AGRI MAGAZINE
(International E-Magazine for Agricultural Articles)
Volume: 02, Issue: 05 (May, 2025)
Available online at http://www.agrimagazine.in

Natural Farming as a Sustainable Alternative to Chemical Agriculture: Core Concepts and Benefits

*Kartike Sharma
Department of Agribusiness Management, Dr. Y.S. Parmar University of Horticulture and Forestry, Solan, Himachal Pradesh, India
*Corresponding Author's email: kartikesharma08@gmail.com

The unsustainable consequences of conventional chemical farming, ranging from soil degradation and ecological pollution to increased production costs and health risks, have prompted the exploration of more regenerative agricultural approaches. Natural Farming, particularly Zero Budget Natural Farming (ZBNF), offers a low-input, ecologically sound alternative grounded in the philosophy of working with nature. By eliminating chemical fertlizers, pesticides and embracing techniques like Jivamrita/Jeevamrutha, Bijamrit/Beejamrutha, Acchadana (mulching) and Whapasa (soil moisture conservation), natural farming aims to restore soil vitality, conserve water and improve farm economies. This article delves into the core methods, plant protection strategies and the environmental, economic and social benefits associated with this approach. Emerging evidence suggests that Natural Farming not only reduces production costs and enhances biodiversity but also revives traditional knowledge systems and empowers smallholder farmers, making it a promising pathway toward sustainable, inclusive and climate-resilient agriculture.

Introduction

Conventional chemical farming is increasingly associated with declining yields and rising costs. Continuous monoculture of crops depletes topsoil, degrades soil health, reduce groundwater quality and disrupts beneficial microbial populations, making crops more susceptible to pests and diseases. Excessive use of chemical fertilizers and pesticides contributes to environmental pollution, destroys soil microflora and leads to the formation of harmful compounds like nitrosamines known for their phytotoxic, mutagenic and carcinogenic effects. This intensive chemical input also results in soil and water contamination with toxic chemicals and heavy metals. People who consume these plant products are at risk of adverse health effects (Devarinti, 2016). In response to these challenges, a quiet but powerful shift is underway towards Natural Farming. Rooted with the philosophy of working with nature rather than against it. Natural Farming is also known as Zero Budget Natural Farming (ZBNF). The aim is to provide support to farmers through training and required machinery to achieve the objectives of sustainable farming, doubling farmers' income, improved soil fertility and low input costs (Vashishat et al., 2021). Natural Farming is a special form of agriculture that does not require any financial expenditure to purchase the essential inputs such as fertilisers and chemicals for plant protection. Instead, it relies on nature's own systems with the farmer acting merely as a facilitator. Natural farming, though in its preliminary stages, is showing increased positive results and is being adopted by farmers in good faith. Many farmers even cite that labour and production costs have drastically reduced i.e. (14-15%) through natural farming (Chandel et al., 2021). In ZBNF, the word 'budget' refers to credit and expenses, thus the phrase 'Zero Budget' means without using any credit and without spending any money on purchased inputs. The four most

popular pillars of ZBNF are: Jivamrita, Bijamrita, Acchadana and Whapasa (Bishnoi and Bhati, 2017) **(Table 1)**.

Table 1: Pillars of Natural Farming

Sr. No.	Methods	Preparation	Benefits
1.	Jivamrita/ Jeevamrutha	It comprises the cow-dung, urine, jiggery and dicot flour and is applied to the crops with each Irrigation cycle OR directly to the crops.	It provides nutrients, promotes microorganisms' activity in soil, and increases earthworm activity. It also helps to prevent fungal and bacterial diseases.
2.	Bijamrita/ Beejamrutha	It is made up of water, cow dung, urine, lime and just a handful of soil.	It is used for seed treatment, protecting young roots from soil and seed-borne diseases.
3.	Acchadana - mulching	It could be done by soil mulch, straw mulch or live mulch.	It conserves soil moisture by reducing evaporation.
4	Whapasa - moisture	The irrigation should be reduced and should be practised only at noon, in alternate furrows.	It is an appropriate proportion of air and water molecules present in the soil.

Principles of Natural Farming

Natural Farming is based on four core principles: no tillage, no chemical fertilizers or pesticides, no weeding and no pruning. These principles aim to minimize soil disturbance, enhance soil health and promote the growth of diverse crops and beneficial organisms. The key practices of natural farming include:

Natural Inputs: Natural Farming eliminates the use of synthetic chemicals and fertilizers, relying instead on naturally occurring catalysts that stimulate biological activity in the soil. While essential nutrients are present in the soil, they often exist in forms that are not readily accessible to plants. Natural farming practices help unlock these nutrients, enhancing plant uptake. The use of bio-pesticides and natural fungicides such as extracts of tobacco, green chilli, garlic and neem helps protect crops while preserving the integrity of soil and water.

Mulching: ZBNF emphasises mulching as one of its four foundational principles. Mulching helps create an ideal microclimate within the soil, maintaining a temperature range of 25 to 32 degrees Celsius, 65 to 72 per cent moisture and necessary darkness and warmth for optimal activity. This environment supports the growth of beneficial microorganisms, conserves soil moisture, regulates temperature and protects microbial life, all of which significantly reduce the need for frequent irrigation.

Multi-cropping: The practice of cultivating multiple crops in close proximity within the same field during a single planting season in known as intercropping, multi-cropping or mixed cropping. This approach serves as an effective risk management strategy if one crop fails, others can compensate for the loss. Additionally, crop rotation and diversification help guard against endemic pests, preserve biodiversity and contribute to a more balanced and nutritious diet.

Biofertilizers and Biopesticides: These are used to nourish the soil and crops. These organic amendments improve soil structure, water holding capacity and nutrient availability. Biopesticides derived from plants, fungi or bacteria are used to manage pests and diseases, reducing the reliance on synthetic pesticides.

Integration of Livestock: Livestock plays a crucial role in natural farming systems, providing manure, draft power and income diversification. Cattle, Goats and Poultry are integrated into the farming system and contribute to nutrient cycling. The integration of livestock also helps in weed management and soil aeration.

Plant Protection Measures

Natural farming emphasizes the use of traditional, organic and plant-based solutions for pest and disease management. They are known as 'astras', and different astras are utilized for plant protection.

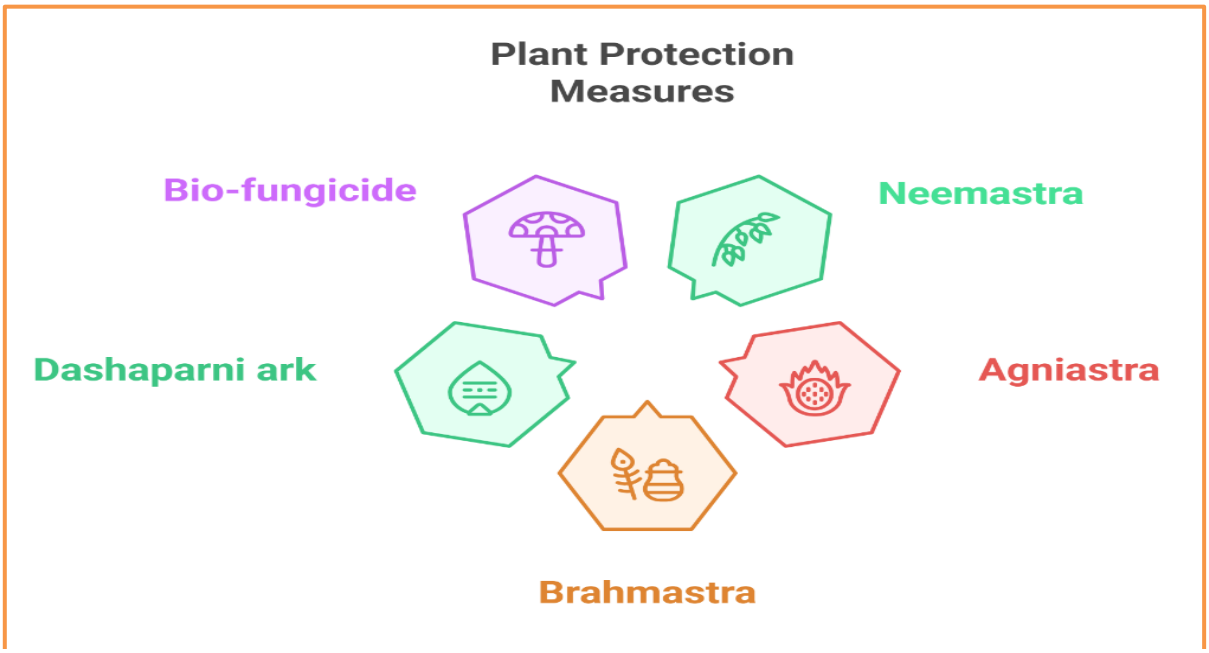

Figure 1: Plant Protection Measures in Natural Farming

Neemastra: It is used to eradicate insects or larvae that consume plant foliage and drink plant sap, as well as to prevent or treat diseases. Additionally, this aids in preventing the spread of dangerous insects. Neemastra is a bioinsecticide and pest deterrent for natural farming that is incredibly simple to manufacture.

Agniastra: Neem leaf pulp, tobacco powder, green chilli powder, garlic paste and turmeric powder are combined to create a natural insecticide. All sucking pests and caterpillars such as Leaf Roller, Stem Borer, Fruit Borer and Pod Borer are controlled with it.

Brahmastra: This all-natural insecticide is made from neem, karanj, custard apple and daphnia leaves, which contain certain alkaloids that deter pests.

Dashaparni ark: It serves as an alternative to Agniastra, Brahmastra and Neemastra. Depending on what's available, it's made with tobacco powder, ginger paste, turmeric powder, chilli pulp and any ten leaves. We can utilise the leaves of several plants, such as Neem, Castor, Datura, Rui, Mango, Guava, Hibiscus, Pogoamia Pinnata, Annona squamosa and Lantana camara.

Bio-fungicide: It is made with cow milk and curd, which is found to be very successful in controlling and managing fungal infections.

Benefits of Natural Farming

1. Environmental Benefits

Soil Health Improvement: Natural farming practices such as mulching, minimal tillage and use of organic inputs like Jeevamrit enhance soil fertility and structure. These practices increase soil organic matter, microbial populations and enzymatic activity, leading to healthier soils (Choudhary et al., 2022).

Biodiversity Conservation: By promoting agroecosystems that mimic natural ecosystems, natural farming supports biodiversity. Intercropping. Crop rotation and the avoidance of chemical pesticides create habitats for beneficial insects and microorganisms, thereby preserving biodiversity (Lakhani and Geete, 2024; Lakhani et al., 2024).

Water Conservation: Techniques such as mulching and moisture management (Whapasa) in natural farming reduce soil moisture loss and improve water retention, making farming

systems more resilient to droughts and water scarcity (Chandravanshi et al, 2024; Lakhani et al., 2024).

Climate Change Mitigation: Natural farming reduces greenhouse gas emissions by minimising the use of synthetic fertilizers and pesticides. It also enhances carbon sequestration through improved soil health, contributing to climate change adaptation and mitigation efforts (Lakhani et al., 2024; Daifa et al., 2024).

2. Economic benefits

Reduced Production Costs: Natural farming eliminates the need for expensive synthetic fertilizers and pesticides. Farmers rely on locally available resources and homemade inputs, significantly lowering production costs. For instance, Zero Budget Natural Farming (ZBNF) has been shown to reduce costs by up to 30% compared to conventional farming (Daifa et al., 2024).

Higher Net Returns: While yields in natural farming may sometimes be lower than those in conventional systems, the net returns are often higher due to reduced input costs. Studies in regions like Arunachal Pradesh and Tamil Nadu have demonstrated that natural farming systems generate higher returns per hectare (Dhivya et al., 2024).

Profitability of Organic Produce: Natural farming produces chemical-free, organic crops, which often fetch premium prices in the market. This enhances the profitability of natural farming operations, especially for smallholder farmers (Dhivya et al., 2024; Kumar et al., 2023).

Employment Generation: Natural farming practices, which are often labour-intensive, create employment opportunities in rural areas. Activities such as mulching, composting and intercropping require more manual labour, contributing to local economies (Chandravanshi et al., 2024; Laishram et al., 2022).

3. Social and Cultural Benefits

Empowerment of Smallholder Farmers: Natural farming is particularly beneficial for smallholder farmers who may not have the resources to invest in expensive chemical inputs. By leveraging local knowledge and resources, these farmers can achieve sustainable livelihoods (Daifa et al., 2024; Rao et al., 2023).

Revitalization of Traditional Practices: Natural farming draws on indigenous knowledge and indigenous knowledge and traditional agricultural practices, preserving cultural heritage and promoting community resilience (Vaja et al., 2024; Daifa et al., 2024).

Improved Food Security: By enhancing soil fertility and promoting biodiversity, natural farming contributes to food security. It ensures the availability of nutritious, chemical-free food for local communities (Lakhani et al., 2024).

Social Equity and Inclusivity: Natural farming practices reduce inequality by providing equal opportunities for farmers regardless of their economic status. This fosters a more inclusive agricultural system (Lakhani et al., 2024; Daifa et al., 2024)

Conclusion

Natural Farming offers a sustainable and low-cost alternative to chemical-intensive agriculture. Rooted in ecological harmony and traditional wisdom, it minimizes external inputs while enhancing soil health, biodiversity and water efficiency. Different practices of natural farming have been shown to reduce costs and improve farmer incomes. Beyond environmental benefits, it empowers smallholders and revitalises rural livelihoods. As agriculture faces growing climate and sustainability challenges, Natural Farming emerges not just an alternative but as a transformative path towards resilient and inclusive food systems.

References

1. Bishnoi, R. and Bhati, A. (2017). An Overview: Zero Budget Natural Farming. *BioScience Trends*, **10**(46): 9314-9316.
2. Chandel, R.S., Gupta, M., Sharma, S., Sharma, P.L., Verma, S., and Chandel, A. (2021). Impact of Palekar's natural farming on farmers' economy in Himachal Pradesh. *Indian Journal of Ecology*, **48**: 873–878.

3. Chandravanshi, M., Behera, P., Kashyap, S., Ray, R., Karan, N.K. and Boro, B. (2024). Principles and Practices of Zero Budget Natural Farming. *International Journal of Plant and Soil Science*, **36**(9): 834–839.
4. Choudhary, R.B., Kumar, R., Sharma, G., Sharma, R., Rana, N. and Dev, P. (2022). Effect of natural farming on yield performances, soil health and nutrient uptake in wheat + gram inter cropping system in sub-temperate regions of Himachal Pradesh. *Journal of Crop and Weed*, **18**(2): 01–08.
5. Daifa, O., Panchal, N., Jangir, S., Singh, S. and Win, C. (2024). Cultivating abundance and harmony: exploring the ecological, economic, and cultural implications of natural farming: a literature review. *International Journal of Management Public Policy and Research*, **3**(2): 30-35.
6. Devarinti, S.R. (2016). Natural farming: eco-friendly and sustainable. *Agrotechnology*, **5**(2): 1000147.
7. Dhivya, C., Murugan, P.P., Senthilkumar, M. and Arunkumar, R. (2024). Opportunities and Challenges on Natural Farming. *Asian Journal of Soil Science and Plant Nutrition*, **10**(4): 301–309.
8. Jayaraj, D. and Periyasamy, M. (2023). Comparative economic indicators of the farmers practising natural farming vs conventional farming system. *Journal of Agriculture and Ecology*, **16**: 64–66.
9. Kumar, R., Kumar, S., Yashavanth, B., Venu, N., Meena, P., Dhandapani, A. and Kumar, A. (2023). Natural Farming Practices for Chemical-Free Agriculture: Implications for Crop Yield and Profitability. *Agriculture*, **13**(3): 647.
10. Laishram, C., Vashishat, R.K., Sharma, S.C., Rajkumari, B., Mishra, N.K., Barwal, P., Vaidya, M.K., Sharma, R.K., Chandel, R.S., Chandel, A., Gupta, R. and Sharma, R.K. (2022). Impact of Natural Farming Cropping System on Rural Households—Evidence From Solan District of Himachal Pradesh, India. *Frontiers in Sustainable Food Systems*, **6**: 878015.
11. Lakhani, H. and Geete, M. H. (2024). Transforming Agriculture: Role of Natural Farming Models in India's Sustainable Future. *International Journal of Current Microbiology and Applied Sciences*, **13**(9): 93–99.
12. Lakhani, H., Chinchure, S. and Geete, M. H. (2024). Natural Farming: A Strategic Tool for Climate Change Adaptation. *International Journal of Current Microbiology and Applied Sciences*, **13**(10): 198–205.
13. Rao, D.U.M., Rao, K.T., Kumar, P.B.P. and Rao, P.J. (2023). A comprehensive study on natural farming practices - Adoption and impact on crop yield and farmer's income. *International Journal of Plant Sciences*, **18**(2): 147-153.
14. Vaja, M.B., Kulshrestha, K. and Lakhani, H.N. (2024). Natural farming in India: A sustainable alternative to conventional agricultural practices. *Farming and Management*, **9**(2): 63-65.
15. Vashishat, R.K., Laishram, C. and Sharma, S. (2021). Problems and factors affecting adoption of natural farming in Sirmaur District of Himachal Pradesh. *Indian Journal of Ecology*, **48**: 944–949.