
Sustaining the Soil: The Macroeconomics of Traditional Farming Systems

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ABSTRACT

While modern farming has prioritized short-term Productivity and Profit maximization, it has simultaneously caused significant diseconomies, hidden costs, financial burden, agriculture productivity, resource depletion, unemployment, food security, dependency on Imports & Budget deficits. This paper examines traditional farming systems—defined by low-input, biodiversity-centric, Ecosystem Services and indigenous-led practices—through a macroeconomic viewpoint by mitigating the "hidden" costs of soil erosion, nutrient depletion (productivity), and chemical dependency (diseconomies), traditional farming offers a model for long-term economic stability, food sovereignty, and climate resilience that modern systems currently lack. This current research is conducted with objective of finding loopholes of Modern farming practices and providing solution through Traditional Agriculture Practices. For this Published, secondary data is used from specific government organizations & some research reports.

1. Introduction

Soil is the backbone of the Farming. In India, an estimated 121 million ha (Mha) of land is degraded due to water and wind erosion, chemical and physical degradation, soil salinity/ alkalinity, and waterlogging. In the 14th Conference of the Parties (COP 14) (UNCCD). fertilizer consumption are assumed to accelerate by 10%, the demand for fertilizers is expected to increase to 640 lakh tonnes by 2047-48 (NITI Ayog 2024). Major subsidies of the includes fertilizer subsidy which is ₹1.71 lakh crore paid on imported fertilizers(BE 2026-27) Agriculture sector contributes about 19% of GHG emissions in total



emissions. India imports about 60% of its edible oil demand the overall food demand is expected to grow at an annual rate of 2.44% by 2047-48. (NITI Ayog 2024). food grain productivity growth have already fallen from 3 to 1.5%. About 50% more food would be needed due to the diminishing share of agricultural land area/capita (from 0.61 ha in 2018 to 0.49 ha in 2047) (Indian Agriculture by 2047). these findings & suggestions questions future of Agriculture, Employment, Financial health, Job security, Food security, health etc concerns the rapidly growing population in india.

This paper tries to analyzes the macroeconomic implications of these traditional practices, soil sustainability, not just as an environmental concern, but as a foundational pillar of national economy, employment & food security.

Traditional Farming Systems

Traditional farming is broadly defined as a way of farming that involves labor-intensive methods, cultivating crops and raising livestock, focuses on sustainability and harmony with the environment and climate, emphasizes local and indigenous knowledge that relies on natural processes, natural resources & organic fertilizers. Traditional farming is also called as small-scale farming.

Traditional Farming Methods in India

Traditional farming methods rely on natural techniques and minimal use of external inputs. Some of the most common methods include:

1. Agroforestry

This method involves planting trees that can provide suitable climatic conditions for the crops around them. It regulates the temperature, controls sunlight, and wind.

- a) Integrates trees and shrubs with crops and livestock farming.
- b) Enhances soil fertility, prevents deforestation, and provides additional income through timber and fruits.

e.g. Khejri in Rajasthan, Kaavu or Purayidom in Kerala, Khonoma Alder System in Nagaland

2. Crop Rotation

Crop rotation is the process of growing diverse crops on the same field depending on the season.



- a) Different crops are grown in a sequence on the same land to maintain soil health.
- b) Switching crop (normally two or three crops are rotated), the nutrients in the soil are revitalized.
- c) Helps in effectively combats pests and weed formation, reduces soil erosion, and enhances soil fertility.
- d) Examples: Alternating legumes with cereals (e.g., growing wheat after pulses).
e.g. Phasal Chakra - Uttar Pradesh, Madhya Pradesh, Haryana, and Rajasthan,

3. *Organic Farming*

This traditional farming method uses natural materials to decompose and enrich soil. It also fosters nutrient cycling and fertility.

- a) Avoids synthetic fertilizers, pesticides, and genetically modified seeds.
- b) Uses compost, manure, and natural pest control methods.

e. g. Apatani System in Arunachal Pradesh, Zabo in Nagaland, Ahars and Pynes in Bihar

4. *Mixed Cropping*

When soil more productive then two or more crops are planted collectively on the farms.

- a) It maximize yield and reduce risks.
- b) It Ensures better utilization of land and resources.
- c) Example: Growing maize, beans, and pumpkin together.

e.g. Baranaja in Uttarakhand, Akkadi Saalu in Karnataka, Utera / Paira in MP, Bihar

5. *Shifting Cultivation*

It involves temporary cultivation in one area until soil fertility declines. After that, moving to a new plot, allowing the land to regenerate.

1. Farmers cultivates on particular location few years, and then move to a new location.
2. Allows the land to recover



e.g. **Kuruwa** in Jharkhand, **Kumari** in Kerala, Karnataka, and Goa.

6. *Poly Culture*

This method involves cultivating several crop species simultaneously in a single area. In order to, follow natural ecosystems and enhances biodiversity.

- a) This method, a farmer grows a variety of crops on the same farm.
- b) It protects biodiversity and stabilizes the yield.

e.g. Apatani Wet Rice Cultivation in Arunachal Pradesh, Zabo System in Nagaland

7. *Subsistence Farming*

It is a self-sufficient agricultural system where farmers grow crops and raise livestock primarily to feed themselves and their families.

- a) Production for family's consumption rather than for commercial purposes.
- b) Suitable for farmers with small landholdings.
- c) Focuses on staple crops like rice, wheat, millets, and pulses.

8. *Integrated farming:*

This method combines crop cultivation with livestock rearing. In order to, optimize nutrient cycling and agricultural output.

- a) Livestock provided draft power and manure
- b) Trees provided fodder and fuel.

e.g. - Pokkali in Kerala, Khazan in Goa, Tuhet in Nicobar Islands

Economic impact of traditional Farming:

From a macroeconomic perspective, traditional integrated systems internalize costs that industrial systems externalize. For millennia, traditional farmers did not view crops and livestock as separate industries. The integration of cattle provided draft power for tilling and manure for soil fertility, while crop residues provided fodder. Through this the farmer reduces the "cash out" requirement of the farm unit. This reduces the vulnerability of the rural economy to the inflationary pressures of global commodity markets.



The following points will explain the Macro economic impact of traditional farming systems.

1) Subsidy Savings:

- a) A study by CEEW in Andhra Pradesh estimated that if 25% of the state's cropped area shifted to ZBNF, the state could save approximately **₹517 crore** annually in fertilizer subsidies. At 100% adoption, savings could reach **₹2,000+ crore** per state.
- b) According to **ICAR-IIFSR** reports, integrated models can reduce chemical fertilizer requirements by **25% to 50%** through efficient nutrient cycling of animal manure and crop residues.
- c) In its report *A New Paradigm for Indian Agriculture (2023/2026)*, ICAR Research Complex for NEH Region highlights that: Natural farming uses 45–70% less input energy than conventional irrigated models, reducing the state's energy subsidy burden.

2) Cost Reduction:

- a) Studies indicate that input costs under natural farming are **50–70% lower** than conventional farming. For instance, in Andhra Pradesh, the cost of cultivating rice dropped from roughly **₹5,961 per acre (chemical)** to **₹846 per acre (natural inputs)**
- b) In its report *A New Paradigm for Indian Agriculture (2023/2026)*, ICAR Research Complex for NEH Region highlights that: Natural farming reduces paid-out cultivation costs by 5–10% for major crops and up to 55% in specialized cases.

3) Resource Conservation:

- a) Evidence from the **ICAR-Indian Institute of Water Management (IIWM)** and long-term studies under the **AICRP on Irrigation Water Management** shows that IFS can achieve up to **40% improvement in water-use efficiency** in certain models.
- b) In its report *A New Paradigm for Indian Agriculture (2023/2026)*, ICAR Research Complex for NEH Region highlights that: Healthier soils in traditional systems save 50–60% of water and electricity due to improved moisture retention and porosity.

4) Out-Migration & Employment Generation



- a) Research data from the **Project Directorate on Farming Systems Research (PDFSR)** and **ICAR** indicates that IFS models can generate up to 34% extra of annual employment than single-crop systems.
- b) Data from NITI Aayog's regional reports suggest that villages adopting high-intensity mixed cropping see a **12-18% decline in seasonal distress migration**.

5) **Carbon Sequestration:**

- a) According to the **ICAR-Central Agroforestry Research Institute (CAFRI)** and reports from the **National Innovations in Climate Resilient Agriculture (NICRA)** project, integrated agroforestry can sequester significantly more carbon than monocropping, potentially opening avenues for "Carbon Credit" revenue at a national level.
- b) According to research synthesized in the **EAC-PM Working Paper (2024)** shifting to tree-based farming can sequester between **13.7 to 27.2 tonnes of CO₂ per hectare per year**.

6) **Import Substitution:**

- a) According to the **EAC-PM Working Paper (2024)** titled "*Agroforestry: Missing Trees for the Forest*", India imported over **USD 2.7 billion worth of timber in 2023** (based on ITTO data). Scaling up high-value native species like Teak through agroforestry could reduce these imports by hundreds of millions of dollars annually.

7) **Income Doubling:**

- a) A study by **Singh et al. (2017)** from the **ICAR-Central Agroforestry Research Institute (CAFRI)**, titled "*Doubling farmer's income through agroforestry: A policy perspective*", demonstrated that poplar-based systems can more than double a farmer's income over a 7-year cycle compared to traditional rice-wheat rotations in the Indo-Gangetic plains.
- b) ICAR models show that shifting from traditional monocropping to Integrated Farming can increase net returns by up to 366% in certain regions (e.g., Western Plains).

Government Schemes for Traditional Farming

To bridge the gap between traditional wisdom and modern economic policy, the Government of India has institutionalized several schemes aimed at scaling "natural" and "traditional" farming practices.



- 1) **Paramparagat Krishi Vikas Yojana (PKVY) 2015:** PKVY is the flagship scheme promoting organic and traditional agricultural practices. It operates on a "cluster" model, encouraging groups of farmers to adopt chemical-free methods. Farmers receive financial assistance of ₹50,000 per hectare for 3 years. Out of this, ₹31,000 (62%) is provided directly via DBT (Direct Benefit Transfer) for organic inputs like seeds, bio-fertilizers, and bio-pesticides. It promotes the Participatory Guarantee System (PGS-India), a locally relevant organic certification that avoids the high costs of third-party audits.
- 2) **Bharatiya Prakritik Krishi Paddhati (BPKP) 2020-21:** Introduced as a sub-scheme of PKVY, BPKP specifically focuses on Natural Farming (often referred to as Zero Budget Natural Farming or ZBNF). Focuses on on-farm biomass recycling, biomass mulching, and the use of cow dung-urine formulations (like *Jeevamrut*). Provides financial assistance of ₹12,200 per hectare for 3 years for cluster formation, capacity building, and continuous handholding. The government announced a mission to bring 1 crore farmers into Natural Farming over the next few years, supported by 10,000 Bio-Input Resource Centers.
- 3) **Mission Organic Value Chain Development for NER (MOVCDNER) 2015-16:** This central sector scheme targets the eight states of the North Eastern Region, where traditional farming is already prevalent. To develop certified organic production in a "Value Chain Mode" to link growers with consumers. Provides 75%–100% subsidies for creating collection centers, grading units, and "North East Organic Bazaars."
- 4) **Rashtriya Krishi Vikas Yojana (RKVY) – RAFTAAR:** While RKVY started in 2007, it was revamped in 2017-18 as RAFTAAR (Remunerative Approaches for Agriculture and Allied Sector Rejuvenation). It provides states with the flexibility to fund specific traditional farming projects, such as local seed banks, indigenous cattle breeding, and "Rainfed Area Development" (RAD).
- 5) **National Mission on Sustainable Agriculture (NMSA) 2015:** Adopted as part of the National Action Plan on Climate Change, NMSA focuses on making traditional agriculture resilient. Helps traditional farmers understand their soil's specific needs to avoid over-reliance on chemical fertilizers. Promotes Integrated Farming Systems (IFS) which combine traditional crop cultivation with livestock, fishery, and forestry.
- 6) **Support for Agricultural Heritage (GIAHS):** The government, in collaboration with FAO, supports Globally Important Agricultural Heritage Systems (GIAHS) sites in India. These sites receive special attention for "In-situ conservation" of endemic species and traditional knowledge preservation. a) Koraput Traditional Agriculture (Odisha): Focused on preserving indigenous rice varieties. b)



Kuttanad Below Sea Level Farming (Kerala): A unique traditional system of rice cultivation below sea level.

- 7) **Namami Gange (Organic Farming Component):** Under the Clean Ganga mission, the government has promoted natural farming clusters along the banks of the River Ganga (5 km corridors) to reduce chemical runoff into the river. This has successfully transitioned thousands of hectares to traditional chemical-free farming.
- 8) **PM-PRANAM (Promotion of Alternate Nutrients for Agriculture Management):** Introduced to incentivize states to reduce their reliance on chemical fertilizers, PM-PRANAM offers a direct macroeconomic benefit. States that save on fertilizer subsidies through the adoption of organic and natural farming receive 50% of those savings as a grant for local infrastructure and asset creation. This aligns state-level fiscal health with soil health.

Conclusion

The "efficiency" of modern agriculture is a temporary illusion bought at the expense of our environmental degradation & economic depletion. Government research from India confirms that traditional systems are not just "cultural artifacts" but high-performing economic models that optimize for long-term stability rather than short-term extraction. Sustaining the soil is the ultimate act of economic & Environmental preservation.

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