowledge sharing, farm planning, and sustainable resource utilization.

7.2 Biofertilizer Technology

Integration of beneficial microorganisms with natural farming enhances nutrient availability and plant growth. Biofertilizers such as *Rhizobium*, *Azotobacter*, phosphate-solubilizing bacteria (PSB), and plant growth-promoting rhizobacteria (PGPR) improve

biological nutrient cycling, nitrogen fixation, phosphorus availability, and root development. These microbial technologies complement natural inputs and strengthen soil fertility.

7.3 Precision Farming

Precision farming technologies help optimize the use of natural resources through accurate monitoring and management. Sensor-based systems can improve water management, nutrient application, and crop monitoring. These technologies enable efficient resource use, reduce wastage, and support sustainable crop production while maintaining the ecological principles of natural farming.

8. Challenges of Natural Farming

Although natural farming offers several environmental and economic benefits, its widespread adoption faces various challenges related to productivity, knowledge, labour, marketing, and policy support. Addressing these limitations through research, training, and institutional support is essential for successful implementation at a larger scale.

8.1 Initial Yield Reduction

During the transition period from conventional farming to natural farming, some farmers may experience temporary yield reduction due to changes in nutrient availability and soil biological processes. It may take time for soil ecosystems to recover and achieve balanced nutrient cycling.

8.2 Lack of Technical Knowledge

Successful natural farming requires proper knowledge about the preparation, storage, and application of natural inputs such as Beejamrit, Jeevamrit, and botanical extracts. Farmers need regular training, demonstrations, and extension support to effectively adopt these practices.

8.3 Labour Requirement

Preparation of biological inputs, composting, mulching, and other natural farming operations may require additional labour and regular management. Increased labour demand can be a challenge, especially for farmers with limited workforce availability.

8.4 Marketing Challenges

Farmers practicing natural farming often face difficulties in accessing suitable markets and obtaining premium prices for naturally produced crops. Development of certification systems, value chains, and consumer awareness is necessary to improve economic returns.

8.5 Large-Scale Adoption

Large-scale adoption of natural farming requires supportive policies, scientific validation, farmer training programs, and strong extension networks. Research-based recommendations and institutional support are essential to promote sustainable natural farming systems across diverse agro-ecological regions.

9. Future Prospects of Natural Farming

The future of agriculture requires sustainable approaches that maintain productivity while protecting natural resources. Natural farming has great potential to support sustainable food systems by improving soil health, reducing environmental impacts, and enhancing climate resilience. Future opportunities include scientific validation of natural inputs, integration with biotechnology, development of improved bio-input formulations, digital support systems, and climate-smart farming models. These advancements can strengthen natural farming efficiency, increase farmer acceptance, and promote environmentally sustainable agricultural production.

CONCLUSION

Natural farming represents a sustainable pathway toward environmentally friendly and climate-resilient agriculture. By reducing dependence on chemical inputs, improving soil health, conserving biodiversity, and enhancing resource-use efficiency, it supports long-term agricultural sustainability. Practices such as Beejamrit, Jeevamrit, mulching, and crop diversification strengthen ecological balance and farm resilience. Although challenges exist regarding knowledge, labour, and adoption, integration of scientific research, digital technologies, and farmer training can improve

its success. Natural farming today is not only a farming technique but also a movement toward a greener tomorrow, ensuring healthy soils, sustainable production, and a secure future for generations to come.

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