

Journey of natural farming

The pathway towards sustainable agriculture

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This article provides a precise explanation of the necessity of natural farming. Over time, advancements in farming technology have addressed the immediate needs of hunger and poverty. However, the long-term repercussions on the environment and humanity are not favourable. Hence, there is a growing recognition for a more sustainable and ecological lifestyle, commonly referred to as natural farming. The increasing global popularity of natural farming can be attributed to its numerous environmental and social benefits. By using less chemical pesticides and fertilizers, soil and water pollution is reduced, biodiversity is preserved, and the effects of climate change are mitigated. Realizing the potential of natural farming, some countries, including India, have recently taken steps to promote its adoption. Natural farming has several advantages, yet there are still barriers to its widespread adoption.

Keywords: Cow dung, Green revolution, Natural farming, Soil fertility, Sustainable agriculture

INDIA once possessed a self-sufficient socio-economic model in the pre-British era. However, colonization by the British and Western policies had a profound impact on India's agriculture. In 1943, during World War II, the Bengal region faced a severe drought, leading to a policy failure that resulted in the loss of 30 lakh lives due to starvation in colonized India.

The struggle for Indian independence was marked by significant challenges. In 1951, during the first population census, India had a population of 36.11 crore, with grain production at 50.82 million metric tonnes. This output proved inadequate to meet the nation's food requirements. To address this shortfall, Indian leaders decided to expand agricultural land by clearing forests. Despite some improvements in grain production through the five-year action plan, it remained insufficient to meet the hunger needs of the population. In response, India sought assistance from the USA, signing Public Law 480 (PL 480) agreements to acquire low-quality wheat at market prices.

Globally, agriculture is the fundamental industry for feeding humanity. In 1960, American scientist Norman Borlaug made groundbreaking contributions to farming, introducing concepts like the use of high yielding varieties (HYV), fertilizers, and pesticides. He developed short-straw, high-yielding wheat varieties from the Japanese Norin 10 and the Mexican PV 18 local variety. Recognizing the efficiency of this technology,

Dr. M. S. Swaminathan endorsed it to meet India's agricultural needs.

In 1965, India faced a war crisis with a neighbouring country, coupled with international pressure and restricted sanctions threatening to halt supplies under PL 480. In this challenging situation, India's strong political leadership rallied the nation with the slogan "Jai Jawan, Jai Kisan," marking the inception of the real Indian Green Revolution.

Green revolution

Under the guidance of the Indian Council of Agricultural Research and Dr. M. S. Swaminathan, the Government of India initiated efforts to develop high yielding varieties, encouraged use of fertilizer, introduced pesticides, promoted mechanization, and enhanced irrigation facilities. A scientist from Punjab, Mr. Athwal, identified a variety named Kalyan, and ICAR combined it with another variety called Sona, which resulted in the high-performing Kalyan-Sona. The Indian government extended subsidies on various facets was crucial for the Green Revolution.

The positive outcomes were notable, with crop yields soaring to 131 million metric tonnes in 1978. Within a decade, India transitioned from being an importer to becoming an exporter. Even during the severe drought faced by Maharashtra in 1972, not a single case of starvation-related casualties was reported, showcasing

the revolution's impact on food security. However, as the saying goes, "every coin has two sides," the Green Revolution also brought about adverse effects on ecology and human well-being.

Impact of the Green Revolution

The Green Revolution primarily targeted wheat and rice production in states like Punjab, Haryana, and Uttar Pradesh, bringing about significant changes in crop yields. Farmers in these regions experienced increased yields through the application of more fertilizers. However, the excessive use of fertilizers made the soil alkaline, which resulted in a loss of soil fertility.

In the Punjab region, the use of pesticides reached approximately 923 g/ha in 2011, which was 353 g/ha higher than the national average. This extensive use of pesticides had severe implications on the health of the local population. Notably, the region gained notoriety for the 'cancer train' running between Bhatinda and Bikaner, underscoring the adverse health impacts. The Bhopal tragedy in 1984 serves as a poignant example of the direct and negative consequences of the chemical-intensive practices associated with the Green Revolution. The incident underscores the potential hazards and risks posed by the widespread use of such chemicals in agricultural practices.

Organic farming

In response to the adverse effects of the Green Revolution, a solution known as organic farming has been advocated. This environmentally friendly approach is considered safer than conventional farming. It involves utilizing inputs such as organic waste, cow dung, green manuring, bio enzymes, and some mechanical operations, which are not only less costly than chemical inputs but also contribute to sustainable agriculture. However, it demands more time and effort.

One challenge of organic farming is the need for a substantial amount of organic matter, requiring the maintenance of a large number of animals to generate organic waste. Additionally, inoculating bacterial cultures and using diesel or fuel for mechanical operations entail capital investments that may be beyond the means of small or marginal farmers. Despite growing awareness of the benefits of organic products, distinguishing genuine ones can be challenging. This difficulty arises from the fact that plants absorb nutrients in inorganic forms. Nutrients in organic sources remain unavailable for crop use until the material undergoes decomposition, releasing its nutrients into the inorganic soil pool.

Natural farming

Natural farming is an ecological farming approach established by Masanobu Fukuoka (1913 to 2008), a Japanese farmer and philosopher. Natural methods of farming respect life, maintain natural laws, and apply natural products. Natural farming includes earthworms, microorganisms, and small creatures and it intends to have a positive impact on the environment. Natural

farming restores soil damage caused by chemicals and equipment. Natural farming products offer a pleasant taste, superior quality, and higher yields and have high nutritional content. The very essence of the term suggests that nature takes care of the farming process. This method requires minimal external inputs, with just one indigenous cow being sufficient for nearly 30 acres of land.

Renowned natural farming advocate Padmashree Mr. Subhash Palekar emphasized that hybrid seeds are more responsive to chemical fertilizers and pesticides, but their responsiveness diminishes over time with increased use. In contrast, indigenous seeds exhibit high responsiveness to natural farming practices, resulting in more productive, nutrient-rich, and healthier crops compared to hybrid seeds. Mr. Palekar asserts that Basmati Rice production using chemical fertilizers reaches only 12 quintals per acre, while natural farming can elevate it to 18 quintals per acre. Similar benefits are expected for Bansi wheat in the Madhya Pradesh region.

Table 1. State-wise area and farmers under natural farming (2022-23)

State	Area (in ha)	No. of practicing farmers
Andhra Pradesh	290000	630000
Bihar	132	137
Gujarat	186000	432000
Haryana	7931	2992
Himachal Pradesh	50000	159000
Jammu and Kashmir	12120	3850
Jharkhand	50	40
Karnataka	2000	4400
Kerala	82000	326000
Madhya Pradesh	111000	59071
Maharashtra	74000	82000
Odisha	24000	27009
Punjab	2217	1853
Rajasthan	9000	171000
Tamil Nadu	2000	2360
Telangana	2403	2002
Uttar Pradesh	97460	105000
Total	952313	2008714

Source: <https://naturalfarming.dac.gov.in/NaturalFarming/ImplementationProcess>

During 2022-23, as per the data released by the Department of Agriculture & Farmers Welfare, the total area under natural farming in India is 9.5 lakh hectares in 17 states. The total number of farmers practicing natural farming within these states is estimated to be 20.08 lakhs. The highest area under natural farming has been reported from Andhra Pradesh (2.9 lakh hectares) followed by Gujarat (1.86 lakh hectares) and Madhya Pradesh (1.11 lakh hectares).

Components of natural farming

Natural farming is based on four key pillars described below:

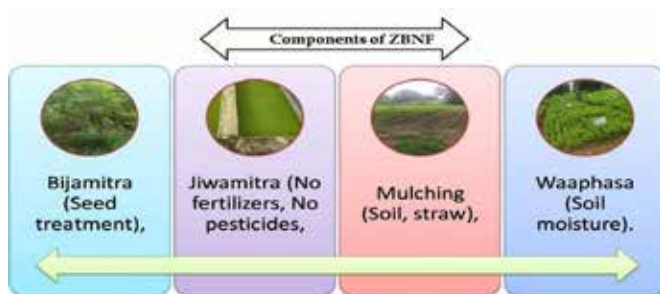


Figure1: Different components of Zero Budget Natural Farming

Jivamrita: Jivamrita is a fermented mixture of cow dung, urine, jaggery, pulse flour, water, and farm bund soil, used to improve soil fertility. It is not a fertilizer but a source of 500 million microorganisms that convert nutrients from their 'non-available' state into their 'available' one.

Benefits of jivamrita

- Higher growth rates in plants
- Higher level of palatability
- Higher profitability and production of sustainable crops boost the crop's absorption and concentration of nutrients

Bijamrita: The process includes the treatment of seed using cow dung, urine, and lime-based formulations. Used as a seed treatment solution before sowing.

Benefits of bijamrita

- It promotes the growth of plants
- Protects the crops from harmful seed-borne and soil-borne pathogens
- Improve the pH level of soil
- Increases earthworm count in the soil

Whapasa: The process involves activating earthworms in the soil to create water vapour condensation.

Benefits of whapasa

- Improves soil aeration, humus content, water availability, capacity to retain water
- Improve soil structure

Mulching: A microclimate is created using mulches with trees and crop biomass to maintain soil moisture and maintain a temperature range of 25-32°C for survival of microorganisms.

Benefits of mulching

- Improves soil drainage and structure as it decomposes
- Improves soil conditions
- Stops nutrients from leaching out of the soil

Status of natural farming in India

Department of Agriculture and Farmers Welfare, Government of India has sanctioned a project titled 'Outscaling of Natural farming through 425 KVKs'. The Indian Council of Agricultural Research has



implemented the project through 11 Agricultural Technology Application Research Institutes (ATARIs) in 425 KVKs of the country. Under the project, KVKs are carrying out the activities like awareness campaigns, training programmes and demonstrations on natural farming as per the targets given to them. ATARI wise targeted activities for KVKs during 2022-23 and 2023-24 is given in Table 1.

Several states implemented natural farming, Andhra Pradesh, Chhattisgarh, Kerala, Gujarat, Himachal Pradesh, Jharkhand, Odisha, Madhya Pradesh, Rajasthan, Uttar Pradesh, and Tamil Nadu are prominent among them. Through a variety of programs, state governments in several states are encouraging natural farming practices at the ground level.

Andhra Pradesh

The government of Andhra Pradesh has adopted a natural farming system based on ecology instead of input economics. Its main approach is that it reduces synthetic inputs, provides cost-effectiveness as well, and improves environmental conditions, making it climate-resilient and less expensive.

Gujarat

Additional financial support was provided in the Budget 2020-21 under the Gujarat Atma Nirbhar package to promote natural farming. Additionally, on 17 September 2020, the Gujarat government developed two programs namely Sat Pagala Pastoral Welfare and Pagala for natural farming.

Table 2. ATARI wise targeted activities for KVKs during 2022-23 and 2023-24

Name of ATARI	State/ Union territory	KVKs under Project	No of training pro-grammes	No. of demon-strations
Ludhiana	Punjab, Himachal Pradesh, Uttarakhand, Jammu and Kashmir, Leh-Ladakh	42	840	1008
Jodhpur	Haryana, Rajasthan, Delhi	38	760	912
Kanpur	Uttar Pradesh	52	1040	1248
Patna	Bihar, Jharkhand	39	780	936
Kolkata	Odisha, West Bengal, Andaman and Nicobar Islands	34	680	816
Guwahati	Assam, Arunachal Pradesh, Sikkim	27	540	648
Barapani	Manipur, Nagaland, Mizoram, Tripura, Meghalaya	25	500	600
Pune	Maharashtra, Gujrat, Goa	48	960	1152
Jabalpur	Chhattisgarh, Madhya Pradesh	48	960	1152
Hyderabad	Andhra Pradesh, Telangana, Tamil Nadu, Puducherry	44	880	1056
Bengaluru	Karnataka, Kerala, Lakshadweep	28	560	672
Total		425	8500	10200

Himachal Pradesh

Himachal Pradesh practices natural farming under the *Prakrit Kheti Khushal Kisan* (PK3) scheme. The main objective of this scheme is to reduce the cost of cultivation and increase the income of the farmers. This scheme was announced by the Chief Minister in the budget speech of 2018-19. The scheme aims to increase

food grain, vegetable, and fruit output without using artificial fertilizers or pesticides.

Rajasthan

In the budget statement for the financial year 2019-20, the Hon'ble Chief Minister of Rajasthan expressed his support for natural farming through an initiative-*Kheti Mein Jaan Toh Sashakt Kisan*, which reduced input costs and empowered farmers through profitable farming. The initiative, first launched as a pilot project, covers Tonk, Sirohi, and Banswada in three districts of the state. Under the programme, expert trainers from the department led two-day sessions in which 18,313 farmers were trained.

SUMMARY

One of the compelling aspects of natural farming is the minimal input costs for farmers, accompanied by no harm to nature or human health. This approach creates a win-win situation. In a world with increasing awareness of the detrimental effects of excessive chemical use, products cultivated through natural means are in high demand, commanding premium prices in the market. Natural farming is gaining popularity due to its emphasis on organic methods, low external inputs, and ecological balance. It offers a potential substitute for traditional farming and can lead to sustainable agriculture and food security. However, to fully realize its potential, several challenges need to be addressed, including access to organic inputs, efficient certification, and beneficial marketing and distribution networks. Collaboration between farmers, governments, educational institutions, and consumers is crucial to tap the potential of natural farming in India. Investments in research, capacity building, and infrastructure development can help facilitate the adoption of natural farming techniques across the country.

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New initiatives undertaken by KVKs at National Level

- Promotion of Natural Farming in 425 districts
- Application and promotion of agri-drone across the country
- Involvement in International project (ICAR-CSISA Collaborative project) for obtaining feedback regarding technology adoption and development of strategies for upscaling and outscaling
- ICT led interactive technology information dissemination through Kisan Sarathi
- Special project on Cotton under Cotton Mission in 100 districts and Millets based interventions for popularization of millets
- Promotion of FPOs by KVKs as CBBOs, technology backstopping and handholding
- Linkage with CSCs (3.5 lakhs) for last mile extension delivery