



Natural Farming in India: A Need of the Hour for Sustainable and Resilient Agriculture

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Abstract

Indian agriculture is facing increasing pressure to maintain productivity while addressing challenges related to soil degradation, declining nutrient use efficiency, rising input costs and climate variability. Natural farming has emerged as a promising agroecological approach that emphasizes soil biological processes, on-farm resource recycling and reduced dependence on synthetic inputs. This article examines natural farming as a transition strategy for sustainable agriculture in India by analysing its core components, sustainability benefits, implementation challenges and recent government initiatives supporting its adoption. Evidence from government reports and scientific studies suggests that natural farming can improve soil quality, reduce cultivation costs and enhance climate resilience in certain production systems, although outcomes remain context-specific and dependent on effective transition support. The article also highlights the importance of strengthening extension systems, developing bio-input infrastructure and ensuring market linkages to support adoption. Overall, natural farming is best viewed as part of a broader pathway toward sustainable intensification, where environmental conservation, economic viability and farmer welfare are addressed together. Its future contribution will depend on continued research validation, policy support and farmer-centered implementation strategies.

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Introduction

India is being asked to produce more food with tighter ecological space. The global context is intense: the Food and Agriculture Organization of the United Nations projects demand for food and other agricultural products to increase by about 50% between 2012 and 2050 (FAO, 2017).

But India's agricultural constraint is no longer area expansion; it is resource efficiency and resilience. A large share of India's soils shows nutrient imbalance and low organic carbon, fertilizer efficiency is limited and water productivity is weak under conventional irrigation practices (Press Information Bureau, 2025; Government of India, 2026; NITI Aayog, 2015) ^[16, 8].

In that context, natural farming is being promoted as a transition strategy—aiming to restore soil biology, reduce farmers' cash outlay on external inputs and build climate resilience as a co-benefit (Press Information Bureau, 2026; NITI Aayog, 2026) ^[18, 9].

Introducing Natural Farming

Officially, natural farming is framed as chemical-free farming based on locally available resources (often livestock-based inputs), emphasizing on-farm biomass recycling (especially mulching), cow dung–urine formulations, botanical preparations for pest management and exclusion of synthetic chemical inputs (Press Information Bureau, 2023) ^[11].

This is not merely “reduced chemicals.” It is a redesign of the farm as an ecosystem—where fertility is built through microbial activity and organic matter, pest pressure is moderated through biodiversity and botanicals and water stress is reduced through

soil cover and improved soil structure (NITI Aayog, 2026; Press Information Bureau, 2026) ^[18, 9].

A practical distinction often missed in public debate is that natural farming targets minimal external purchases, while organic farming can include externally purchased organic inputs and typically relies on certification for market differentiation; natural farming policy in India is explicitly anchored in on-farm inputs and locally sourced ingredients (Press Information Bureau, 2026; Press Information Bureau, 2023) ^[11].

Why Need of the Hour?

India's case for natural farming is not romantic; it is strategic. The following pressures push agriculture toward systems that rebuild soil biology and reduce dependence on costly external inputs.

Declining Soil Health

Government reporting explicitly acknowledges the decline in soil organic carbon and links it to practices such as excessive chemical fertilizer use, frequent tillage, residue burning, overgrazing and erosion (Press Information Bureau, 2024) ^[14].

The national response—soil testing and advisory at scale—has expanded markedly. Under the Soil Health & Fertility framework, official figures indicate 24.74 crore Soil Health Cards generated, ₹1,706.18 crore released to states/UTs and 8,272 soil testing labs established (including static, mobile, mini and village-level labs) (Press Information Bureau, 2025) ^[17].

Yet nutrient sufficiency remains a bottleneck. A 2026 analysis drawing on Soil Health Card assessment (2024–25) reports that <10% of soils are high/sufficient in nitrogen, 45% sufficient in phosphorus, 32% sufficient in potassium and 25% sufficient in soil organic carbon—far below the 1–1.5% SOC range described as desirable for tropical/subtropical soils (Sahu *et al.*, 2026) ^[21].

Fertilizer Efficiency and Diminishing Returns

Official experimental estimates show nutrient use efficiency in India is limited: N 30–45%, P 15–25%, K 50–60% (Government of India, 2026). That means a substantial share of applied nutrients can be lost through leaching, volatilization and runoff—or locked as residual nutrients not immediately available to crops (Government of India, 2026). ICAR-reported field experiment compilations also indicate the fertilizer-to-grain response ratio in recent years has ranged from 9.55 to 11.05 kg grain per kg fertilizer applied, signaling lower marginal productivity compared to earlier decades (Government of India, 2026). Peer-reviewed analysis similarly reports India's nitrogen use efficiency declining from 48% to 35% by 2018, implying increasing nitrogen surplus and environmental loss (Bijay-Singh, 2023) ^[1].

Rising Input Costs and Fiscal Burden

Chemical dependence is expensive for farmers—and for the state. In FY 2024–25, the government allocated and utilized ₹1,77,129.50 crore for fertilizer subsidies, illustrating the scale of the chemical-input affordability challenge (Press Information Bureau, 2026) ^[19].

High reliance is also visible in consumption signals: the government reported subsidized urea sales of 399.40 lakh

metric tonnes (LMT) in 2025 (Government of India, 2026).

Land degradation

Land degradation is a productivity problem, not only an environmental one. Official estimates drawing on the Indian Space Research Organisation's Space Applications Centre atlas report land degradation and desertification at 97.84 million hectares (2018–19) (Press Information Bureau, 2023c) ^[13].

Water Use and Water Productivity

Water is the tightest constraint for future growth. NITI Aayog notes irrigation consumes about 84% of total available water and India uses 2–4 times more water to produce one unit of major food crops than major agricultural countries—implying that closing the water productivity gap could save at least half of irrigation water, in principle (NITI Aayog, 2015) ^[8].

Beyond shares, efficiency is low: flood irrigation dominates in many regions and NITI Aayog-cited analysis estimates water-use efficiency around 30–35% under conventional irrigation practices (Chand, 2019) ^[2].

How Natural Farming Helps Achieve Sustainability

Natural farming supports sustainability through environmental, economic, social, and climate benefits by strengthening biological processes, reducing external inputs, and improving resilience.

Environmental Sustainability

Natural farming enhances soil health by improving soil organic carbon, microbial diversity, and reducing chemical pollution. Government trials under the National Mission on Natural Farming (NMNF) reported increases in soil organic carbon and microbial activity in natural farming plots compared to conventional systems (Press Information Bureau, 2026) ^[18]. Similarly, studies on Jeevamrit application showed improvements in soil organic carbon and nutrient availability over time (Saharan *et al.*, 2023) ^[20]. However, outcomes may vary across crops and regions, highlighting the importance of local adaptation and transition management (Kumar *et al.*, 2020; Press Information Bureau, 2026) ^[19].

Economic Sustainability

Natural farming improves economic sustainability mainly through reduced input costs and lower dependence on purchased fertilizers and pesticides. Government evaluations indicate that over 90% of farmers reported reduced production costs after adopting natural farming (Press Information Bureau, 2026) ^[19]. However, some studies also report yield reductions in certain cropping systems, indicating that profitability depends on local conditions, crop type, and transition support (Das *et al.*, 2024) ^[3].

Social Sustainability

Natural farming promotes social sustainability by reducing health risks from chemical exposure and strengthening local knowledge systems. Government initiatives such as the *Krishi Sakhi* programme train women as community resource persons to support farmer adoption through field-level guidance and training (Press Information Bureau, 2024). Such knowledge-based extension systems are essential because natural farming depends more on management skills than external inputs.

Climate Sustainability

Natural farming also contributes to climate sustainability by reducing synthetic fertilizer use and improving soil carbon sequestration. Improved soil organic matter enhances moisture retention and climate resilience, while reduced fertilizer dependence may lower greenhouse gas emissions associated with fertilizer production and use (Press Information Bureau, 2026; Bijay-Singh, 2023; NITI Aayog, 2026)^[1, 10].

Implementation Realities

Evidence from government and scientific studies suggests that natural farming is not uniformly superior, and outcomes depend on crop systems, agro-ecological conditions, and the quality of transition support. NMNF reports indicate that natural farming performance is highly context-specific, with some studies showing stable yields in certain regions, while others report yield reductions in intensive cropping systems despite lower input costs (Press Information Bureau, 2026; Duddigan *et al.*, 2022; Das *et al.*, 2024)^[4, 3].

Soil improvements may also take time, as some field comparisons have shown slightly higher soil organic carbon and nutrient levels under conventional systems during early transition stages, indicating the need for location-specific adaptation (Kumar *et al.*, 2020). Furthermore, the scale of adoption remains limited compared to India's total cropped area, while chemical farming continues to be supported through strong subsidy and input distribution systems (Press Information Bureau, 2026)^[18].

Practical constraints also exist. Natural farming depends on biomass availability and livestock resources, which may not be accessible to all farmers, prompting the development of cluster-based Bio-Input Resource Centres. In addition, lack of strong certification systems and market differentiation may limit farmers' ability to obtain premium prices, although recent policy efforts aim to address these gaps through simplified certification and branding initiatives (Press Information Bureau, 2025a; Press Information Bureau, 2026)^[19].

Government Initiatives

India's natural farming strategy is increasingly "mission-mode" and includes several distinctive implementation practices.

National Mission on Natural Farming (NMNF): NMNF is a centrally sponsored scheme with an overall outlay of ₹2,481 crore, including output-based incentives of ₹4,000 per acre per year for two years (Press Information Bureau, 2026)^[18]. As noted earlier, progress figures as of 05.03.2026 include 18,786 clusters, 8.80 lakh hectares and 18.19 lakh farmers enrolled (Press Information Bureau, 2026).

Bio-Input Resource Centres (BRCs): NMNF defines BRCs as **cluster-level enterprises** that provide ready-to-use bio-inputs such as Beejamrit and Jeevamrit to farmers who may not prepare them themselves and that also disseminate training and demonstrations (Press Information Bureau, 2026). NMNF planning documents target 10,000 such centres (Press Information Bureau, 2025a).

Krishi Sakhis and last-mile extension: NMNF and related soil health initiatives deploy community resource persons for village-level support. Official reporting notes training

of 33,676 community resource persons at KVKs/agricultural universities/local natural farming institutions under NMNF implementation (Press Information Bureau, 2026). Separately, Krishi Sakhi programme design details 56-day training and certification as para-extension workers (Press Information Bureau, 2024).

Cluster models and the BPKP foundation: Before NMNF, the government promoted natural farming under the Bharatiya Prakritik Krishi Paddhati (BPKP) sub-scheme of PKVY, emphasizing exclusion of synthetic chemical inputs and on-farm biomass recycling. BPKP implementation uses 500-hectare clusters and provides ₹12,200 per hectare over three years, including ₹2,000 farmer incentives via DBT; reported coverage reached 4.09 lakh hectares (Press Information Bureau, 2023)^[12].

Certification and market linkages: NMNF policy notes explicitly state a "simple certification system" and a "common national brand" for naturally grown chemical-free produce to improve market access (Press Information Bureau, 2025a; Press Information Bureau, 2026).

Way Forward

Natural farming can become a credible pillar of India's agricultural future if scaling is treated as a risk-managed transition rather than a uniform replacement. Four actions stand out.

First, target systems where the sustainability upside is highest: rainfed regions, degraded soils and mixed crop-livestock contexts where cost reduction and soil moisture buffering are decisive (Press Information Bureau, 2023c; NITI Aayog, 2015)^[8].

Second, expand "bio-input infrastructure" as a public-good supply layer: BRCs should be quality-assured, locally accountable and linked to farmer training—because bio-input quality variability can undermine results (Press Information Bureau, 2026).

Third, embed measurement into scaling: track SOC changes, microbial indicators, water productivity and net returns across agro-climatic zones. The government already has the data backbone (Soil Health Cards) and digital portals; the next step is to use them for adaptive learning at scale (Press Information Bureau, 2025; Press Information Bureau, 2024). Fourth, protect farmers during transition: where evidence indicates yield risk (e.g., some rice-wheat systems), transition support must include stronger agronomic handholding, market assurance and temporary income buffers (Das *et al.*, 2024; Press Information Bureau, 2026)^[3].

Conclusion

Indian agriculture is increasingly challenged by declining soil health, resource degradation and the need to ensure long-term productivity under changing climatic conditions. In this context, natural farming represents an important agroecological approach that focuses on restoring soil biological processes, reducing external input dependency and improving farm resilience. While the approach shows promise in improving soil quality and reducing cultivation costs, its long-term success will depend on continued scientific validation, farmer training, market support and integration with existing sustainable agriculture programs. Moving forward, the transition toward natural farming should be viewed as part of a broader strategy to achieve sustainable

intensification—where productivity, environmental conservation and farmer welfare are addressed simultaneously. Strengthening research, extension support and policy incentives will be essential to ensure that natural farming contributes meaningfully to India's goals of sustainable agriculture and food security. As Sir Albert Howard rightly stated, “The health of soil, plant, animal and man is one and indivisible,” highlighting the ecological foundation upon which the future of Indian agriculture must be built.

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