

Natural Farming: A Reconnection with Nature

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ABSTRACT

Natural and organic farming, as well as chemical-free farming, rely on ecosystem management and aim to reduce or eliminate external agricultural inputs, particularly synthetic ones. It has been determined that increasing agri-production through the intense use of pesticides, fertilisers, and other inputs is necessary to meet the growing population's food needs. On the other hand, the careless use of chemical inputs has seriously endangered human life. Finding a balance between producing enough food—400 million tonnes—for India's estimated 1.66 billion people by 2050 and ensuring that it is safe, healthful, high-quality, and environmentally sustainable is a difficult issue. In order to provide high-quality food without harming the environment, alternative agricultural approaches such as conservation agriculture, carbon positive farming, organic farming, natural farming, and regenerative agriculture have been acknowledged as viable alternatives to traditional farming. However, the term "natural farming" has come to refer to a concept of chemical-free, diversified agriculture-based farming practices that place more emphasis on affordable native resources and management techniques. Natural farming minimises or avoids the use of inputs that are purchased externally and emphasises the use of native resources with agro-ecological principles, community participation, and common resource management for the benefit of farmers and the larger farming community. India has been making concentrated efforts for the past ten years to help many stakeholders adopt science-based natural agricultural practices by fostering the correct mindset. Without affecting the supply of food, India may safely switch 2% of its farmed land annually from conventional farming to organic or natural farming (ONF). By 2030, it may replace about 20% of its conventional farming land with ONF. Agro-ecological technologies, particularly those based on ONF, are allowing rapid changes in food production systems worldwide, offering small farms appealing options due to their premium price tag and high-quality supply of organic inputs. However, the key elements that will determine the widespread acceptance of natural farming are the poor yield, nitrogen deficiency, and the rate and scope of ecosystem services impact on food security and profitability. The necessity, current state, initiatives, research findings with case studies, tactics, and problems related to natural farming in India are all covered in this study.

Keywords: natural farming, organic farming, challenges and opportunities

INTRODUCTION

We are currently in the era of Industry 4.0 and Agriculture 4.0, where precision farming is being implemented through automated agricultural practices to achieve maximum efficiency in output. This involves the use of genomics and the adoption of the finest available technologies. Nevertheless, the rise in carbon emissions and the detrimental impact of intensive agricultural methods on the environment, soil fertility, and the quality of the food chain are worrisome issues in the 21st century. These problems arise from an unbalanced emphasis on technological advancements and the failure to incorporate environmentally friendly practices in

agriculture, starting from the cultivation process to the final consumption (Ozlu *et al.*, 2022). The modern economic growth model is characterised by its generation of waste, which has significant adverse effects on the environment. This phenomenon is commonly referred to as negative growth. As a result, scientists are increasingly exploring alternative approaches that go beyond the traditional boundaries of growth (OECD, 2020). Today, there is a strong focus on the advancement of a circular economy. The current requirement is to embrace a development strategy that results in the most efficient utilisation of resources.

India is faced with the challenges of a

growing population, increasing urbanisation, climate change, and environmental degradation. Therefore, it is imperative for India to transition towards a circular economy (Mishra and Goel, 2022). The Indian government's Mission LiFE - 2022 and the goal of achieving a zero carbon economy are in response to the urgent need to address the negative impact of climate change and meet the targets of the Sustainable Development Goals by 2030. These national priorities aim to promote the use of environmentally friendly technologies in agriculture. This has resulted in a greater focus on the concept of environmentally friendly, chemical-free agriculture and the principles of classical ecological economics.

Natural farming is a broad concept rooted in fundamental ecological principles. On a global scale, Masanobu Fukuoka, a Japanese farmer and philosopher, introduced the concept of "natural way of farming" in his book "One-straw Revolution" in 1935. This approach involves farming without the use of chemicals and embracing ecological farming practices. Similarly, Mokichi Okada established the term "Nature Farming" in 1936. A pivotal moment in contemporary agriculture occurred when the application of pesticides was challenged on the basis of scientific data. This occurred with the publication of Rachel Carson's book, *Silent Spring*, in 1962, which caused a significant outcry and had a profound impact on the usage of pesticides.

UNO and FAO have implemented projects to promote environmentally friendly and ecologically-based agricultural practices, with the aim of enhancing the sustainability and effectiveness of conventional agricultural methods for local communities and native agro-ecosystems.

Organic and natural farming have gained popularity as alternative agricultural approaches (FAO, 2017 and HLPE, 2017). Organic agriculture is being implemented in 191 countries, covering around 1.6% of the total global agricultural area. This sustainable farming method is adopted by 34 lakh farmers worldwide. It has expanded as a specialised, environmentally-friendly kind of

agriculture, and there are ongoing efforts to integrate it into conventional agriculture. However, the primary limitations of this product are its expensive production process, relatively low yield, and uncertain market conditions, which affect its net return. Additionally, the cost of certification is also a significant restraint (Willer *et al.*, 2023). A significant proportion of farmers worldwide engage in low-input farming practices, utilising local agroecosystem resources. These practices result in moderate productivity levels and allow for sustainable living within the bio-capacity of the native agro-ecosystem (FAO, 2017 and HLPE, 2017). Many farmers have embraced a set of nature-based techniques that are cost-effective, varied, and less risky. These methods are also affordable within the native socio-economic system. They aim to maintain a balance between human well-being and the ecology, ensuring the well-being of both nature and human beings. These approaches have been recorded under several names such as natural farming, eco-farming, permaculture, Rishi Krishi, Vedic agriculture, and Zero Budget Natural Farming (ZBNF). In India, numerous efforts have been made to encourage the practice of natural farming. These efforts include providing training and resources to farmers and other stakeholders, as well as demonstrating the use of technology. Additionally, there have been financial incentives for the production of environmentally friendly products (Bharucha *et al.*, 2020; Deborah and Shambu Prasad, 2022). According to reports, India has the capacity to allocate a portion of its agricultural land from traditional farming methods to organic or natural farming (ONF) without disrupting the balance between domestic demand and supply. Given a projected increase of 3.5% in output, a 2.8% rise in demand, and a 30% reduction in yield due to organic farming, India may feasibly transition 2% of its farming acreage from conventional to organic each year without causing any shortage in meeting domestic demand. Implementing the ONF will result in a reduction in exports, as the lower yields will lead to a loss of surplus production beyond what is needed. According to the data, India has the potential to

convert around 20% of its conventional farming area to organic and natural farming (ONF) by 2030. This can be done while ensuring a balance between the increasing demand for agricultural products and the supply of agri-food.

Current State and Future Prospects of Indian Modern Natural Farming

Since 2000, chemical-free or organic agriculture has gained popularity in India (APEDA, 2023). Natural farming, which avoids external inputs and emphasises local ecology and low-cost integrated practices, has replaced organic farming in states like Andhra Pradesh, Karnataka, Himachal Pradesh, Gujarat, Tamil Nadu, and Maharashtra in recent decades (Table 2). About 2.7% of India's farming area is organic or uses natural methods, utilising natural processes and inputs to enhance soil health, crop productivity, and quality, instead of chemical fertilisers and pesticides.

The National Institution for Transforming India (NITI Aayog) promotes 'natural farming'. Farmers and community organisations often use 'organic' and 'natural' farming words interchangeably. Over the next five years, organic farming is projected to reach 20 lakh hectares, including natural farming, with 12 lakh hectares under Bharatiya Prakritik Krishi Padhati. States like Andhra Pradesh, Himachal Pradesh, Gujarat, Haryana, Karnataka, and Kerala are pushing natural farming. Andhra Pradesh takes the lead in mass-scale natural farming implementation among all states. The Andhra Pradesh government said that 0.62 million farmers (10.5%) have enrolled in the initiative as of March 2020. Of the enrolled farmers, 0.44 million (7.5%) practiced natural farming on 0.45 million acres, or 2.9% of the net planted area over 3,011 gram panchayats. Karnataka has started implementing ZBNF on 2,000 hectares in each of its 10 agro-climatic zones as a pilot project. Few farmers in other states have been doing it individually. Himachal Pradesh launched Prakritik Kheti Khushal Kisan in May 2018 to encourage natural farming. Kerala, Gujarat, Haryana, and Rajasthan have promoted natural farming through

mass awareness initiatives, trainings, and seminars for thousands of farmers. To encourage chemical-free farming and expand natural farming, the government created the National Mission on Natural Farming (NMNF) in 2023-24 by expanding the Bhartiya Prakritik Krishi Paddati (BPKP) programme. For NMNF to succeed, farmers must convert from chemical-based inputs to cow-based, locally generated inputs. This involves ongoing awareness, training, hand holding, and capacity building in the early years (NMNFKP, 2023).

Challenges and Opportunities

Research suggests that NF and other systems may experience yield decline over 3-5 years of conversion. Various factors affect production capacity, therefore the level of decline varies by crop and agricultural condition. Adding agricultural residues, green manures, ghanajeevamrutha, jeevamritha, acchadhana, cover crops, crop rotations, and diversity can enrich soil and crops with nutrients. Long-term studies of nutrient dynamics, particularly nitrogen and phosphorus, are necessary for fixed sites. Consider the better usage efficiency of organic/natural sources compared to chemical sources. Draw conclusions about N and P shortfalls and management in natural farming and their impact on yield. Most NF farmers have been practicing for over five years and have documented success stories. They use jeevamrit and acchadhana in crop production, supplement nutrients with organic and green manures, and have higher soil nitrogen and organic carbon levels than conventional farmers. Lack of consistent production techniques in natural farming leads to significant yield and profit variations among farmers (Sharma *et al.*, 2022a).

Continuous research on natural farming is still in its infancy. Further research on natural farming systems should aim to maintain ecosystem services like biodiversity, erosion prevention, and weed suppression while minimising yield loss in the main crop. Solution is needed to reduce system competition and negative nitrogen balance in soil.

Collecting research on the economic and

environmental benefits of natural farming is crucial, rather than solely focusing on crop production. The country requires a long-term blueprint for adopting agro-ecological systems in various regions. Providing technical and financial support to farmers during the transition to organic and natural farming is crucial. Refocus farmer subsidies and policies to promote organic, community-based products, manures, and bio-fertilizers over synthetic chemicals.

According to Dorin *et al.* (2013), 53% of the global population has many farmers with micro farms, indicating a classic Lewis Trap. Data from 1961-2013 indicates that land productivity increases with lower land holdings. In the 100% natural farming scenario, productivity is marginally lower than in the 100% industrial system scenario. India excels in producing food in harmony with nature, market values, investments, entrepreneurship, and start-ups, offering diverse quality products and services like carbon farming, multi-utility farm residue products, and innovative renewable energy use. The viability of natural farming depends on equity and equality in resource sharing and management at the community level. Developing Integrated Natural Farming Systems based on ecological principles requires addressing the following issues/priorities:

1. Ecological intensification of natural farming in a method that improves nutrient cycling and balances soil nutrients.
2. Utilising ecological services and enhancing synergy among farming system components might reduce yield gaps in natural farming systems and be recommended.
3. To minimise production gaps and increase soil health, interdisciplinary study is necessary to thoroughly understand the role of crop and animal integration and diversification in the eco-zone, reaching bio-potential synergy of all components.

Action plans needed

Diversifying local farming systems promotes soil health and reduces GHG emissions.

NF best practices should be developed for each agro ecology in the country.

A big policy shift is needed to boost NF, which produces nutritional crops including pulses, oilseeds, and coarse cereals.

Develop an incentive structure to compensate for yield/income losses during the initial years of NF implementation.

As NF requires scientific evidence, we must co-create and validate results at the landscape level.

Implementation of NF requires a national and state-level institutional framework.

Significant policy changes are needed to encourage local input utilisation and avoid overuse.

Natural Farming Scientific Issues:

1. According to research, natural farming can provide higher crop yields than benchmark farming under low input and poor resource conditions. The conventional input scenario results in a yield gap of 15-40% between conventional and natural farming. How to reduce it under low and high input situations is a significant task. How can NF be marketed as a technology for increased yield and value? Standardisation is necessary.
2. Yield stability: Organic and natural farming have higher yield stability (CV % mean yield throughout time evaluated is 2-30%) than conventional farming, but highly variable with low and high input management.
3. Soil fertility and nutrient use: Limited N availability is a concern in natural farming. ZBNF only supplies less than 50% of the usual N fertiliser consumption rate, resulting in low yields. Further research is needed to determine sustainable strategies for high yields in natural farming. Addressing negative nutrient balances in Indian soils through natural and conventional farming is a serious challenge.

4. Nutritional dynamics Long-term yield and soil health in NF depend on N demand by crops and N release by manures and residues. Studying real-time data in specific regions is practical.

Recommendations

In certain areas, farmers have been successfully utilising NF in various forms for a very long time. The idea of renewing nutrients needed for plant growth under NF by energising different microbes and enriching the soil with biomass seems intuitive. Natural farming may not be viewed as a method of increasing productivity, but rather as an alternative, especially in rain-fed areas with less intense agricultural techniques. Additionally, it lowers costs for farmers by preserving market-based agricultural supplies, which boosts their income. The NF produce may be identified as specialty produce with superior quality and flavour that is chemical-free. The farmers will benefit from a greater price for their produce.

CONCLUSION

Recently, natural farming has gained

popularity as a sustainable, holistic method that partners with nature rather than opposing it. This technique follows organic farming principles but emphasises the link between earth, plants, and animals in a holistic and spiritual manner. Natural Farming utilises composting, crop rotation, and biodiversity to enhance soil fertility and crop yields without chemical fertilisers or pesticides. Compared to regular farming, natural farming offers environmental sustainability and reduced resource usage for food production. Promoting animal welfare and economic and social sustainability are also encouraged.

Natural farming is available to farmers of all sizes and may be applied in any agricultural context. Natural farming has numerous hurdles despite its many benefits. Farmers may have challenges in adopting Natural Farming techniques due to limited access to necessary technologies and infrastructure. The lack of awareness of Natural Farming techniques among farmers and customers may result in a lack of support for the strategy.

REFERENCES

- APEDA. 2023. Available online at: <https://apeda.gov.in/apedawebsite/organic/data.htm>. Accessed on 17 October 2023.
- Bharucha, Z.P., Mitjans, S.B. and Pretty, J. 2020. Towards redesign at scale through zero budget natural farming in Andhra Pradesh, India. *International Journal of Agricultural Sustainability* 18(1): 1-20. DOI: <https://doi.org/10.1080/14735903.2019.1694465>.
- Deborah, D. and Shambu Prasad, C. 2022. Motivating youth engagement in sustainable agriculture: institutional innovations in Andhra Pradesh community-managed natural farming. *Development in Practice* 32(7): 1003-1010.
- Dorin, B., Hourcade, J. C. and Benoit-Cattin, M. 2013. A World Without Farmers? The Lewis Path Revisited: Working paper no 47-2013. CIRED.
- FAO. 2017. *The Future of Food and Agriculture – Trends and Challenges*. Food and Agriculture Organization of the United Nations, Rome, Italy. 163 p. Available online at: <https://www.fao.org/3/i6583e/i6583e.pdf>. Accessed on 17 October 2023.
- FAO. 2017. *The Future of Food and Agriculture – Trends and Challenges*. Food and Agriculture Organization of the United Nations, Rome, Italy. 163 p. Available online at: <https://www.fao.org/3/i6583e/i6583e.pdf>. Accessed on 17 October 2023.
- HLPE. 2017. *Nutrition and Food Systems. A Report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security*, Rome. Available online at: <https://www.fao.org/3/i7846e/i7846e.pdf>. Accessed on 17 October 2023.

- Mishra, A. and Goel, S. 2022. Achieving Circular Economy in Residual Waste Management. NITI Aayog. Available online at: https://www.mospi.gov.in/sites/default/files/main_menu/Seminar/Achieving%20circular%20economy-NITI%20Aayog.pdf. Accessed on 17 October 2023.
- NMNFKP. 2023. National Mission on Natural Farming Management and Knowledge Portal. Department of Agriculture and Farmers Welfare, Government of India. Available online at: <https://naturalfarming.dac.gov.in/>. Accessed on 17 October. 2023.
- OECD, 2020. Beyond Growth: Towards a New Economic Approach. In series: New Approaches to Economic Challenges. Available online at: <https://www.oecd.org/governance/beyond-growth-33a25ba3-en.htm>. Accessed on 17 October 2023.
- Ozlu, E., Arriaga, F.J., Bilen, S., Gozukara, G. and Babur, E. 2022. Carbon footprint management by agricultural practices. *Biology* 11(10): 1453. doi: <https://doi.org/10.3390/biology11101453>.
- Sharma, S. K., Choudhary, R., Ravishankar, N., Jat, G., Sharma, R. K., Yadav, S. K., & Jain, R. K. 2022b. Natural Farming: Concept, Importance, Scope and Status. Technical Bulletin, Directorate of Research, Maharana Pratap University of Agriculture and Technology, Udaipur 313 001, Rajasthan, India. 16 p.
- Willer, H., Bernhard S. and Jan T. 2023. The World of Organic Agriculture, Statistics and Emerging Trends 2023. Research Institute of Organic Agriculture FiBL, Frick, and IFOAM –Organics International, Bonn. Online Version 2 of February 23, 2023.

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