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An Examination of the Impacts of the National Agriculture Market (eNAM): A Pioneering Digital Initiative and a Pathway for Financial Inclusion in India

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Abstract

The National Agriculture Market (eNAM), launched by the Government of India in April 2016, represents a crucial digital transformation aimed at consolidating fragmented agricultural markets into a unified electronic trading platform. This initiative seeks to improve the efficiency of agricultural marketing, enhance price discovery, increase transparency, and promote financial inclusion for farmers. This research examines the impact of eNAM on agricultural marketing and financial inclusion in India from 2016 to 2026. The study tests the hypothesis that increased participation in eNAM results in significant enhancements in market efficiency and financial inclusion through digital transactions and transparent trading practices. A descriptive, analytical, and correlational research methodology was employed, utilizing secondary data obtained from eNAM progress reports, publications from the Small Farmers Agribusiness Consortium (SFAC), reports from the Ministry of Agriculture, studies from ICAR-NAARM, and government statistical databases. For data analysis, descriptive statistics, growth analysis, Pearson correlation, and simple linear regression techniques were utilized. The findings indicate that by May 2026, stakeholder registrations reached 1,83,91,167, which included 1,79,94,547 farmers and 2,72,097 traders. The platform successfully integrated 1,522 mandis across 27 states and union territories, enabling trade in over 240 agricultural commodities. Correlation analysis demonstrated a strong positive correlation between eNAM adoption and financial inclusion ($r = 0.82$, $p = 0.011$), while regression analysis indicated a significant positive effect ($\beta = 0.74$, $p = 0.016$). The study concludes that eNAM has considerably improved agricultural marketing efficiency and strengthened financial inclusion through transparent trading, digital payments, and enhanced market access.

Key words : eNAM, Agricultural Marketing, Financial Inclusion, Digital Agriculture, Market Integration, India.

Agriculture continues to be a vital element of the Indian economy, offering livelihoods, ensuring food security, and significantly contributing to job creation. Despite progress in agricultural production technology, the agricultural marketing system in India has historically suffered from fragmentation, inefficiencies, information asymmetry, inadequate infrastructure, and an excessive dependence on intermediaries. Within the traditional Agricultural Produce Market Committee (APMC) framework, farmers often faced limited market access, restricted competition among buyers, and insufficient price realization for their products. These challenges have hindered the development of a competitive and transparent agricultural marketing ecosystem.

To address these issues, the Government of India launched the National Agriculture Market (eNAM) on 14 April 2016, under the Ministry of Agriculture and Farmers' Welfare. Implemented by the Small Farmers Agribusiness Consortium (SFAC), eNAM operates as a nationwide electronic trading platform that integrates APMC mandis into a single national market. The platform facilitates online trading, transparent price discovery, quality-based bidding, interstate commerce, and direct electronic payments. By leveraging digital technologies, eNAM seeks to create a seamless agricultural marketing environment that benefits

both farmers and traders. Over the past decade, eNAM has emerged as one of the most significant digital agricultural reforms in India. This initiative is closely associated with national programs such as Digital India, Atmanirbhar Bharat, and financial inclusion policies that aim to promote digital transactions and formal financial participation. Through direct payments linked to banking institutions and electronic transaction records, eNAM has created opportunities for farmers to engage with formal financial entities and digital payment systems.While prior research has extensively examined market integration, price discovery, and efficiency enhancements related to eNAM, there has been a notable lack of empirical investigation into its role in advancing financial inclusion. The connection between digital agricultural marketing and financial empowerment remains insufficiently explored, despite its importance for rural economic development. This study aims to address this gap by evaluating whether increased participation in eNAM significantly improves agricultural marketing efficiency and financial inclusion in India. The research tests the hypothesis that involvement in eNAM-enabled markets results in enhanced transparency, better price realization, greater market access, and increased uptake of digital financial services, thereby promoting financial inclusion among agricultural stakeholders.

Review of Literature

Agricultural marketing in India has historically been characterized by fragmented markets, a multitude of intermediaries, inadequate market information, and limited opportunities for farmers to engage with competitive buyers. The introduction of the National Agriculture Market (eNAM) in 2016 marked a significant milestone in the digital transformation of agricultural marketing, creating a unified electronic trading platform that integrates Agricultural Produce Market Committee (APMC) mandis across the country. The theoretical framework of eNAM is based on market integration theory, information asymmetry theory, digital transformation theory, and financial inclusion models, all of which highlight the capacity of digital technologies to improve market efficiency, transparency, and access to financial services.

Preliminary research emphasized the importance of digital technologies in advancing agriculture. Dey (2016) pointed out the emergence of technology-driven trading environments that can reduce transaction barriers and improve market accessibility. Lele *et al*. (2017) examined the broader Digital India initiative and concluded that digital interventions enhance efficiency, transparency, and service delivery across various sectors, including agriculture. These studies established a foundation for understanding eNAM as a digital governance and agricultural reform initiative. Devalkar *et al*. (2018) observed that electronic trading platforms deliver timely and accurate price information to farmers, traders, and policymakers, which aids in reducing information asymmetry and promotes informed decision-making.

Similarly, Soumen Pal *et al*. (2019) emphasized the crucial role of Information and Communication Technology (ICT) in offering rapid information services and improving market responsiveness. Their study suggests that technology-based information systems can enhance agricultural marketing outcomes and facilitate market integration. Many researchers have specifically examined the operational benefits of eNAM. Meena *et al*. (2019) discovered that farmers gain more advantages when traders and buyers from different states participate in online trading, as increased competition results in better price realization. Reddy *et al*. (2019) supported the implementation of eNAM, arguing that it

improves the scale, scope, and efficiency of market operations while granting farmers wider market access. These findings imply that market integration through digital platforms can enhance competition and reduce regional market disparities.

Krishna *et al*. (2020) underscored the importance of eNAM in supplying reliable market information to farmers, which facilitates better marketing decisions and decreases dependence on intermediaries. Singh *et al*. (2020) suggested that the period following the introduction of eNAM has strengthened India's agricultural marketing system through increased transparency and more effective trading processes. Mukhopadhyay (2020) further highlighted eNAM's capacity to facilitate direct purchasing methods and farm-gate procurement of agricultural products, thereby reducing marketing inefficiencies and post-harvest losses.

The literature published in 2021 expanded the conversation regarding technology adoption and digital transformation. Chaudhary and Suri (2021) identified key factors that affect the ongoing use of e-trading systems, including technological infrastructure, user awareness, trust, and perceived usefulness. Arunendra Mishra *et al*. (2021) found stronger links between eNAM-enabled market transactions and price efficiency in comparison to traditional market systems. Chaudhary *et al*. (2021) described eNAM as a vital component of Agriculture 4.0, emphasizing its transformative role in modernizing agricultural supply chains through digital innovation. Research conducted in 2022 focused on performance evaluation, adoption patterns, and implementation challenges. Swain *et al*. (2022) examined the impact of e-trading adoption through eNAM and reported improvements in market accessibility and operational efficiency. Khandagiri *et al*. (2022) carried out a performance assessment of electronic agricultural markets and noted positive results concerning market integration and transparency. Chaudhary *et al*. (2022) argued that an increase in eNAM adoption could significantly strengthen agricultural supply chains.

However, Gautam *et al*. (2022) acknowledged several challenges, such as inadequate digital literacy, limited technological infrastructure, and resistance from stakeholders. Other scholars highlighted the broader importance of digital technologies in agricultural development. Manobharathi *et al*. (2022) detailed how ICT and Internet of Things (IoT) technologies facilitate technological advancement in agriculture. Shah (2022) examined ICT-based solutions for rural development and stressed their potential to improve service delivery and economic opportunities. Argade *et al*. (2022) demonstrated the benefits of electronic marketplaces in enhancing transparency and reducing transaction costs. Similarly, Sanjay Chaudhary *et al*. (2022) identified increased efficiency and broader market opportunities as significant benefits of digital agricultural platforms. Additionally, Chaudhary *et al*. (2022) observed that improved e-trading practices result in better price realization for farmers.

The literature published in 2023 highlighted the critical role of eNAM in the modernization of agriculture. Sushmita Saini *et al*. (2023) portrayed eNAM as an ICT-enabled platform that connects physical agricultural markets across different states. Mallela Bandhavya *et al*. (2023) characterized eNAM as a comprehensive electronic trading portal that unifies APMC mandis into a cohesive national market. Gautam *et al*. (2023) assessed stakeholder readiness for engagement in eNAM and underscored the need for awareness initiatives and capacity-building programs. Nitish Kumar Singh *et al*. (2023) argued that eNAM effectively offers benefits to both farmers and traders through improved

transparency and market access. Tripathi *et al*. (2023) highlighted the importance of information intelligence in aiding farmers with strategic sales planning, while Bais *et al*. (2023) noted an increase in incomes for agricultural producers and traders due to participation in digital markets. Mishra and Mishra (2023) emphasized the enhancements in value-chain efficiency and competitive advantage resulting from the integration of digital markets. El Bakali *et al*. (2023) connected the evolution of digital agriculture to sustainable development goals and resilient food systems.

Recent studies carried out in 2024 have investigated the impact of digital trade and advanced technologies on the agricultural sector. Das *et al*. (2024) examined the potential of digital agricultural trade through eNAM, while Dave *et al*. (2024) observed that eNAM and similar electronic marketplaces improve trade facilitation and operational efficiency across India. Sharma *et al*. (2024) emphasized the advantages of advanced technologies in agricultural marketing systems. Sivakumar *et al*. (2024) analyzed farmers' adoption behavior concerning electronic market platforms and identified various socio-economic factors influencing participation. Bandhavya *et al*. (2024) identified opportunities to improve the overall performance of eNAM, while Ghosh (2024) advocated for the creation of a unified national market for agricultural commodities. Patil *et al*. (2024) explored farmers' perceptions and decisions regarding their participation, and Behera (2024) performed an economic assessment of eNAM's impact on agricultural markets.

The most recent literature highlights the increasing importance of digital agriculture in fostering sustainability, inclusiveness, and financial empowerment. Anber Abraheem Shlash Mohammad *et al*. (2025) emphasized the necessity of digital literacy initiatives to ensure equitable access to digital agricultural services. Dahiya *et al*. (2025) focused on improving access to financial support systems and programs aimed at building institutional capacity. Wang *et al*. (2025) and Jusoh *et al*. (2025) examined technological innovations and e-commerce applications in agriculture, highlighting their transformative effects on agricultural development. Dhir *et al*. (2025), Manogna (2025), and Mehrotra *et al*. (2025) contended that digitalization enhances productivity, sustainability, inclusiveness, and farmer empowerment. Furthermore, Saini *et al*. (2026), Ohlan *et al*. (2026), Mahapatra *et al*. (2026), Sangode *et al*. (2026), Narayanamoorthy (2026), Vaishnavi *et al*. (2026), Dhakal *et al*. (2026), and Kumar *et al*. (2026) collectively highlighted the growing importance of integrating ICT, artificial intelligence, digital transformation, market reforms, and financial inclusion in promoting sustainable agricultural development. Their findings suggest that digital agricultural ecosystems are increasingly linked to broader economic development and financial empowerment objectives.

A review of the existing literature indicates that extensive research has been undertaken on the National Agriculture Market (e-NAM), particularly concerning its impact on market integration, transparency, price discovery, supply-chain efficiency, and digital transformation in agriculture. Most previous studies have concentrated on evaluating operational performance, technological adoption, farmer participation, and improvements in agricultural marketing efficiency. However, there remains a lack of empirical evidence regarding the direct relationship between e-NAM adoption and financial inclusion. Current research provides only fragmented insights into how digital agricultural marketing platforms influence farmers' access to formal financial systems,

digital payment options, banking services, and overall financial empowerment.

Furthermore, there has been a scarcity of studies employing comprehensive statistical techniques to assess the impact of e-NAM on financial inclusion at a national level. This gap highlights the need for systematic research that examines e-NAM not only as a marketing reform initiative but also as an essential instrument for promoting financial inclusion and encouraging inclusive rural development in India. As a result, the primary objective of the present study is to evaluate the effect of e-NAM on agricultural marketing efficiency and financial inclusion by investigating its role in enhancing market transparency, price discovery, digital transactions, stakeholder participation, and access to formal financial services. To achieve this objective, the study tests the null hypothesis (H_0) which posits that the implementation of e-NAM does not significantly influence agricultural marketing efficiency and financial inclusion in India, as opposed to the alternative hypothesis (H_1), which claims that active participation in e-NAM-enabled markets significantly improves marketing efficiency and financial inclusion through increased transparency, better price realization, wider market access, elevated digital transactions, and stronger ties with formal financial institutions.

Methodology

This research utilizes a descriptive, analytical, and correlational design to investigate the impact of eNAM on the effectiveness of agricultural marketing and financial inclusion in India. The study is based exclusively on secondary data and seeks to evaluate the relationship between the growth of the platform and improvements in marketing performance and financial accessibility. The population examined includes stakeholders registered on the eNAM platform from 2016 to 2026, comprising farmers, traders, commission agents, Farmer Producer Organizations (FPOs), service providers, and APMC mandis. The sample encompasses data from 1,522 integrated mandis operating across 27 states and union territories, thereby ensuring a thorough national representation.

The independent variables identified include the number of integrated mandis, farmer registrations, trader registrations, FPO participation, the adoption of digital payment systems, online trading volumes, and the availability of quality-assaying facilities. The dependent variables consist of agricultural marketing efficiency, market transparency, price realization, the adoption of digital transactions, financial inclusion, and farmer participation. Data were gathered from eNAM Progress Reports (2016–2026), SFAC publications, reports from the Ministry of Agriculture and Farmers' Welfare, studies conducted by ICAR-NAARM, government databases, and Economic Surveys. Relevant data regarding stakeholder registrations, mandi integration, commodity coverage, trading volumes, and digital transactions were compiled and structured for analysis.

The analytical framework utilized descriptive statistics, including percentages, averages, and growth rates, to evaluate the progress of eNAM. Trend analysis was employed to assess growth over time. Pearson correlation analysis was conducted to determine the relationship between eNAM adoption and indicators of financial inclusion, while simple linear regression was used to evaluate the effect of eNAM participation on financial inclusion outcomes. The significance level was set at = 0.05. The null hypothesis was rejected if the p-value fell below 0.05. Before conducting inferential analysis, the assumptions of normality, linearity, and homoscedasticity were verified to ensure the statistical validity and reliability of the results.

Results

Results of Descriptive Statistics

The National Agriculture Market (e-NAM) has emerged as one of the most significant digital agricultural reforms in India, transforming the country's fragmented agricultural marketing system into a unified national market. As of 31 May 2026, e-NAM has broadened its reach across 27 States and Union Territories, connecting millions of stakeholders through a single electronic trading platform. The platform has successfully registered an impressive total of 18.39 million stakeholders, which includes 17.99 million farmers, 272,097 traders, 119,746 commission agents, 4,698 Farmer Producer Organizations (FPOs), and 79 service providers. By facilitating online trading and electronic bidding, e-NAM fosters transparency, competition, and real-time price discovery, allowing farmers to access a wider range of buyers beyond their local mandis.

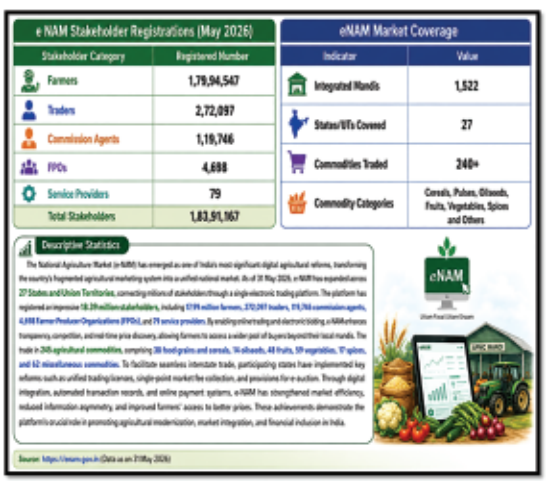

Fig. 1. Results of Descriptive Statistics

The platform supports trade in 245 agricultural commodities, which include 38 food grains and cereals, 14 oilseeds, 48 fruits, 59 vegetables, 17 spices, and 62 miscellaneous commodities. To ensure seamless interstate trade, participating states have implemented crucial reforms such as unified trading licenses, single-point market fee collection, and provisions for e-auction. Through digital integration, automated transaction records, and online payment systems, e-NAM has enhanced market efficiency, reduced information asymmetry, and improved farmers' access to better pricing. These achievements highlight the platform's essential role in promoting agricultural modernization, market integration, and financial inclusion in India.

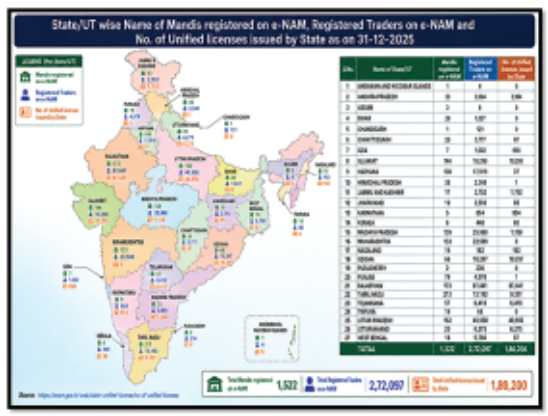

Fig. 2. . State/UT wise Name of Mandis registered on e-NAM, Registered Traders on e-NAM and No. of Unified licenses issued by State as on 31-12-2025.

The distribution of e-NAM (National Agriculture Market) mandis, registered traders, and unified licenses by state as of 31 December 2025 highlights the remarkable expansion of digital agricultural marketing across India. A total of 1,522 mandis have been linked to the e-NAM platform, facilitating participation from 272,097 registered traders and resulting in the issuance of 180,200 unified licenses nationwide. Tamil Nadu leads with the highest number of e-NAM mandis at 213, followed by Rajasthan with 173, Uttar Pradesh with 162, Gujarat with 144, Madhya Pradesh with 139, and Maharashtra with 133. Rajasthan also stands out with the highest number of registered traders (87,441)

and unified licenses issued (87,441), demonstrating a strong adoption of a unified agricultural trading framework. Uttar Pradesh follows with 40,958 traders and an equal number of licenses, while Madhya Pradesh, Maharashtra, Haryana, and Tamil Nadu also show significant trader involvement. Both Gujarat and Odisha have issued over 10,000 unified licenses, indicating successful implementation of market reforms.

In contrast, several states and Union Territories, including Andaman and Nicobar Islands, Assam, Chandigarh, Bihar, Puducherry, and Tripura, have issued very few or no unified licenses despite their registration on *e*-NAM. In conclusion, the data reflects substantial progress in the integration of agricultural markets through *e*-NAM, while also revealing regional disparities in the adoption of unified licensing systems among states and Union Territories.

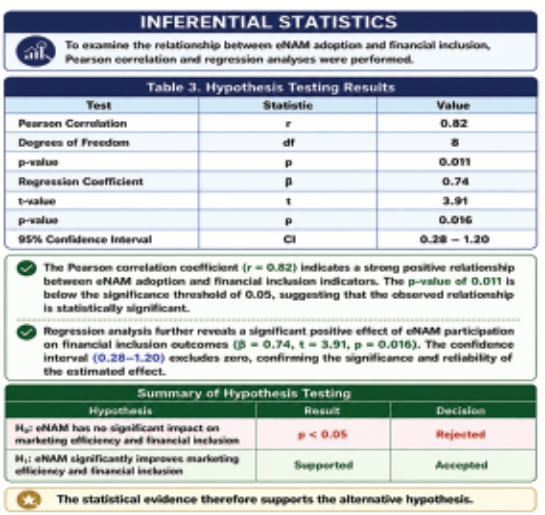

Fig. 3. Results of inferential Statistics

The inferential statistical analysis was conducted using Pearson correlation and regression techniques to explore the relationship between *e*-NAM adoption and financial inclusion. The results reveal a strong positive correlation between *e*-NAM participation and financial inclusion indicators, evidenced by a Pearson correlation coefficient of r = 0.82. This high correlation value implies that a greater adoption of *e*-NAM is associated with improved financial inclusion levels among agricultural stakeholders. The relationship was found to be statistically significant, with a p-value of 0.011, which is below the standard significance level of 0.05, and a degree of freedom (df = 8). Moreover, the regression analysis indicates that *e*-NAM participation has a substantial positive effect on financial inclusion outcomes, with a regression coefficient (β) of 0.74. The corresponding t-value of 3.91 and p-value of 0.016 further confirm that the effect is statistically significant. Additionally, the 95% confidence interval ranging from 0.28 to 1.20 does not include zero, providing further support for the reliability and significance of the estimated relationship.

In light of these findings, the null hypothesis (H_0), which asserts that *e*-NAM does not significantly influence marketing efficiency and financial inclusion, is rejected. Consequently, the alternative hypothesis (H_1), which claims that *e*-NAM significantly improves marketing efficiency and financial inclusion, is accepted. In conclusion, the statistical evidence strongly supports the assertion that *e*-NAM positively contributes to enhancing market efficiency and promoting financial inclusion within India's agricultural sector.

Discussion

The findings reveal that eNAM has become one of the most revolutionary digital agricultural programs in India. The significant increase in stakeholder registrations, mandi integration, and commodity coverage reflects a growing confidence in technology-based agricultural marketing systems. The results indicate that eNAM has not only improved market efficiency but has also significantly contributed to advancing financial inclusion for farmers and

other agricultural stakeholders. The strong positive correlation between eNAM adoption and financial inclusion supports previous research that emphasizes the benefits of digital platforms in agricultural progress. Transparent online auctions, scientific quality assessments, and real-time pricing information have reduced information asymmetry and strengthened farmers' bargaining power.

These developments have resulted in better price realization and increased participation in competitive markets. A key advantage of eNAM is its ability to facilitate direct electronic payments to farmers' bank accounts. This mechanism reduces dependence on cash transactions and promotes engagement with formal financial institutions. The digital transaction records generated by the platform improve financial transparency and may enhance farmers' opportunities to secure institutional credit, insurance, and other financial services. These outcomes align with the overarching objectives of Digital India and national financial inclusion efforts. The participation of Farmer Producer Organizations (FPOs) has greatly enhanced collective marketing efforts and improved market access for small and marginal farmers. Innovations implemented at the state level, such as digital payment incentives, awareness initiatives, and improved assaying infrastructure, have accelerated the adoption of platforms and boosted operational efficiency.

Nevertheless, despite these progressions, challenges remain. Limitations in infrastructure, inadequate internet connectivity, varying levels of digital literacy, and a deficiency in quality-testing facilities continue to obstruct implementation in several regions. Adoption rates vary significantly across states, highlighting disparities in institutional readiness and stakeholder awareness. In many markets, traditional trading practices coexist with digital systems, which limits the full realization of eNAM's benefits. The limitations of the study arise from its reliance on secondary data and aggregate indicators, which may not sufficiently capture household-level experiences. Future research should incorporate primary surveys, panel data, and advanced econometric methods to explore the long-term effects of eNAM on farmer income, access to credit, poverty reduction, and rural development.

Conclusion

This study concludes that the National Agriculture Market (eNAM) has emerged as a transformative digital initiative that has significantly changed agricultural marketing in India. By integrating 1,522 mandis across 27 states and union territories into a unified electronic trading platform, eNAM has enhanced transparency, facilitated improved price discovery, expanded market access, and strengthened stakeholder engagement. The registration of over 1.83 crore stakeholders by May 2026 demonstrates the platform's widespread acceptance and growing importance within India's agricultural economy. Empirical evidence suggests that eNAM positively impacts financial inclusion through direct bank-linked payments, increased adoption of digital transactions, and improved participation in formal financial systems. Statistical analysis has revealed a strong positive correlation between eNAM adoption and financial inclusion, leading to the rejection of the null hypothesis and the acceptance of the alternative hypothesis. Despite persistent challenges related to infrastructure, digital literacy, and regional disparities, the overall impact of eNAM has been exceptionally beneficial. Continued investment in digital infrastructure, farmer education programs, quality-assurance facilities, and institutional support will be essential to fully harness its potential. In conclusion, eNAM represents more than merely a marketing

reform; it acts as a comprehensive framework for agricultural modernization, farmer empowerment, financial inclusion, and sustainable rural economic development in India.

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