

# A Sustainable Revolution: India's Transition to Natural Farming

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The remarkable agricultural growth experienced by the country in the 1960s, following the emergence of the Green Revolution, ushered in a new era in Indian agricultural history. The primary objectives of the Green Revolution technology were to enhance agricultural production through the adoption of high-yield crop varieties and hybrids and the increased use of fertilizers and plant protection chemicals (Sebby *et al.*, 2010). India scored an impressive position in the food production as a result of these efforts. However, it also confronted a rather dreadful ranking in the hunger index (Menon *et al.*, 2008).

Regrettably, the Green Revolution also posed some detrimental effects on Indian agriculture. The adoption of a mono-cropping system, excessive and frequent application of fertilizers and pesticides, resulted in substantial harm to the soil's natural processes, reduced crop's diversity, raised the overall cost of cultivation, depleted groundwater reserves, led to the loss of biodiversity, increased human health issues, malnutrition, and diminished soil's fertility, rendering extensive areas barren. Consequently, small-scale farmers were compelled to invest in these costly inputs, exposing themselves to significant financial risks and trapping them in a cycle of debt (Eliazer *et al.*, 2019). Given the evident environmental and ecological consequences of pesticides, it is unsurprising that government regulations have now been strengthened.

Moreover, concerns about the potential health impacts of pesticidal residues have in-turn motivated many individuals to opt for pesticide-free products. Despite the existence of regulations to ensure legally permissible maximum residual levels of pesticides in food, there has been a growing movement to eliminate pesticides from agriculture. Therefore, the restoration of soil health through a shift away from chemical-intensive agriculture has assumed paramount

importance in striving for sustainability in agricultural production.

## Chemical Fertilizers: A Double-Edged Sword

According to the "Fertilizer Association of India" in 1951-52, India produced a modest 0.20 million tonnes of fertilizers. By 2021-22, this number had skyrocketed to a staggering 43.7 million tonnes. Simultaneously, fertilizer consumption surged from 0.069 million tonnes to an astonishing 29.79 million tonnes over the same period. While chemical fertilizers undoubtedly contributed to an increased crop production, their drawbacks were severe as discussed ahead:

- **Soil Hardening:** Excessive use of chemical fertilizers over time resulted in soil hardening, diminishing its natural properties.
- **Reduced Fertility:** Continuous reliance on chemical fertilizers led to reduced soil fertility, creating dependence on external inputs.
- **Environmental Hazards:** Chemical run-off from farms polluted water bodies, while ammonia and nitrous oxide emissions contributed to air pollution and greenhouse gases.
- **Health Risks:** Exposure to chemical fertilizers posed health hazards to both the farmers and the consumers.

## The Global Call for Sustainable Farming

The adverse effects of chemical farming practices spurred a global demand for sustainable agricultural alternatives. One such approach gaining momentum is "Natural Farming," which initially gained recognition in Japan and has since captured worldwide attention.

## Natural Farming: A Sustainable Alternative

Nature farming, first proposed as an alternative to chemical farming in 1935 by Japanese

philosopher Mokichi Okada, is an agricultural approach that prioritizes sustainability and environmental responsibility. According to the International Nature Farming Research Centre in Nagano, Japan, their approach is grounded in the following principles:

- Fertilizers are seen as a source of soil pollution and a cause of reduced soil productivity.
- Excessive fertilizer use is believed to trigger pest outbreaks.
- The nutritional status within plants is considered a key factor in the difference in disease occurrence between plants that are resistant and those that are susceptible.
- Nature farming proponents argue that vegetables and fruits produced using their methods have superior taste compared to those grown using chemical farming practices.

Unfortunately, the followers of Okada, the founder of this approach, were unable to produce yields substantial enough to persuade a significant portion of the country to adopt nature farming techniques. Then Masanobu Fukuoka proposed the new concept of natural farming. Key principles of natural farming include:

- **Exclusion of Synthetic Chemicals:** Natural farming avoids synthetic chemicals, emphasizing natural and organic inputs to enhance soil health and fertility.
- **Local Knowledge and Resources:** It harnesses local knowledge and resources, promoting self-sufficiency and community engagement.
- **The Role of Cows:** Cows play a central role in natural farming, providing essential inputs like cow dung, cow urine, jaggery, and pulse flour. These materials enrich the soil and enhance crop growth.
- **Mulching Techniques:** Natural farming incorporates mulching techniques to retain moisture, suppress weed growth, and improve soil structure.
- **Symbiotic Intercropping:** The practice encourages the cultivation of multiple crops in

harmony, fostering a diverse and resilient agricultural ecosystem.

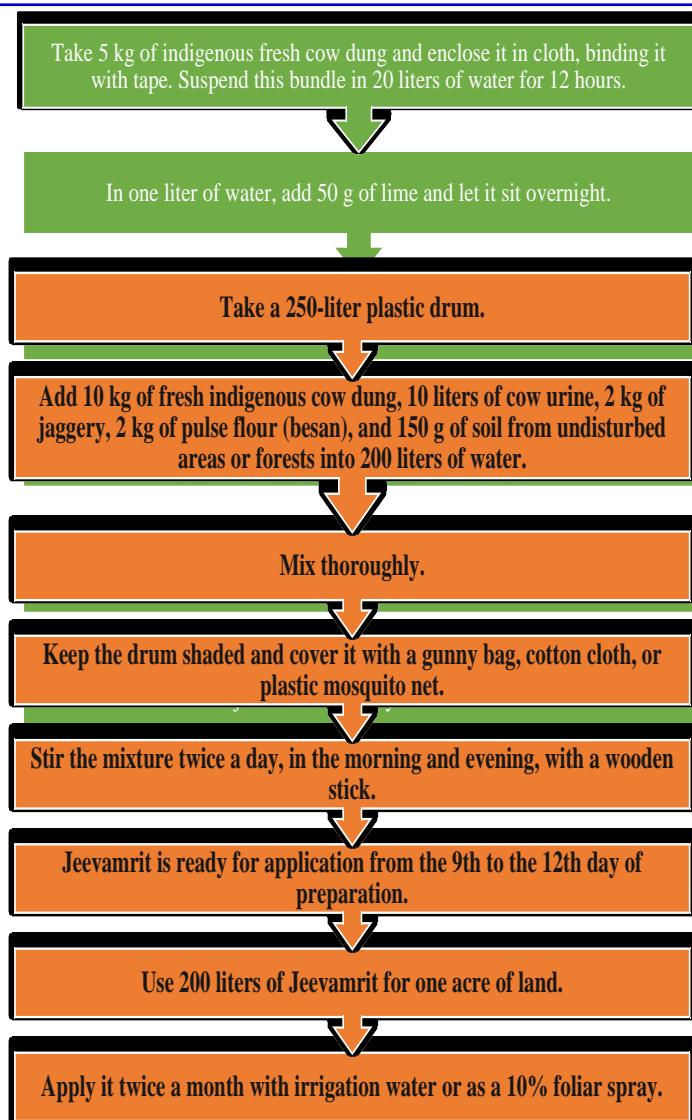
In the mid-1990s, Subash Palekar pioneered the concept of zero-budget natural farming (ZBNF) in India. This innovative approach aims to reduce production costs by replacing expensive chemical fertilizers with natural resources like cow dung and cow urine. ZBNF operates on the principle of not purchasing any external inputs from the market, effectively rendering production costs negligible. The adoption of Green Revolution technologies, including synthetic fertilizers and pesticides, has led to adverse consequences such as a decline in soil fertility, the erosion of sustainability, and disruption of beneficial soil microorganisms. In contrast, ZBNF harnesses the power of cow dung, where just 1 gram contains 300-400 crore beneficial microbes. This cow dung-based solution, known as jeevamrit, serves as a natural culture to promote soil health and enhance crop productivity. An intriguing claim associated with ZBNF is that a single cow can provide sufficient nutrients for a thirty-acre farm, highlighting the efficiency and sustainability of this farming method. Despite widespread interest and support from various organizations, universities, and scientists, there is a debate regarding the "zero budget" terminology. Critics argue that farmers still need to invest in equipment such as pumps, pipes, and other machinery for their agricultural operations, making it inaccurate to describe the system as "zero budget." In response to this contention, ZBNF has been renamed as Subash Palekar Natural Farming.

### Fundamentals Practices of Natural Farming

#### Beejamrit: Safeguarding Seedlings

Beejamrit is invaluable for treating seeds, seedlings, and young plants, protecting them from fungus and soil-borne diseases. To make Beejamrit: mix it with seeds by hand, shade dry, and then sow. For leguminous crops, simply dip the seeds and quickly dry them. Like Jeevamrit, Beejamrit contains beneficial bacteria beneficial for plant protection and growth stimulation.

#### Jeevamrit: The Elixir of Soil Health



Jeevamrit, known by various names, serves as a natural defence against fungal and bacterial diseases. It can be applied through irrigation or as a foliar spray and stored for up to a year. To create Jeevamrit, follow these steps:

### Acchadana: The Power of Mulching

Mulching involves covering topsoil with crop waste, dried leaves, or cover crops. This practice shields soil from erosion, improves aeration, conserves moisture, enhances water retention, encourages soil fauna, maintains soil nutrient levels, and controls weed growth.

### Whapasa: Balancing Air and Water

Whapasa represents the ideal state where both air and water molecules coexist in the soil. Adequate aeration is crucial for proper plant growth and development. It enhances soil aeration, humus content, water-holding capacity, and soil structure, particularly beneficial during drought periods.

### Ghanjeevamrit: Nurturing Soil Fertility

Ghanjeevamrit enriches soil with beneficial organisms that fix and mobilize NPK (nitrogen, phosphorus, and potassium). It's prepared by mixing 100 kg of indigenous cow dung, air-dried for 4-5 days, with 1 kg of jaggery, 1 kg of pulse flour, 3 liters of cow urine, and 250 g of soil from undisturbed areas. After preparation, Ghanjeevamrit can be used as cakes in fields. Prior to sowing, apply it at a rate of 250 kg per hectare as per the recommended dose.

### Neemashtra: Nature's Insect Repellent

Neemashtra, a liquid-based formulation of neem and cow urine, serves as a natural pesticide. It effectively controls insect-pests like aphids, jassids, mealybugs, thrips, whiteflies, small caterpillars, and other sucking pests. Prepare it by mixing fresh neem leaves or neem seed kernels with cow urine, cow dung, and water.

### Agnishtra: Combatting Borers and Caterpillars

Agnishtra is a botanical formulation prepared using neem leaves, chili fruits, garlic, and cow urine. It's used to manage stem borers, fruit borers, and different types of caterpillars in crops. Prepare it by boiling the ingredients and then dilute for spraying.

### Brahmashta: Nature's Defense Against Pests

Brahmashta, another cow urine and botanicals-based formulation, acts as a natural pesticide against insects like pod borers, fruit borers, thrips, aphids, and jassids. It's prepared using a mix of leaves and cow urine, and it's effective in high-infection scenarios.

### Mixed Leaf Extract (Decoction): A Natural Sucker and Borer Buster

This formulation is made using leaves from various trees like custard apple, papaya, pomegranate, and guava. It effectively manages sucking pests and various pod and fruit borers.

### Chilli-Garlic Extract: Tackling Caterpillars

Chilli-Garlic extract is a formulation that uses chili, garlic, neem, and Ipomea carnea leaves. It helps control various caterpillars, including leaf rollers, stem, fruit, and pod borers.

### Dashparni Extract: All-Purpose Pest Management

Dashparni extract, a concoction of various plant species, indigenous cow urine, cow dung, and spices, is effective against a wide range of insect pests in crops and orchards. It's fermented and stored for long-term use.

These traditional farming techniques provide eco-friendly alternatives to chemical-intensive agriculture. By harnessing the power of nature and incorporating these practices, farmers can protect their crops, nurture soil health, and contribute to sustainable and environmentally responsible agriculture.

### Natural Farming in India: The BPKP Initiative

Bhartiya Prakritik Krishi Padhati (BPKP), a component of the Paramparagat Krishi Vikas Yojana (PKVY) since the fiscal year 2020-21, is dedicated to the promotion of traditional indigenous farming practices, notably including Zero Budget Farming. This scheme places a primary focus on the exclusion of all synthetic chemical inputs and encourages on-farm biomass recycling, particularly through practices such as biomass mulching, the utilization of cow dung-urine formulations, and plant-based preparations.

Under the BPKP initiative, financial assistance amounting to Rs 12,200 per hectare is provided for a period of three years. This support covers activities such as cluster formation, capacity building and continuous guidance from trained experts, certification processes, and residue analysis. To date, the BPKP program has extended its coverage to approximately 4.09 lakh hectares of agricultural land across eight states in India, with a total fund allocation of Rs. 4980.99 lakh being released for its implementation.

**Table. 1: The State-wise details of funds released under BPKP**

Sl. No.	States	Area in Ha	Amount released (Rs in lakh)
1.	Andhra Pradesh	100000	750.00
2.	Chhattisgarh	85000	1352.52

3.	Kerala	84000	1336.60
4.	Himachal Pradesh	12000	286.42
5	Jharkhand	3400	54.10
6.	Odisha	24000	381.89
7.	Madhya Pradesh	99000	787.64
8.	Tamil Nadu	2000	31.82
<b>Total</b>	<b>409400</b>	<b>409400</b>	<b>4980.99</b>

### Conclusion

Natural farming has evolved into a much transformative farming model, especially beneficial for small and marginal farmers, offering a solution to the challenges they face. This approach addresses farmer's distress while prioritizing the well-being of both the environment and the farmer's themselves. By eliminating the need for costly external inputs and relying on locally available resources, natural farming significantly reduces the production costs for farmers. It's fundamental advantage lie in its capacity to restore ecosystem and soil health. It nurtures the land by encouraging the revival of vital microorganisms and fostering a sustainable farming environment. As a result, it not only safeguards the livelihoods of small and marginal farmers but also contributes to the broader goal of preserving our ecosystem. Furthermore, natural farming places the health of farmer at the forefront, promoting practices that are not only economically viable but also conducive to their physical well-being. This holistic approach represents a promising path towards a more sustainable and resilient agricultural future for India.

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