International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 09 Issue: 12 | Dec - 2025 SJIF Rating: 8.586 ISSN: 2582-3930

# Assessing the Policy Landscape: Opportunities and Constraints for Scaling Sustainable Agriculture in India

**Ravina Nikhar**

IIMT College of Management, Greater Noida, 202310, India

**Abstract:** India's agricultural sector is at a crossroads, grappling with the dual imperatives of feeding a growing population and preserving environmental integrity. This paper critically examines the policy landscape that shapes the adoption and scaling of sustainable agriculture practices across the country. By mapping existing national and state-level initiatives—such as the Pradhan Mantri Fasal Bima Yojana, the National Mission for Sustainable Agriculture, and emerging climate-smart incentive schemes—the study identifies key opportunities for accelerating eco-friendly farming, including the integration of digital extension services, promotion of agro-ecological inputs, and the leveraging of public-private partnerships. At the same time, it foregrounds persistent constraints: fragmented institutional coordination, inadequate credit flow to smallholders, insufficient infrastructure for post-harvest handling, and policy gaps that favor input-intensive monoculture. Employing a mixed-methods approach that combines policy document analysis, stakeholder interviews, and case studies from diverse agro-ecological zones, the research delineates actionable policy recommendations aimed at aligning agricultural growth with sustainability objectives.

Keywords: Sustainable agriculture, India, policy analysis, scaling, climate-smart farming, agro-ecology, institutional coordination, smallholder farmers, agricultural policy, environmental sustainability.

**1. Introduction:** India's agricultural sector is a cornerstone of the nation's economy, providing livelihoods for over 50 % of the population and contributing roughly 18 % of the country's gross domestic product (GDP). Yet the sector is at a critical juncture. Rapid population growth, increasing per-capita food demand, and the looming threats of climate change have amplified the need to transition from input-intensive, resource-degrading practices to more sustainable, resilient farming systems.

In recent years, the Government of India has introduced a suite of policy initiatives aimed at promoting sustainable agriculture—ranging from the National Mission for Sustainable Agriculture (NMSA) and the Soil Health Card scheme to newer instruments such as green credit facilities and climate-smart subsidies. While these policies signal a shift in intent, their implementation has been uneven across the country's diverse agro-ecological zones. Fragmented institutional coordination, limited access to finance for smallholders, inadequate post-harvest infrastructure and persistent biases toward monoculture cropping continue to hinder the scaling of sustainable practices.

Against this backdrop, this paper seeks to critically assess the policy landscape that shapes the adoption and scaling of sustainable agriculture in India. Specifically, it asks: What policy levers enable or constrain the widespread uptake of sustainable agricultural practices, and how can these levers be leveraged to achieve both food security and environmental sustainability?_

The study combines a systematic analysis of national and state-level policy documents with qualitative insights from policymakers, farmer groups, agribusinesses, and civil-society actors across three representative states—Punjab, Maharashtra, and Bihar. By mapping existing instruments, identifying gaps, and drawing lessons from on-the-ground case studies, the research aims to generate actionable recommendations that can guide policymakers, practitioners, and scholars in shaping a more sustainable agricultural future for India.

The remainder of the paper is organized as follows. Section 2 reviews the relevant literature on agricultural policy, scaling challenges, and emerging opportunities. Section 3 outlines the mixed-methods research design. Section 4 presents the key findings, discussing both enabling policies and persistent constraints, while Section 5 offers policy recommendations. Finally, Section 6 concludes with reflections on the implications for future research and practice.

## 2. Literature Review

The literature on sustainable agriculture in India is extensive, yet it tends to fall into three broad strands: (i) analyses of national and state-level policy frameworks, (ii) empirical studies of the barriers that prevent scaling of eco-friendly practices, and (iii) assessments of emerging technologies and market mechanisms that create opportunities. This review synthesises the most relevant work to position the present study within the existing scholarship.

### 2.1 Policy frameworks

Early policy surveys (Singh & Kumar, 2020; Patel et al., 2021) map the evolution of India's agricultural policy from the Green Revolution to the recent "Doubling Farmers' Income" agenda. They highlight flagship programmes such as the National Mission for Sustainable Agriculture (NMSA), the Soil Health Card (SHC) scheme, and the Pradhan Mantri Fasal Bima Yojana (PMFBY) as central pillars of the government's sustainability narrative. More recent work (Rao & Desai, 2022) points out that while these initiatives provide a normative foundation, they suffer from fragmented implementation across states, leading to a "policy-implementation gap" (Kumar, 2023).

### 2.2 Scaling challenges

A substantial body of research documents the constraints faced by smallholders when attempting to adopt sustainable practices. Credit constraints are repeatedly identified as a critical bottleneck: only 22 % of surveyed farmers reported access to formal green credit (Gupta, 2022). Institutional coordination issues are another recurring theme—overlapping mandates between the Ministry of Agriculture, the Ministry of Environment, and state agencies create administrative silos (Choudhury, 2021). Infrastructure deficits, especially in post-harvest handling, exacerbate market-access problems and erode the economic incentives for sustainable production (Mishra & Sharma, 2020). Finally, socio-cognitive barriers—such as risk aversion and limited awareness of climate-smart techniques—further impede uptake (Joshi, 2019).

### 2.3 Opportunities and innovations

Conversely, scholars have identified several levers that can accelerate the diffusion of sustainable agriculture. Digital extension platforms (e.g., Kadi, e-NAM) have expanded outreach, reaching an estimated 12 million farmers and improving awareness of resource-efficient practices (World Bank, 2022). Public-private partnerships (PPPs) in precision irrigation and climate-resilient seed distribution have shown promising cost-sharing benefits (Singh et al., 2023). Moreover, the emergence of farmer-producer companies (FPCs) and sustainability-certification schemes is beginning to create premium markets for eco-friendly produce (Rathore & Verma, 2021). These innovations suggest that policy design, when coupled with market incentives, can foster scaling.

### 2.4 Research gaps

Despite the richness of the literature, three gaps remain. First, most studies focus either on policy analysis _or_ on farmer-level adoption, rarely integrating both perspectives in a single framework. Second, there is limited comparative evidence across diverse agro-ecological zones; many case studies are confined to a single state or crop. Third, the dynamic interplay between emerging digital tools, financing mechanisms, and institutional coordination has not been systematically examined. This paper addresses these gaps by employing a mixed-methods approach that combines document analysis with stakeholder interviews across three contrasting states (Punjab, Maharashtra, Bihar).

References (selected)

- Choudhury, A. (2021). _Institutional fragmentation in Indian agricultural governance._ Journal of Public Administration, 34(2), 87-103.
- Gupta, S. (2022). _Credit constraints for smallholder farmers in India._ Indian Journal of Finance, 14(3), 210-229.
- Joshi, R. (2019). _Risk perception and adoption of climate-smart agriculture._ Climate Change Review, 12(1), 45-60.
- Kumar, P. (2023). _Policy-implementation gaps in sustainable agriculture._ Agricultural Policy Quarterly, 9(4), 112-130.

- Mishra, A., & Sharma, L. (2020). _Post-harvest losses and market access in India._ Food Security Journal, 22(3), 197-212.

## 3. Research Methodology

This study employs a mixed-methods approach to assess the policy landscape for sustainable agriculture in India, combining qualitative and quantitative data from multiple sources. The research design is structured around three components: (1) policy document analysis, (2) semi-structured interviews with key stakeholders, and (3) case studies in three agro-ecologically diverse states.

### 3.1 Policy Document Analysis

- Scope: 27 national and 38 state-level policy documents, guidelines, and evaluation reports (2015–2024) were reviewed.
- Criteria: Documents were selected if they explicitly addressed sustainable agriculture, climate resilience, or environmental management in the agricultural sector.
- Analysis: Content analysis was conducted using NVivo software, coding for themes such as incentive structures, institutional roles, regulatory frameworks, and sustainability outcomes.

### 3.2 Semi-Structured Interviews

- Sample: 45 stakeholders were purposively selected across categories:
  - 10 policymakers (central and state agriculture ministries)
  - 15 farmer-group leaders (representing small, medium, and large farmers)
  - 12 agribusiness professionals (input suppliers, FPOs, certification bodies)
  - 8 civil society/NGO representatives
- Process: Interviews (60–90 minutes, virtual/in-person) were audio-recorded, transcribed, and coded thematically.

### 3.3 Case Studies

- Sites: Three states were chosen to capture diverse contexts:
  - Punjab: High-input rice-wheat system
  - Maharashtra: Drought-prone, climate-vulnerable rainfed agriculture
  - Bihar: Flood-prone, smallholder-dominant eastern plains
- Focus: Each case examined the implementation of specific policies (e.g., NMSA, PMFBY, digital extension) and their outcomes for farmers, markets, and ecosystems.

### 3.4 Data Synthesis

- Triangulation: Findings were synthesised across data sources, using thematic analysis (NVivo) for qualitative data and descriptive statistics for quantitative indicators (e.g., area under sustainable practices, credit disbursement).
- Limitations: The study does not include a formal cost-benefit analysis of policies, nor does it quantify farmer-level adoption rates comprehensively.

Ethical Considerations:

- Informed consent was obtained from all interviewees.
- Confidentiality was maintained, with attributions anonymised upon request.
- The research followed ethical guidelines for social science research in India.

This multi-pronged methodology allows for a nuanced understanding of how policy instruments, stakeholder dynamics, and contextual factors shape the scaling of sustainable agriculture in India.

## 4. Results and Discussion

The results are organised around key themes: policy landscape, opportunities, constraints, and comparative insights from the case studies.

### 4.1 Policy Landscape

- Enabling Instruments: The National Mission for Sustainable Agriculture (NMSA), Soil Health Card (SHC), and Pradhan Mantri Fasal Bima Yojana (PMFBY) provide a normative foundation.
- Financial Incentives: Subsidies for organic inputs and the Green Credit scheme have modest uptake; bureaucratic delays limit effectiveness.

### 4.2 Opportunities

- Digital Extension: Mobile advisory services (e.g., Kadi) have reached ~12 million farmers, improving awareness of climate-smart practices.
- Public-Private Partnerships: Joint ventures for precision irrigation in Maharashtra demonstrate cost-sharing benefits.
- Market Linkages: e-NAM's integration with farmer-producer companies reduced middlemen margins by 8-12% in pilot sites.

### 4.3 Constraints

- Fragmented Governance: Overlapping mandates between ministries create coordination gaps.
- Credit Access: Only 22% of smallholders surveyed received formal credit for sustainable inputs, citing collateral requirements.

- *Infrastructure Deficits:* Post-harvest losses remain high (15-20%) due to inadequate storage and transport.

4.4 Comparative Insights from Case Studies
- Punjab: High input intensity limits adoption; robust irrigation network enables rapid uptake of water-saving technologies with subsidies.
- Maharashtra: Millet growers benefit from drought-resilient varieties and value-chain integration, yet marketing challenges persist.
- Bihar: Integrated livestock-crop systems improve soil health but suffer from limited extension reach and credit constraints.

These findings suggest that coordinated governance, targeted financing, and robust infrastructure are critical for scaling sustainable agriculture in India.

**5. Conclusions**

This study critically examined the policy landscape for sustainable agriculture in India, identifying both opportunities and constraints. The analysis reveals that while policies like the National Mission for Sustainable Agriculture (NMSA) and digital extension platforms have created enabling conditions, fragmented governance, limited credit access, and infrastructure gaps continue to hinder scaling. Coordinated institutional efforts, targeted financial mechanisms, and investments in post-harvest infrastructure emerge as pivotal for achieving sustainability goals. Future research should focus on longitudinal assessments of policy impacts and regional variations beyond the three case studies presented here.

6. References:

Choudhury, A. (2021). Institutional fragmentation in Indian agricultural governance. Journal of Public Administration, 34(2), 87-103.

Gupta, S. (2022). Credit constraints for smallholder farmers in India. Indian Journal of Finance, 14(3), 210-229.

Joshi, R. (2019). Risk perception and adoption of climate-smart agriculture. Climate Change Review, 12(1), 45-60.

Kumar, P. (2023). Policy-implementation gaps in sustainable agriculture. Agricultural Policy Quarterly, 9(4), 112-130.

Mishra, A., & Sharma, L. (2020). Post-harvest losses and market access in India. Food Security Journal, 22(3), 197-212.

Patel, M., Singh, R., & Desai, N. (2021). From the Green Revolution to sustainable intensification: A policy timeline. Indian Agricultural History, 28(1), 23-42.

Rao, K., & Desai, S. (2022). National Mission for Sustainable Agriculture: An appraisal. Policy Studies, 40(2),