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Review Article

Carbon Trading Mechanisms in India: A Review of Current Policies and Future Prospects

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Abstract

India's carbon credit and trading framework has evolved through the integration of national climate policies, market-based mechanisms and agricultural sustainability initiatives. The Renewable Energy Certificate (REC) mechanism and the Perform, Achieve and Trade (PAT) scheme contributed to renewable energy expansion and industrial energy-efficiency improvements, while the Energy Conservation (Amendment) Act, 2022 established the foundation for the Carbon Credit Trading Scheme (CCTS). India's installed solar capacity exceeded 63,000 MW by 2023, reflecting notable progress toward low-carbon development and industrial decarbonisation. Despite these achievements, agricultural participation in carbon markets remains limited due to small landholdings, inadequate awareness, high transaction costs and weak institutional access. Conservation agriculture, zero tillage and agroforestry demonstrate substantial potential for carbon sequestration, greenhouse gas mitigation and enhancement of farmer income. Agroforestry systems reported sequestration rates ranging from 0.25 to 23 Mg C ha^{-1} yr^{-1}, while conservation agriculture practices showed potential carbon credit earnings of USD 16–30 per hectare. Institutions such as the Indian Council of Agricultural Research (ICAR), Krishi Vigyan Kendras (KVKs) and agricultural universities are increasingly promoting climate-smart agriculture, organic farming and carbon farming through research, extension and farmer training programs. The review highlights the quantitative gap between industrial decarbonisation and agrarian sustainability in India. While industries benefit from structured compliance mechanisms and policy incentives, agricultural systems remain inadequately integrated into formal carbon markets. Carbon credit mechanisms therefore offer significant opportunities to bridge this gap by incentivizing sustainable agricultural practices and strengthening rural participation in India's green transition. The study concludes that inclusive policies, institutional coordination and farmer-centric market frameworks are essential for equitable low-carbon growth.

1. Introduction

Carbon credit trading has become a pivotal mechanism in the global effort to combat climate change, providing a market-based framework to reduce greenhouse gas (GHG) emissions while supporting sustainable development. According to Chitre et al. [1], India is the world's third-largest emitter of GHGs, facing the dual challenge of addressing energy poverty and sustaining economic growth. The country has committed to generating 40% of its electricity from non-fossil-fuel sources by 2030 and reducing emissions intensity by 33–35%. Central to achieving these targets is the establishment of a robust carbon credit trading system that incentivizes industries, communities and farmers to adopt low-carbon practices.

Global carbon markets have expanded rapidly, with multiple studies highlighting substantial growth in both market size and corporate participation. Kossoy et al. [2] reported a global market valuation of USD 176 billion in 2011, while Chaudhry et al. [3] documented a 240% annual growth rate in the voluntary market. Corporate engagement has intensified as well, with Streck et al. [4] noting that interest in voluntary carbon markets has nearly tripled. Although voluntary markets generate most carbon credits, compliance markets maintain stricter methodological standards, as emphasized by Maguire et al. [5]. Although earlier studies projected rapid expansion of the global carbon economy, the expected valuation of USD 2,000 billion annually by 2020 was not fully realized due to market volatility, uneven regulatory frameworks and disruptions caused by global economic uncertainties. Nevertheless, carbon markets continued to expand steadily after the Paris Agreement, particularly through compliance-based trading systems, renewable energy investments and voluntary carbon market participation. In India, the carbon economy evolved through mechanisms such as Renewable Energy Certificates (RECs), the Perform, Achieve and Trade (PAT) scheme and the recently introduced Carbon Credit Trading Scheme (CCTS), contributing to gradual reductions in greenhouse gas emissions and supporting the country's green transition goals.

India is strategically positioned to leverage carbon trading as a driver of its green transition, supported by strong legislative and market-based frameworks. Central to this strategy is the Perform, Achieve and Trade (PAT) scheme, which promotes energy efficiency across eight energy-intensive sectors [6–9] and initially included 478 designated consumers [10]. The Energy Conservation (Amendment) Act, 2022, further strengthened this foundation by institutionalizing carbon credit trading [4, 11]. While regulatory uncertainties and market complexities persist, India's potential remains significant, offering opportunities to reduce greenhouse gas emissions and generate substantial carbon credits as part of the evolving global carbon economy.

Carbon trading in India faces notable inclusivity challenges, particularly within the agricultural sector, where current project structures often exclude small and marginalized farmers. Evidence from [12] highlighted significant disparities: only 4% of carbon farming project participants were women and participation was dominated by large landholders from non-marginalized castes. Furthermore, 99% of participating farmers received no monetary benefits, revealing a critical gap between participation and tangible economic returns—one that undermined the intended incentive structure of carbon initiatives.

Research by Ghosh et al. [13] and Singh et al. [14] pointed to several strategies for addressing these barriers, including targeted technical assistance, financial support mechanisms and strengthened economic incentives through improved carbon credit access. Notably, Singh et al. [14] reported that agroforestry practices could have raised farmer income by 40–50%, underscoring the considerable untapped potential of more inclusive carbon trading systems. By integrating marginalized communities into carbon markets, India could have enhanced both climate mitigation outcomes and rural livelihoods.

This review examines India's carbon credit trading landscape through a multidimensional lens, evaluating legislative frameworks, stakeholder dynamics and grassroots challenges. It also analyses government initiatives aimed at democratizing carbon markets, such as the Paramparagat Krishi Vikas Yojana (PKVY) for organic farming and digital platforms to streamline credit access. By synthesizing insights from post-2020 Indian journals and policy documents, the article seeks to address a pressing question: How can India's carbon market evolve to bridge the gap between industrial decarbonization and agrarian sustainability, ensuring equitable growth in its climate journey.

2. Methodology

This review was conducted using a systematic narrative approach to analyse the development of carbon trading systems and related agricultural sustainability policies in India. Relevant literature published between 2010 and 2025 was collected from major scientific databases including Google Scholar, Scopus, Web of Science and government or institutional reports from organizations such as ICAR, Bureau of Energy Efficiency (BEE) and Ministry of Environment, Forest and Climate Change (MoEFCC). Keywords used during the literature search included "carbon credit trading in India", "Carbon Credit Trading Scheme (CCTS)", "Perform Achieve and Trade (PAT)", "Renewable Energy Certificates", "agricultural carbon markets", "climate-smart agriculture", "agroforestry carbon sequestration" and "carbon farming in India".

2.1. Policy Landscape in India

India's climate governance framework evolved through a multilayered policy landscape where state-led innovation, national regulatory mechanisms and international climate commitments intersected. Early analyses by Joergensen et al. [15] highlighted the importance of state-level experimentation, noting that subnational initiatives such as Maharashtra's Climate Action Plan and Kerala's Haritha Keralam Mission often pioneered context-specific climate solutions, even though alignment with national policies remained a persistent challenge. This fragmented governance context became increasingly relevant as India expanded its engagement with global carbon markets. Under Article 6 of the Paris Agreement, India actively explored bilateral carbon trading and the development of Internationally Transferred Mitigation Outcomes (ITMOs), as documented by Tripathy et al. [16]. At the same time, external policy instruments such as the European Union's Carbon Border Adjustment Mechanism (CBAM) intensified pressure for more explicit domestic carbon pricing signals, particularly for export-oriented sectors.

Market-based climate instruments in India began gaining prominence with the introduction of the Renewable Energy Certificate (REC) system in 2010. As explained by Girish et al. [17] and Saini et al. (2022), the REC mechanism was established to scale renewable energy deployment by decoupling electricity generation from environmental attributes. While the system initially saw rising participation—demonstrated by certification increases from 2% in 2011–12 to 15% in 2014–15 Sawhney et al. [18] showed that market volatility and policy instability later triggered a collapse in REC prices, reducing compliance rates to 6% during 2017–19. Challenges such as curtailment and delayed payments in states with strong renewable portfolios, including Karnataka and Tamil Nadu, were emphasized by Elavarasan et al. [19]. Government intervention through reinstated floor prices attempted to restore stability and investor confidence.

Complementing the REC mechanism, the National Action Plan on Climate Change (NAPCC) provided a broader policy umbrella since its inception. The missions under the NAPCC demonstrated uneven performance. The Solar Mission was widely recognized as a success, with installed solar capacity reaching 63,000 MW by August 2023—far exceeding initial targets—as noted by Yadaw et al. (2024). In contrast, the National Mission on Sustainable Agriculture (NMSA) progressed more slowly, despite its mandate to promote climate-resilient farming [8] and its emerging potential for agricultural carbon credits [20]. Persistent issues such as weak inter-mission coordination and non-binding targets diminished the overall coherence of the NAPCC.

Recent studies highlighted growing interest in agricultural carbon markets, yet significant structural barriers remained. Ghosh et al. [13] noted that policy frameworks such as the National Agroforestry Policy and PKVY were conceptually robust but constrained by inconsistent implementation. Evidence from carbon farming pilots presented by Cariappa et al. [12] revealed deep inequities, with only 4% participation by women and 99% of farmers receiving no monetary benefits. Small landholdings, averaging 1.08 hectares and weak aggregation systems further limited scalability. Despite low organic farming adoption—with only 2% of farmers holding certification [21]—agroforestry continued to show substantial sequestration potential, estimated between 0.25 and 23 Mg C/ha/yr (Ram et al., 2024). These findings underscored the need for stronger institutional support, targeted research and financial incentives.

A major policy breakthrough occurred with the Energy Conservation (Amendment) Act, 2022, which laid the foundation for India's domestic Carbon Credit Trading System (CCTS). Chawda et al. [22] emphasized that the CCTS represented a significant shift toward a regulated carbon market, enabling cross-sectoral emissions trading. Malik et al. [23] identified electricity, iron and steel, cement and fertilizer as priority sectors, noting that cross-sectoral trading could reduce compliance costs by up to 24% compared to sector-specific schemes. The mechanism relied on assigning emission caps to obligated entities, who were required to purchase credits to offset excess emissions, as outlined by Patil et al. [24]

Parallel to the upcoming CCTS, the Perform, Achieve and Trade (PAT) scheme remained India's flagship energy-efficiency market instrument. Studies by Oak et al. [25, 26] and Giri et al. [10] demonstrated measurable impacts, including a 2.7% reduction in energy intensity in the cement sector and 1.6% in fertilizers, with the cement sector achieving approximately 22.5 million tons of CO_2 savings. However, concerns persisted regarding overly lenient targets, operational inconsistencies [27] and the absence of a unified national carbon registry, which could limit market integration across mechanisms.

3. Quantitative Gap between Industrial Decarbonisation and Agrarian Sustainability in India

India's low-carbon transition has progressed unevenly between industrial and agricultural sectors. Industrial decarbonisation has advanced through structured market-based mechanisms such as the Perform, Achieve and Trade (PAT) scheme, Renewable Energy Certificates (RECs) and the proposed Carbon Credit Trading Scheme (CCTS). Giri and Sharma [10] reported that these mechanisms established measurable emission-reduction targets, compliance frameworks and financial incentives for energy-intensive industries including cement, fertilizer, iron and steel, and power generation sectors. Similarly, Malik et al. [23] observed that cross-sectoral carbon trading could significantly reduce compliance costs while improving industrial mitigation efficiency. As a result, measurable reductions in industrial energy intensity and greenhouse gas emissions were achieved during the post-Paris Agreement period, after this agreement many transitions had taken in India.

In contrast, agrarian sustainability initiatives have progressed more slowly due to fragmented landholdings, inadequate institutional support, limited farmer awareness and weak integration of agriculture into formal carbon markets. Khurana et al. [20] emphasized that Indian agriculture possesses substantial carbon sequestration potential through agroforestry, conservation agriculture and climate-smart farming practices. However, Cariappa and Krishna [12] observed that small and marginal farmers continue to face high monitoring and verification costs, limited access to carbon-credit platforms and poor market transparency. Indian agriculture contributes substantially to methane and nitrous oxide emissions, yet carbon sequestration opportunities from agroforestry, conservation agriculture, organic farming and zero tillage remain underutilized.

Carbon credit systems can help bridge this quantitative gap by incentivizing climate-smart agricultural practices and rewarding farmers for ecosystem services. Singh et al. [14] reported that agroforestry systems could substantially improve farmer income while increasing carbon sequestration potential. Furthermore, the Indian Council of Agricultural Research (ICAR), Krishi Vigyan Kendras (KVKs) and State Agricultural Universities are increasingly promoting sustainable agriculture through farmer training, research and extension programmes. Farmer Producer Organizations (FPOs), digital monitoring systems and aggregation-based carbon-credit models can further improve smallholder participation in carbon markets. Strengthening institutional coordination between industries, agricultural institutions and carbon-market regulators will therefore be essential for achieving balanced and inclusive green transition pathways in India.

4. Challenges Faced by Farmers

Despite the growing recognition of agriculture in India's low-carbon transition, farmers continue to face substantial institutional, financial and technical barriers in accessing carbon markets. India's carbon credit trading ecosystem is shaped by a diverse network of stakeholders, ranging from government agencies and private corporations to international certifiers and rural communities. This section examines the roles, interactions and challenges faced by these actors in driving the carbon market.

The Bureau of Energy Efficiency (BEE) served as a pivotal institutional mechanism in advancing India's energy-efficiency agenda, primarily through its administration of the Perform, Achieve and Trade (PAT) Scheme. As noted by Krishnan et al. [28], the BEE played a central role in formulating and enforcing energy-efficiency targets across major industrial sectors. Since its launch in 2012, the PAT scheme encompassed eight energy-intensive industries and introduced a market-based approach that enabled the trading of Energy Saving Certificates [25]. A growing body of evidence affirmed the scheme's effectiveness, with Oak et al. [26] reporting reductions in energy intensity of 2.7 percent in the cement sector and 1.6 percent in the fertilizer sector, collectively contributing to an estimated 22.5 million metric tons of CO_2 emission savings. Despite these achievements, Giri and Sharma [10] highlighted ongoing limitations, including the modest ambition of target-setting and the challenges involved in extending regulatory oversight to Small and Medium Enterprises (SMEs), which could constrain the scheme's long-term impact and scalability.

Power exchanges such as IEX and PXIL played a vital role in facilitating Renewable Energy Certificate (REC) trading in India, providing a market structure that supported spatial flexibility in renewable power generation. The available sources partially substantiated these claims: Girish et al. [29] confirmed that REC trading through power exchanges commenced in 2011 and underscored their importance within India's broader energy-trading framework. However, the specific assertions regarding a 90 percent market share and the issuance of 8.4 million certificates were not directly verifiable from the cited literature. Aparna Sawhney et al. [18] further identified key market challenges, noting that REC certification rates declined from 15 percent to 6 percent between 2014 and 2019, a trend driven by persistent price volatility and significant inventories of unsold certificates. While these findings affirmed the presence of structural inefficiencies in the REC market, the sources did not corroborate the precise pricing discrepancies referenced in the original statement.

International certification bodies such as Gold Standard and VCS played a pivotal role in validating Indian carbon projects, yet they continued to face substantial challenges in ensuring both inclusivity and credibility. Evidence showed significant barriers to participation: Cariappa et al. [12] reported that carbon-farming initiatives were dominated by large landholders, with only 4 percent female participation and 99 percent of farmers receiving no monetary benefits, while also noting that Verra denied registration to four Indian carbon-farming projects, reflecting the stringency of international validation processes. Key obstacles included high documentation costs, technical complexity and stringent additionality requirements, all of which tended to marginalize small-scale and resource-poor stakeholders. Although Gold Standard certified more than 200 Indian projects since 2020, only 15 percent met the highest certification benchmarks, highlighting a persistent gap between project-development practices and the compliance standards set by leading international certification bodies.

The private sector indeed drove carbon-credit generation in India through large-scale renewable-energy projects, but this growth trajectory presented notable limitations in terms of community inclusivity. Existing research affirmed the dominant role of corporate-led carbon-credit initiatives [11], supported by estimates that carbon-financing opportunities in India could reach nearly USD 100 billion [30]. However, Cariappa et al. [12] highlighted that such large-scale initiatives often excluded small farmers and marginalized communities, with only 4 percent female participation and 99 percent of farmers receiving no monetary benefits. Thus, while corporations effectively leveraged economies of scale to expand carbon-credit generation, the evidence indicated that this model risked deepening social inequities within sustainable-development pathways. Researchers therefore recommended more inclusive policies that expanded participation and addressed systemic biases embedded in the structure of carbon-credit project implementation.

Smallholder farmers faced substantial barriers to participating in agricultural carbon markets, with systemic constraints limiting their engagement in carbon-sequestration initiatives. Existing literature highlighted persistent structural obstacles: Havemann et al. [31] identified small individual benefits, complicated registration procedures and high upfront transaction costs as major impediments. Although the research question's projection of 50,000–100,000 credits annually appeared encouraging, Sadiq et al. [32] emphasized that agribusiness intermediaries such as FarmERP and DeHaat were crucial for enabling participation by aggregating farmer contributions and providing technical and administrative support. Reinforcing these concerns, a NABARD survey showed that 78 percent of farmers were unaware of carbon-credit guidelines and 65 percent viewed initial costs as prohibitive. Collectively, these findings underscored the need for targeted institutional support and simplified processes to ensure that smallholders could effectively access and benefit from agricultural carbon markets.

Punjab's zero-tillage farmers successfully reduced diesel consumption and generated carbon credits, yet they continued to face substantial market barriers in monetizing these environmental gains. Empirical evidence supported the effectiveness of zero-tillage: Farooq et al. [33] reported fuel savings of approximately 35 liters of diesel per hectare, while Aryal et al. [34] documented greenhouse-gas reductions of 1.5 Mg CO_2-eq per hectare. Cariappa et al. (2024) further confirmed the carbon-credit potential, estimating farmer earnings of USD 16–30 per hectare. Despite these environmental and economic advantages, structural inefficiencies in voluntary carbon markets—such as delayed payments, high intermediary commissions and limited transparency—significantly weakened farmer participation and reduced net benefits. Without targeted reforms to streamline market processes and improve farmer access, the substantial climate-mitigation and income-generation potential of zero-tillage practices was unlikely to be fully realized.

5. Government Interventions

The Indian government has recognized the potential of carbon credit systems to incentivize sustainable agriculture while addressing climate change. However, farmers face systemic challenges in accessing these markets, including high costs, technical barriers and fragmented policies. To overcome these obstacles, the government has introduced targeted interventions aimed at simplifying participation, reducing financial burdens and building farmer capacity.

The Indian government was actively integrating carbon credit initiatives into agricultural schemes to incentivize climate-smart practices and reduce greenhouse gas emissions. Ananya Khurana et al. [20] indicated that India's agriculture sector had significant potential to transition from a net emitter to a net carbon absorber by adopting sustainable practices such as zero tillage, solar energy use and efficient water management. Cariappa et al. [12] specifically found that conservation agriculture practices could have increased farmers' carbon credit earnings by USD 18–30 per hectare, although a 60% rise in carbon prices would have been required to encourage broader adoption. Ghosh et al. [13] emphasized that while economic incentives like carbon credits were promising, farmers still faced persistent challenges including small landholdings, limited awareness and financial constraints. Overall, the evidence suggested that a more strategic and supportive policy approach was needed to fully realize the potential of carbon farming in India.

Advanced technologies were transforming soil carbon sequestration monitoring in India through innovative and scalable measurement approaches. The integration of remote sensing, IoT and AI technologies enabled more precise and cost-effective carbon assessments [35] Shinde et al., 2025), with IoT sensors providing real-time environmental data to support informed decision-making and carbon-neutral practices. Emerging research suggested that these tools could overcome long-standing measurement limitations, with some methods achieving soil carbon stock estimations with less than 5% error [36]. By combining satellite imagery, proximal sensing and machine learning, this integrated approach created robust and scalable systems for soil carbon monitoring. Nevertheless, challenges persisted in large-scale implementation, particularly regarding data privacy, system interoperability and algorithmic bias.

The Indian Council of Agricultural Research (ICAR), Krishi Vigyan Kendras (KVKs) and State Agricultural Universities are playing an increasingly important role in promoting climate-smart agriculture, organic farming and carbon sequestration practices in India. Through research, extension activities and farmer-training programmes, these institutions are helping farmers adopt sustainable land-management practices capable of generating environmental and economic benefits. ICAR has strengthened initiatives related to conservation agriculture, agroforestry, integrated nutrient management and soil-carbon enhancement under programmes such as the National Innovations in Climate Resilient Agriculture (NICRA). These programmes focus on developing climate-resilient technologies, reducing greenhouse gas emissions and improving carbon sequestration potential in agricultural landscapes. Krishi Vigyan Kendras (KVKs) further support these objectives through on-field demonstrations, farmer awareness campaigns and training programmes on organic farming, precision agriculture and residue management.

Several agricultural universities across India are also conducting research on carbon sequestration, climate-resilient cropping systems and carbon-credit opportunities associated with agroforestry and conservation agriculture. Universities are increasingly collaborating with government agencies, Farmer Producer Organizations (FPOs) and private stakeholders to improve carbon accounting methodologies and facilitate farmer participation in emerging carbon markets. These institutional efforts are critical for bridging the gap between industrial decarbonisation and agrarian sustainability. By strengthening farmer awareness, improving technical capacity and supporting carbon-credit aggregation systems, ICAR and agricultural universities can contribute significantly to India's green-transition goals and rural livelihood enhancement.

State-led agricultural initiatives in India had been actively developing training programs to educate farmers on carbon credit mechanisms and climate-smart practices. The Krishi Vigyan Kendras (KVKs), operating through 731 centers under the Indian Council of Agricultural Research (ICAR), served as major knowledge hubs, while the National Innovations in Climate Resilient Agriculture (NICRA) program focused on strategic research, technology demonstrations and capacity building to address evolving climate challenges [11]. Although the specific claim that 50,000 farmers in Punjab were trained could not be verified from available sources, existing research highlighted substantial state-level efforts to promote sustainable agriculture. Cariappa et al. [12] reported that conservation agriculture could have generated carbon credits worth USD 16–30 per hectare, indicating strong potential for farmer participation. Furthermore, Ananya Khurana et al. [20] emphasized that practices such as zero tillage, precision land leveling and efficient resource management could have helped shift Indian agriculture from a net greenhouse gas emitter to a potential carbon sink.

India had also initiated a Carbon Credit Trading Scheme (CCTS) to establish a domestic marketplace linking farmers with corporate carbon credit purchasers, offering significant potential for reducing agricultural emissions and empowering rural communities. The scheme aimed to shift agriculture from a net greenhouse gas emitter to a possible carbon absorber [20], with Farmer Producer Organizations (FPOs) in states such as Andhra Pradesh playing a key role by facilitating collective bargaining and lowering transaction costs. Research further indicated that carbon markets could have reduced India's agricultural emissions by up to 84% between 2019 and 2070 [20]. However, the realization of this potential depended on overcoming policy gaps, economic constraints, cultural factors and biophysical limitations. Overall, the CCTS represented a promising market-based mechanism for climate mitigation and rural economic development.

Andhra Pradesh's Community-Managed Natural Farming (APCNF) represented a major agroecological transformation with significant potential for reducing carbon emissions and promoting sustainable agricultural practices. Evidence showed substantial environmental benefits: Rosenstock et al. [9] reported that APCNF could have reduced greenhouse gas emissions by at least 23% compared to conventional farming, potentially saving about 5.1 million tonnes of CO_2eq annually. Reddy et al. [37] highlighted the program's decentralized, multi-actor innovation system marked by strong community participation. However, challenges persisted; Jaacks et al. [38] found that nearly half of APCNF farmers continued to rely on pesticides despite the government's push for organic methods, illustrating the complexity of the transition. Although the specific claim that 600,000 farmers were engaged in carbon credit programs could not be directly verified, the available evidence consistently supported APCNF as a transformative initiative with meaningful environmental potential.

6. Conclusion

India's carbon credit and trading landscape has undergone a profound transformation, shaped by regulatory innovation, evolving market mechanisms and increasing recognition of agriculture's role in climate mitigation. The review shows that while the country made significant progress—through initiatives such as the PAT scheme, REC markets and the newly introduced Carbon Credit Trading Scheme (CCTS)—systemic inefficiencies and inclusivity gaps persisted. Industrial sectors benefited most from structured compliance mechanisms, whereas agricultural participation remained fragmented and constrained by small landholdings, limited awareness and high transaction costs. Emerging technological advances, including remote sensing, IoT and AI-based carbon measurement, offered promising avenues to reduce monitoring burdens and enhance transparency. However, large-scale implementation challenges underscored the need for clearer governance frameworks and stronger data infrastructure. State-led programs such as NICRA and APCNF demonstrated the potential of community-based and agroecological transitions, yet their impacts were uneven due to cultural, financial and behavioral barriers. Overall, India stood at a pivotal juncture: its carbon markets held substantial potential to accelerate national decarbonization while enhancing rural livelihoods, but realizing this promise required targeted policy reforms, better institutional coordination and more inclusive market designs that ensured equitable access for smallholders and marginalized communities. With sustained commitment, India could align climate ambition with socio-economic transformation.

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