Implementation, Impact, and Challenges of eNAM in Agricultural Markets - A Systematic Literature Review (SLR)

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Abstract:

This systematic literature review aims to provide a comprehensive analysis of the Electronic National Agriculture Market (eNAM) concept, focusing on its implementation, impact on stakeholders, and the challenges encountered in agricultural markets globally. The review synthesizes relevant studies from diverse regions to offer insights into the current state of eNAM adoption. In this study there will be the assessment of the current state of eNAM implementation, evaluation of the impact of eNAM on stakeholders, identification of the challenges in the implementation of eNAM. Finally, the review offers evidence-based recommendations for policymakers and practitioners. Drawing on the synthesized knowledge, the recommendations aim to guide the enhancement of eNAM systems, addressing challenges and maximizing positive impacts on agricultural markets. This systematic literature review will contribute to the growing body of knowledge on eNAM, offering a comprehensive overview of its implementation, impact, and challenges while providing practical recommendations for stakeholders involved in agricultural market digitization.

Keywords: eNAM, National Agriculture Market, Systematic Literature Review

1. Introduction

The agricultural landscape is undergoing in profound transformation with the integration of innovative technologies. These technological advancements are gradually enhancing the market efficiency, transparency & accessibility. Agriculture markets play a crucial role in the foundation of Nation's economic landscape. These markets act as conduits or a channel for farmers which facilitate trade between different stakeholders and allow farmers to sell their produce to consumers. These marketplaces have traditionally been operated through manual, region-specific mechanisms which are often beset by inefficiencies and lack of transparency. To revolutionize these traditional agricultural marketplaces, and recognizing the need for the technology-backed, modernized interconnected marketplaces, the "e-NAM" (Electronic Agriculture Market) initiative was launched by Hon'ble Prime Minister of India, Sh. Narender Modi Ji in April 2016.

This initiative was taken with an aim of creating an unified, electronic platform which transcends geographical barriers and establishes seamless digitalized infrastructure for agricultural trade. The e-NAM envisioned as a single agriculture market which provides solutions for all the issues related to marketing of all the stakeholders – traders, farmers, consumers, retailers etc. Different services like commodity arrivals, bids, offers & prices etc with all APMC related information are available on the single window provided by the e-NAM portal (Sekhara et al., 2020). The concept of e-NAM was originated from a pilot project which was conducted on e-trading in Karnataka state (Pavithra et al., 2018). This concept was introduced as a viable solution for extremely inefficient and fragmented supply chain in agriculture sector. This basically works on the B2B (business to business) model of e-Commerce where the associated stakeholders get maximum options regarding selling and buying in a streamlined way.

1.1 E-NAM:

e-NAM is a Pan-India electronic trade system which is created by connecting the current APMC mandis with a single national market for agricultural commodities. Under the direction of the Indian government's Ministry of Agriculture and Farmers' Welfare, the Small Farmers Agribusiness Consortium (SFAC) is the main organisation responsible for implementing eNAM. It is created with a vision to promote consistency in the agriculture produce marketing by streamlining the processes and procedures across all the integrated markets and removing asymmetry of information among buyers and sellers as well as promote real-time price discovery as per the actual demand and supply in the market. e-NAM is working on the mission to integrate all the APMCs within the country through a single common electronic market platform to benefit and facilitate Pan-India trade of agricultural produced (*e-NAM Portal 2024)*.

Stakeholders registered on e-NAM as of 31st January 2024

State	27
Traders	2,53,725
Commission Agents (CAs)	1,11,488
Service Provider	79
FPOs	3,510
Farmer	1,77,05,211
Total	**1,80,74,013**

Source: e-NAM Portal (Accessed by https://enam.gov.in/)

There are approx. 1,80,74,013 stakeholders including Traders, Commission Agents, Service Providers, Farmers and FPOs which are registered on the e-NAM portal.

The detail of the number of commodities enlisted on the eNAM Portal are given in the following table:

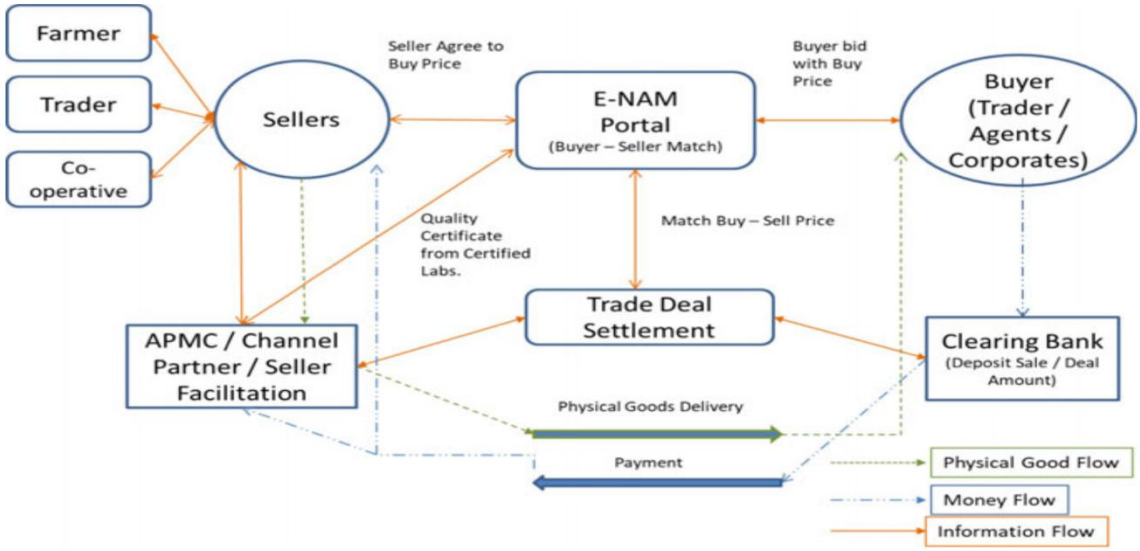
Commodities Traded on e-NAM Portal

Commodity Category	No. of Commodities
Food Grains/ Cereals	35
Oilseeds	14
Fruits	45
Vegetables	59
Spices	16
Misc.	50

Source: e-NAM Portal (Accessed by https://enam.gov.in/)

A vast array of 219 commodities are traded nationwide using the e-NAM network, enabling quick and clear market transactions.

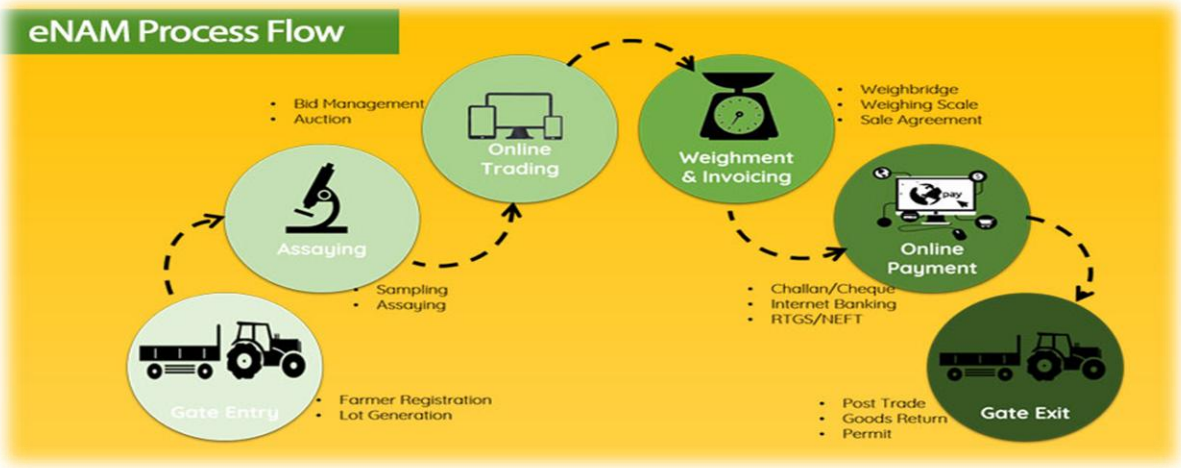
Figure 1: e-NAM Work flow Process



Source: S. Chaudhary and P. K. Suri (2020)

According to past research, the concept of e-NAM can revolutionize the Indian agricultural value chain if this is implemented in a right manner (Chand, 2016).

Figure 2: e-NAM Process Flow



Source: e-NAM Portal (Accessed by https://enam.gov.in/)

1.1.1 Benefits of e-NAM (As per eNAM Portal Accessed through https://enam.gov.in/):

- For APMCs:

1. APMCs can leverage e-NAM for cost-free software facilitating system integration and transaction automation.
2. It offers comprehensive trade information, ensuring transparency.
3. Real-time recording of arrivals is facilitated.

4. Analysis of price trends, arrivals, and trading activities is enabled.
5. Financial information is automatically recorded, reducing the need for manual intervention.
6. There is a decrease in the demand for manpower due to these automated processes.

- For Farmers:

1. Improved price discovery fosters transparency in trade for sellers and farmers.
2. Enhanced access to multiple markets and buyers is facilitated.
3. Real-time updates on prices and arrivals in nearby mandis are provided.
4. Prompt payments contribute to establishing a robust financial profile.

- For Traders:

1. Increased accessibility to additional mandis expands the pool of available sellers.
2. Availability of a broader and interconnected market landscape.
3. Real-time updates on commodity arrivals, quality, and pricing.
4. Simplified business operations through mobile applications.
5. Access to online banking services and streamlined payment processes.

1.2 Rationale

Rapid or quick evolution of the concept of e-NAM and its possible impacts on the economies related to agriculture, it becomes necessary to investigate the existing literature. As the world is embarking on the journey of digital transformations, it becomes important to understand the different aspects like its implementation, challenges and impacts on stakeholders. By synthesizing the body of knowledge acquired through academic research, this systematic literature review seeks to provide valuable well-structured insights for researchers, policymakers and practitioners engaged in the development of infrastructure for digitalized agriculture.

In pursuit of this, we have conducted a comprehensive examination of the pertinent literature concerning e-NAM, guided by the following research questions:

RQ 1: What is the current state of implementation of eNAM in different regions and countries?

RQ 2: What are the documented impacts of eNAM on farmers, traders, and other stakeholders in agricultural markets?

RQ 3: What challenges have been identified in the implementation and adoption of eNAM, and how have they been addressed?

We have emphasized on articles which are addressing the concept of e-NAM published in English-language, peer-reviewed journals from the time 2016 – 2024.

The next section is discussing methodological details.

2. Methodology

The current study uses the methodology of systematic review of literature also termed as Systematic Literature Review (SLR). Although originally designed for reviewing and synthesizing studies within the healthcare domain, this methodology (SLR) is increasingly prevalent in the business and management domain as well because many of the research papers are getting published in the business and management domain (mentioning few studies like, (Kaushal et al., 2021), (Pahlevan-Sharif et al., 2019)). This systematic review adhered to the reporting guidelines outlined in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses checklist (PRISMA; Liberati et al. 2009). In the coming sections, the collection of data, criteria for study selection, extraction methods, inclusion, exclusion criteria etc. are discussed in detail.

2.1 Data Collection

The included studies in this review were collected or identified with the help of databases like Scopus and Web of Science. Since, there were not many studies available on these databases due to unknown reasons, Google Scholar was also used as a database to collect the data by using different combination of keywords like, e-NAM, eNAM, Electronic National Agriculture Market, NAM, National Agriculture Market, NAM, e-NAM implementation, Impact of e-NAM, Challenges in implementation of eNAM etc. Databases and different search options are discussed in the Table 1, whereas the results obtain from the keyword combinations are discussed in the Table 2.

2.2 Selection of Study

Different steps were followed to include and exclude the studies for the current review. Duplicate studies within the database or across the database were discarded. The studies which were written in English language were included only. The titles and abstracts of the retrieved studies were studied and analysed considering their relevance as per the research questions or objectives.

Table 1: Databases and different search options

Sr. No.	Database	Search Options
1	Scopus	- Search in: Abstracts, Full-Text Articles
		- Document Type: Research Articles
		- Source Type: Journals
		- Time Frame: 2016 - 2024
		- Language: English

2	Web of Science (WoS)	- Search in: Abstracts, Full-Text Articles
		- Document Type: Research Articles
		- Source Type: Journals
		- Time Frame: 2016 - 2024
		- Language: English
3.	Google Scholar	- Search in: Abstracts, Full-Text Articles
		- Document Type: Research Articles, Survey Reports, Reports
		- Source Type: Journals, Official Web Portals
		- Time Frame: 2016 - 2024
		- Language: English

Source: Author's findings

Given that only few research articles were found through keyword searches on Web of Science, and on Scopus database, we resorted to use Google Scholar for access to a broader range of literature. The rationale behind this decision stems from the need to ensure comprehensive coverage of relevant research in our study. Further details on the keyword search results from Google Scholar are provided in Table 2.

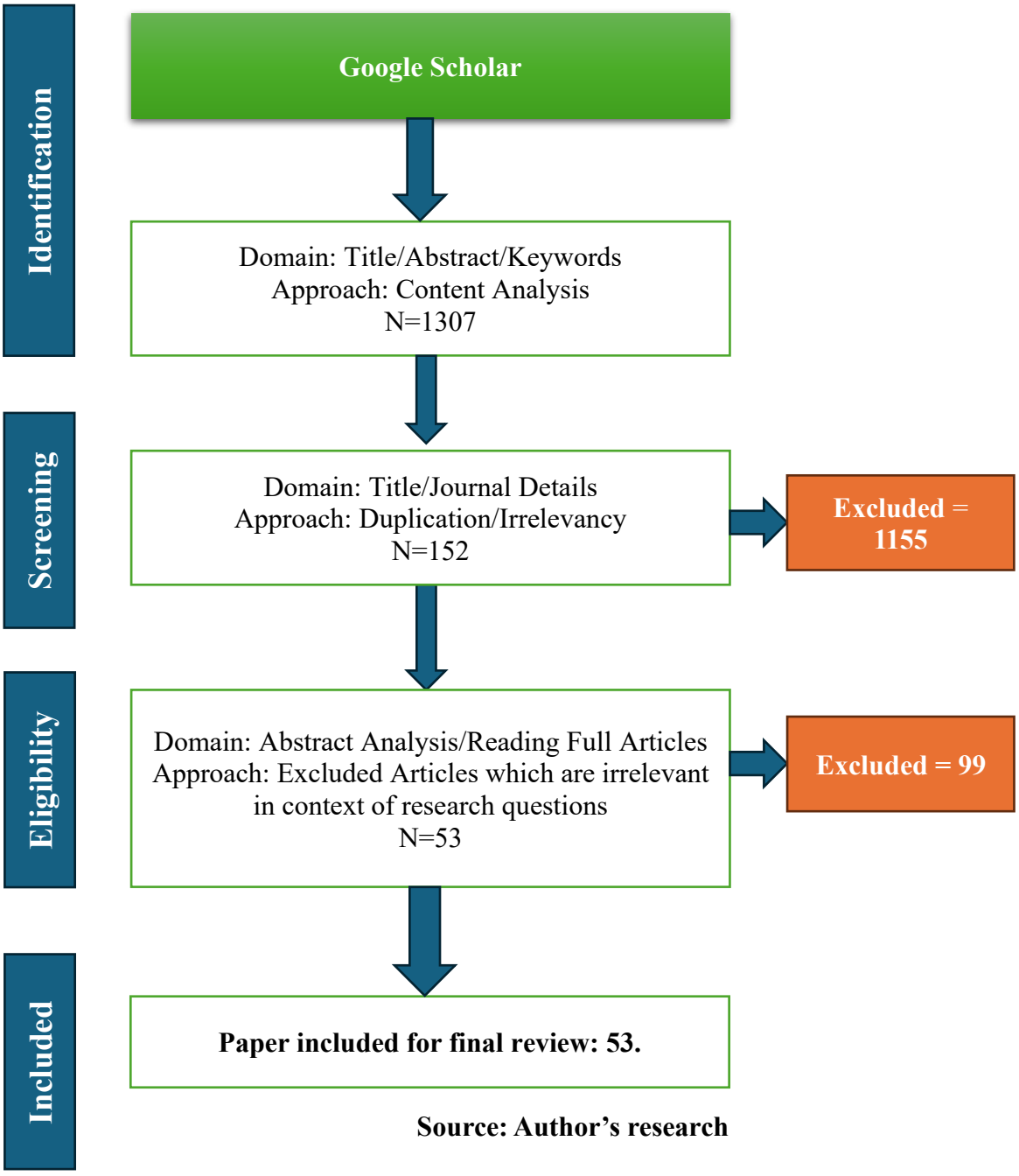
Table 2: Keyword Combinations on different databases

Keyword Combinations	Google Scholar Results
"e-NAM Implementation"	34 Articles
"Impact of e-NAM"	47 Articles
"Electronic National Agriculture Market"	294 Articles
"e-NAM Challenges"	2 Articles
"National Agriculture Market"	911 Articles
"Role of e-NAM"	19 Articles

Source: Author's findings

A total of 1307 articles were retrieved from Google Scholar as a sample with the combination of different keywords with respect to the research questions and objectives of the study. After retrieving the studies, full texts were arranged and analysed thoroughly and the irrelevant articles were discarded. Only those articles were selected for further review which have discussed the selected factors like, Implementation of e-NAM, Impacts of e-NAM, and the challenges associated with the implementation of e-NAM. For reporting these results like inclusion, exclusion or selection of studies are done with the help of PRISMA statement which is discussed in the chart or Figure 3.

Figure 3: Process of Study Selection (PRISMA Framework)



Source: Author's research

2.3 Data Extraction

Data extraction from the full text was conducted for every study incorporated in the systematic review. This process involved retrieving information such as author(s), publication title, year of publication, study title, research question(s) addressed, and principal findings pertaining to the research question(s) of each study. These extracted data served as the foundation for subsequent analysis.

3. Result Analysis

3.1 Characteristics of included research articles

1. Research Articles on the implementation of eNAM:
   - Articles which have discussed the design, development, and rollout of eNAM systems in different regions or countries.
   - Articles which have provided detailed descriptions of eNAM features, functionalities, and technical specifications.
   - Articles which have analysed the adoption process, stakeholder involvement, and institutional arrangements associated with the implementation of eNAM.
2. Research Articles on the evaluation of impact of eNAM on Stakeholders:
   - The articles which assessed the impact of eNAM on various stakeholders involved in agricultural markets, such as farmers, traders, and consumers.
   - The studies which have quantified changes in market efficiency, price transparency, transaction costs, and farmer income resulting from eNAM adoption.
3. Research Articles which have identified the challenges and benefits:
   - Research Articles which have identified and analysed benefits and challenges encountered during the implementation and operation of eNAM.
   - Considered the studies that offered insights into overcoming challenges or propose strategies for addressing them.

3.2 Details of the study included for further study are mentioned in the table given below:

Sr. No.	Author	Title	Major Findings
1	(Swain et al., 2022)	Impact of development of National Agriculture Market (e-NAM) on farmers	• Small farmers possess limited price negotiation power, resulting in significant losses to middlemen and traders.

			• e-NAM could mitigate information imbalances between farmers and traders. • Implementation of e-NAM has the potential to decrease reliance on commission agents.
2	(R. Kumar et al., 2020)	Strengthening E-NAM in India: way forward	• Majority of smallholder farmers utilize e-NAM mandi for selling produce. • Within mandi, smallholder farmers achieve higher average selling prices for some commodities. • Study emphasizes revisiting implementation process and adding features to benefit smallholder farmers.
3	(Samantaray & Kanungo, 2022)	A Study on Growth of Electronic-National Agriculture Market In Odisha	• Landholdings and education do not affect farmers' income in e-NAM. • Any farmer, regardless of land or education, can increase income using e-NAM.
4	(Joharapurkar et al., 2023)	Assessing the impact of eNAM in Vidarbha region	• eNAM remains relatively unpopular among Vidarbhian farmers, as per the study. • The study also indicates a positive impact on soybean modal prices through traditional physical trading methods.
5	(Wadhwa & Nandal, 2023)	Assessing the Socioeconomic Impact of Minimum Support Price and e-NAM on Smallholder Farmers in Haryana	• MSP positively impacts farmers' income, as concluded by the study. • e-NAM has enhanced market access and contributed to crop diversification, according to the research.

6	(Meena et al., 2019)	Electronic-National Agricultural Market (e-NAM): Initiative towards Doubling the Farmers' Income in India	• The most important challenge in front of Indian Government is to convert non e-NAM mandies into e-NAM mandies. • Both the positive as well as negative impact of e-NAM on prices received by farmers and market arrivals was observed in different parts of India.
7	(Jatana & Goswami, 2021)	An analytical study on the functioning of eNAM (with special reference to Rajasthan)	The study concluded that: • Comprehensive, innovative markets like eNAM are vital for employment, government support, and food security. • States must proactively amend laws to integrate farmers into eNAM. • Key challenge: raising awareness among small farmers. Solutions: sensitization campaigns, e-literacy. • eNAM strengths: transparency, real-time price info, stakeholder empowerment. Weaknesses: tech knowledge gaps, lack of training programs.
8	(Barman et al., 2023)	Assessment of Awareness Level of e-NAM among the Jute Farmers of Cooch Behar District in West Bengal	• The farmers were unaware of the basic facilities and technologies available under e-NAM. According to this study the significant factors affecting awareness are: • access to market information, education level, distance to the nearest mandi and participation at training/awareness camps.

9	(Ashalatha et al., 2022)	Assessment Of E-Nam (Electronic-National Agriculture Market) On Jaggery Producers In Visakhapatnam District, Andhra Pradesh.	Primary challenges for jaggery farmers to sell their produce through e-NAM include: • Socioeconomic conditions of farmers • Unsystematic state of affairs of the producer (manufacturer) • Nature of the produce • Demands for infrastructure conveniences, and marketing problems.
10	(Prajapati et al., 2023)	e-NAM: An Overview of Economic and Trade in South India	• The registration of agricultural producers (FPOs) and the issuance of unified licenses have improved significantly. • This study also reveals that the link between the market and the registration of traders also increased considerably. However, the increase in the number of farmers is very low.
11	(Gupta et al., 2018)	E-national Agricultural Market (e-NAM) in India: A Review	It is concluded from the study that: • Responsive, inclusive, and technology-enabled markets are crucial for livelihoods, welfare, and food security, especially for impoverished households. • Urgent steps should be taken to promote the adoption of e-NAM to realize these benefits.
12	(Singh & Alagwadi, 2021)	Electronic-National Agriculture Market (e-NAM): A Paradigm Shift in Agricultural Marketing	It is suggested in the study that: • Government support towards the well-being of farmers needs to be applauded and precursor to future reforms in the agriculture marketing system.

13	(Srivastava et al., 2020)	Impact Of E-Nam On Farmer's Income In India	This study found that: • eNAM has the potential to increase the marketing efficiency. • The role of middlemen has been reduced significantly by selling produce through e-tendering system. • The income of marginal farmers increased by 5.73 per cent, small farmers by 8.83 per cent and large farmer by 10.72 per cent in the study area.
14	A DIRECTOR, E HAQUE, H YADAV, N DIRECTOR	Linking Farmers To Electronic Markets (E-Nam): Current Scenario and A Way Forward	This study concluded that: • Technology can contribute to create the system by synchronising value chain activities into layer-wise process. • Study also revealed that E-NAM is perceived as a marketing system that will facilitate the post-production supply chain of farm produce.
15	(Panday et al., 2020)	National Agriculture Market (e-NAM): Special Reference to Uttar Pradesh	Study found various challenges like: • Lack of awareness of the e-NAM scheme. • A lot of the generation and Complex registration process. • lack of trust between traders and buyers. • Inadequate infrastructure, i.e. equipment, manpower, and space for quality check and High quantity arrivals. • India's IT infrastructure is underdeveloped, and e-auction takes much longer than the conventional process.

			• Lack of trust in online e-payment technology and farmers require cash payment to meet immediate expenses. • Farmers lack key information during the auctioning process.
16	(M. Kumar et al., 2023)	Problems and intricacies in operating through e-NAM: The perception of farmers of Haryana	• Farmers face problems while trading through e-NAM • The study showed that Age of farmers has no significant impact on problem faced by farmers while selling on e-NAM. So, we can say that age of farmers does not affect the opinion of young and old on the problems faced by them during trade through e-NAM. The study also revealed that: • Education level of farmers was significantly associated with opinions on problem faced by farmers while trade through e-NAM which shows that as education level of farmers increases, problems faced by farmers during trade through e-NAM decreases.
17	(Bandhavya, 2022)	Procedural impediments in e-NAM system faced by stakeholders in Guntur Mandi of Andhra Pradesh	The study concluded that: • The bottom-up approach should be followed before framing policies because, theoretically, e-NAM looks excellent but at the ground level, there are many constraints. • It is also revealed from the study that the Individual produce, common marketing policy should be followed by farmers, the authenticated body should replace the role of

			commission agents, sale process should be made simple and quick.
18	(Subash et al., 2018)	Role of e-NAM in Realizing Remunerative price to farmers	• Indian markets are not integrated for most agricultural markets except for few crops like cereals. • According to this study E- NAM portal can only generate offers for commodity and bids; However, it needs system in place for weighing, grading, transport, assuring the quality standards (more so in case of perishables).
19	(Mishra & Rathore, 2020)	Analysis of Impact of eNAM on the stakeholders of Tikamgarh Region, Madhya Pradesh	• decreasing trend in the case of beginners, brokers, transporters, pressers and crushers due to higher marketing margins absorbed by the existing functionaries. • The processing and display auction facilities, weighing, grading, packing, drinking water facility for bullocks, rest rooms for farmers and waiting hall facilities were fully adequate in the selected market.
20	(L. Wadhwa, 2018)	eNAM: A Step Towards Doubling Farmers' Income By 2022	It is concluded from the study that: • e-NAM has the capability to revolutionize India's farm produce market. • For the local traders, eNAM offers the opportunity to access a larger national market for secondary trading.
21	(Reddy et al., 2023)	e-Nam market participation intensity of chilli (Dry) farmers in Guntur district of Andhra Pradesh	Study suggested that: • Specific slot may be given to the farmers through the app, who intends to sell their commodities.

			• The e-NAM should be fully integrated with Artificial Intelligence and the Internet of Things (IoT) to provide real-time information.
22	(Sonawane et al., 2020)	e-NAM: Awareness and Constraints faced by the Farmers in Marketing of Farm Produce	It is concluded from the study that : • Farmers need to bring good quality products which will reduce the chance of rejection even after successful bidding. • Display should be in local language so the farmers properly understand them. • Bank branches should be open on the premises of APMCs which in turn will help the farmers to get instant payments.
23	(R. Kumar et al., 2023)	Attitude of Registered Farmers and Traders Toward e-NAM	• E-Nam increases competition among farmers. • Transaction costs are drastically reduced or even eliminated.
24	(Chaudhary & Suri, 2020)	Examining Adoption of eNAM Platform for Transforming Agricultural Marketing in India	The study concluded that: • Emphasizing key factors like "Performance Expectancy," "Social Influence," and "Trust" is crucial. • Focusing on these variables can enhance the intention to adopt e-NAM and the actual adoption of e-NAM.
25	(A. A. Reddy & Mehjabeen, 2019)	Electronic national agricultural markets, impacts, problems and way forward	• There has been an increase in prices received by the farmers More markets have linked to eNAM due to the introduction of e-auction.
26	(M. Kumar et al., 2023)	Status of Marketing Infrastructure under e-NAM: The Perception of Farmers of Haryana	The study concluded that: • The improvement in the infrastructure facilities provided by both Government

			and intermediaries motivates more farmers to participate in eNAM. • Majority of farmers were satisfied with the infrastructure facilities provided by intermediaries like: Grading/Assaying, Lifting, Market-related Information, and Credit facility. • Some were unsatisfied with infrastructure facilities like Transportation and Storage.
27	(Bhattacharya & Chowdhury, 2024)	How effective is e-NAM in integrating food commodity prices in India? Evidence from Onion Market	The Study concluded that: • introduction of e-Nam has improved market integration for onion prices in India. • e-NAM promotes integrity in onion marketing by streamlining of procedures across the integrated markets, removing information asymmetry between buyers and sellers and promoting real time price discovery based on actual demand and supply.
28	Nedumaran, G et al., (2019)	Trends and Impacts of E- Nam in India	The study concluded that: • Challenges of e-NAM include state fragmentation, multiple mandi fees, and licensing requirements, leading to market monopoly and poor infrastructure. • Farmers can overcome challenges by aggregating produce independently or through cooperatives. • States must ensure reforms like electronic auctions, single-state licenses,

			and single-point market fee levy. • Assistance under the scheme is contingent on states fulfilling these prerequisites. • The National Agriculture Market (NAM) e-platform can revolutionize farm produce movement, but states must amend APMC Acts and provide logistic support.
29	(G. Mishra & Bhatt, 2019)	Evaluation of e-NAM Adoption: A Case of Jetalpur Mandi, Gujarat	The study concludes that for e-NAM's successful adoption, the following aspects are important: • Observability • Relative advantage • Compatibility • Trialability • Complexity These aspects should be considered in the design of existing and future e-NAM centres.
30	(Punia & Kumar Bishnoi, 2022)	Exploring Challenges In The Adoption And Implementation Of The E-NAM Platform In Indian Agricultural Marketing	The study highlights challenges in e-NAM adoption: • Farmers lack digital skills and awareness of e-NAM's benefits. • Infrastructure issues hinder e-NAM operation. • Trust needs to be built through transparency and accountability. • Institutional support requires streamlining.

			• The study provides a framework for future research. • Policy insights emphasize collaborative efforts to harness e-NAM's potential.
31	(Bandhavya et al., 2023)	Perception of Five Diverse Stakeholders of National Agriculture Market (e-NAM) of Asia's Largest Chilli Centric Guntur Mandi in Andhra Pradesh	The study concluded that: • Stakeholders perceive e-NAM as average in ease of use, infrastructure, and quality parameters. • Farmers generally receive prompt payments and view e-NAM positively. • Traders find e-NAM unsatisfactory due to delayed payments. • Commission agents report timely payments but express dissatisfaction. • Officials are generally satisfied but perceive malpractices. • FPOs see e-NAM as satisfactory, empowering small farmers. • Traders' dissatisfaction indicates a need for improved payment timeliness and quality testing. • Enhancements could boost e-NAM's performance in Guntur mandi.
32	(Saini et al., 2023)	Analysis of factors promoting the usage of electronic National Agriculture Market in Rajasthan, India.	The Study highlights the: • the importance of farmers' digital literacy and suggests initiatives such as training programs and

			awareness campaigns to promote it. • Additionally, the study proposes improving the digital platform's usability and information content to enhance interactivity, speed, efficiency, and global connectivity through tailored navigation options. • The study discovered that prominent features of e-NAM comprised virtual highlights, capacity-building amenities, e-bidding design features, value-addition modules, and e-logistics features. E-NAM has effectively shortened the supply chain by connecting physical markets of multiple states onto a virtual platform using ICT.
33	(Bandhavya et al., 2022)	Performance of e-NAM and its determinants in the largest market of Andhra Pradesh	• Majority of farmers, traders, and agents were middle-aged with small families. • Farmers had larger families and higher illiteracy rates. • Awareness programs needed for farmers on e-NAM. • Farmers primarily focused on crop cultivation. • Farmers had high extension contact but low media exposure. • Farmers and e-NAM officials had low incomes; traders and agents earned more. • Commission agents earned the most. • Consider replacing commission agents.
34	(Venkatesh et al., 2021)	The changing structure of agricultural marketing in	• Finds no significant price advantage for most

		India: a state-level analysis of e-NAM	commodities after e-NAM implementation. Highlights the need to strengthen quality assaying and issue unified licenses for inter-market trading and better price discovery.
35	(Nookathoti & Behera, 2022)	A study on functional efficiency of electronic national agriculture market in selected Mandis of Odisha.	Findings of the study show that: • e-NAM is still at a nascent stage in the state. • The government needs to focus on infrastructural development • providing training to farmers • research and development activities for better functioning and benefits of e-NAM.
36	(Pawar & Walke, 2023)	Analysis of the implementation and functioning of the eNAM portal in Maharashtra for strengthening the agricultural marketing sector	Study concluded that: • eNAM is crucial for strengthening agricultural markets and increasing farmer income. Challenges: • integrating all mandis, setting up labs, logistics, and boosting farmer participation. • Full nationwide operation and improved payment systems are needed for maximum farmer benefit.
37	(Saini et al., 2023)	Awareness mapping of National Agriculture market (e-NAM) provisions in Rajasthan	Study concluded that: • Digital-savvy professionals promote e-NAM adoption for marketing. • e-NAM reduces logistics costs, fosters interstate trade. • ICT applications enhance stakeholder collaboration, support sustainable food supply.

			• "One Nation One Market" initiative promotes price transparency, discourages cartels. • Effective value chain strategies and government support are crucial.
38	(Mehta et al., 2019)	Farmers' perception towards Electronic-National Agriculture Market (e-NAM) systems adopted by APMC market, Solan, Himachal Pradesh	Study concluded that: • Farmers preferred regulated markets but lacked awareness about e-NAM. • APMC authorities should disseminate e-NAM information widely. • Farmers believed e-NAM could improve access to government financial services. • Satisfaction with technical aspects of e-NAM but concerns over inadequate information. • Farmers suggested improving payment processes and trade transparency for e-NAM implementation at APMC.
39	(Bisen & Kumar, 2018)	Agricultural marketing reforms and e-national agricultural market (e-NAM) in India: a review	• Fragmented agricultural markets need unified platforms like NAM. • Despite initial challenges, e-NAM offers expansion potential. • Integrated platform ensures fair prices for producers and quality for consumers. • Back-end infrastructure must be strengthened for e-NAM growth. • Focus should be on developing warehouses, cold storage, and training.

			• High-speed internet vital for market efficiency. • Full e-NAM implementation will realize its envisioned benefits.
40	(Raju et al., 2022)	Knowledge of Farmers on Functioning of e-NAM	• Some e-NAM registered farmers sought guidance from e-NAM guidelines. • Overall, e-NAM registered farmers lacked comprehensive understanding due to limited access and comprehension of guidelines. • e-NAM is a significant initiative for ensuring fair prices and transparent price discovery. • Success of e-NAM depends on farmers' knowledge and utilization. • Scientific sensitization and training programs needed to enhance understanding and promote e-NAM adoption.
41	(Kiran et al., 2023)	Empowering Farmers of Himachal Pradesh through E-NAM	• States changing APMC acts, traders still not competitive. • Need rural computer centers, high-speed internet. • Difficulty in online quality assessment. • Inter-state trade works for cereals, not perishables. • Storage infrastructure a challenge. • eNAM ensures timely, full payments to farmers. Investment needed in infrastructure, mandi upgrades.
42	(Samantaray et al., 2023)	Impact of E-Nam on Organic Agriculture Farmers'	The study concluded that:

		Economic Growth: a Smart-pls Approach	• Positive change in the economic growth of organic farmers.
43	(Mini & Kaur, 2020)	Adoption performance of electronic national agricultural markets (e-NAM) in Punjab	The study concluded that: • For various crops, there was a difference in the prices received by adopters and non-adopters.
44	(Gautam et al., 2023)	Ascertain the Farmers and Traders' Willingness to Participate in E-National Agriculture Market (eNAM): Binary Logistic Regression Analysis	• Education, age, and distance from the mandi significantly affect farmers' e-NAM participation. • Selling to mandi arhatiyas increases farmers' likelihood to participate. • Traders' participation is influenced by social category, age, education, lending practices, and market involvement. • Traders are concerned about revenue visibility but overall show willingness to participate in e-NAM. •
45	(Gautam et al., 2022)	Factors Constraining Farmer's Adoption of the E-National Agriculture Market (eNAM) in Sultanpur District of Uttar Pradesh	The study concluded that: Farmers face several constraints in adopting e-NAM: • including the need for immediate cash payments • a preference for physical presence in selling • concerns about receiving payments and online transactions • dissatisfaction with bidding processes and unsold lots. Traders encounter challenges such as: • high transportation costs,

			• managing unsold produce • difficulties in settling complaints concerns about large traders dominating the market.
46	(Singh et al., 2021)	Impact of E-Nam (Electronic-National Agriculture Market) in Doubling Farmers Income	The study concludes that: • e-NAM is aiding farmers in obtaining better prices, aligning with the Government of India's "One Nation One Market" initiative aimed at enhancing farmer income and attracting rural youth to agriculture. • The paper highlights e-NAM as a key marketing strategy for doubling farmers' income.
47	(Hiremath et al., 2022)	Participation of different stakeholders in electronic national agriculture market: an assessment.	The study concluded that: • High interstate variation in stakeholder registration may stem from mandi involvement disparities, lack of awareness, and stakeholder willingness. • Reduction of this variation is necessary for a transparent and hassle-free trade environment for farmers. • The e-NAM portal offers trade, price, and agricultural logistics information, which extension functionaries should utilize to educate stakeholders, especially farmers, about e-NAM's benefits.
48	(S. R. Singh et al., 2020)	Performance Evaluation of e-National Agriculture Market	• e-NAM offers a unified online platform for free agricultural trade, benefiting from streamlined processes and transparency.

			• It provides farmers access to a nationwide market with fair prices and online payments. • Warehouse and FPO-based trading modules enable farmers to sell anywhere, reducing distress sales. With the new ordinances and schemes like the Agriculture Infrastructure Fund, e-NAM's popularity can grow.
49	(Raju, 2022)	Farmers' perceived effectiveness of e-NAM.	• Majority of respondents perceive medium to low effectiveness of e-NAM. • Interventions include specific auction times for commodities and simultaneous e-bidding nationwide. • Compulsory quality assaying and development of efficient third-party assaying units are recommended. • Organizational support such as low-cost logistics, transport, storage, infrastructure, and training on e-NAM usage is essential. • These measures aim to increase trader participation, competition, reduce cartelization, and improve e-NAM effectiveness.
50	(Prabhakar, 2018)	Status of marketing infrastructure under electronic national agriculture markets: a quick study.	Reformed APMCs and UMP/NAM offer benefits like: • increased computer literacy among farmers • improved bargaining power, and transparent transactions. • Basic market infrastructure improvement is

			needed for better farmer participation and market integration. • Rural periodical markets and PACS-owned warehouses can enhance farmer access to markets
51	(Nair, 2023)	A study on the evolution & functioning of E-NAM with special reference to J&K	• Rapid integration of mandis with e-NAM shows growing awareness of electronic trading benefits. • e-NAM PoP enhances digital market access for farming stakeholders. • Farmers benefit from quality analysis, trading, payments, and logistics services. • Online trading reduces transport to mandis by enabling direct transactions. • J&K UT has made significant e-NAM progress. • Agricultural reforms and infrastructure development will boost growth.
52	(Goyal & Kaur, 2021)	Status and Performance Appraisal of Electronic National Agricultural Markets (e-NAM) in Punjab	The study concluded that: • To boost e-markets, farmers should shift from private traders, supported by awareness campaigns. • Recommendations include separate entry gates for e-NAM farmers, widespread awareness campaigns, reliable low-cost internet, and access to digital devices. Disseminating e-market information could set benchmark prices for non-e-markets.

53	(Kalamkar et al., 2019)	Status of Implementation of Electronic National Agriculture Market (eNAM) in selected APMCs of Gujarat	• Farmers lack knowledge and are hesitant to share bank and Aadhaar details, fearing tax issues. • Perception that eNAM auctions take longer and complicate same-day payments. • APMCs concerned about peak season auctions and commission agents resist online payments. • Farmers rely on local agents for advances, fearing eNAM will disrupt these relationships. • Farmers prefer selling as needed for cash flow, fearing eNAM will hinder this. • Small farmers unsure how eNAM handles small sales and protects their bargaining power. • eNAM needs more labs and skilled personnel for commodity conversion. • Insufficient infrastructure for eNAM, like sorting/grading facilities and reliable internet. • Need for e-auction halls with computers and fast internet; rural areas lack digital infrastructure.

4. Summary & Conclusion

The Electronic National Agriculture Market (e-NAM) in India has emerged as a transformative platform aimed at integrating agricultural markets, enhancing price transparency, and improving market access for farmers. Through an analysis of various studies, several key insights have been gleaned, highlighting both the potential benefits and existing challenges of e-NAM implementation.

On the positive side, e-NAM has demonstrated a positive impact on the economic growth of organic farmers, with increased income and improved market access being reported. Price differences between adopters and non-adopters of e-NAM suggest its influence on market outcomes, emphasizing its role in facilitating fairer prices and market integration. Factors such as education, age, and distance from the mandi significantly affect farmers' and traders' willingness to participate in e-NAM, underscoring the importance of socio-economic factors in adoption decisions. However, constraints on adoption persist, including the need for immediate cash payments, reliance on physical selling presence, and concerns about online transactions, particularly among farmers. Traders face challenges such as high transportation costs and concerns about market dominance by large traders, which hinder their full participation in e-NAM. Perceived effectiveness of e-NAM varies among stakeholders, with interventions suggested to enhance trader participation, competition, and overall effectiveness through measures such as specific auction times and compulsory quality assaying. Infrastructure improvements, including reliable internet access and digital devices, are deemed essential for the success of e-NAM. Additionally, awareness campaigns and education programs are recommended to promote e-NAM adoption and usage among farmers and traders.

Despite its potential, e-NAM faces policy and implementation challenges, including tax concerns, payment delays, and lack of digital infrastructure, necessitating policy reforms and infrastructure development to facilitate smoother e-NAM operations. Addressing these challenges is crucial for realizing the full potential of e-NAM and fostering inclusive growth in agricultural markets across India.

In conclusion, while e-NAM has demonstrated significant promise in transforming agricultural markets, concerted efforts are needed to overcome existing challenges and leverage its full potential for the benefit of farmers, traders, and the agricultural economy as a whole.

5. Future Research Scope

Future research on e-NAM could encompass a range of studies to deepen understanding and optimize its impact. Firstly, studies should investigate the specific effects of e-NAM on different types of crops, discerning benefits and challenges for perishable versus non-perishable produce. Additionally, research should delve into socio-economic factors influencing e-NAM adoption, examining the role of education, age, and market proximity in farmers' decisions. Payment systems within e-NAM necessitate scrutiny, with studies aimed at addressing challenges and devising financial solutions for seamless transactions. Market dynamics, including trader participation and interventions like optimized auction timings, merit research to foster fairer and more efficient trading environments. Similarly, policy analysis is crucial for identifying and rectifying regulatory

hurdles, thereby facilitating smoother e-NAM operations. Moreover, evaluating the effectiveness of awareness campaigns and educational programs is essential for maximizing e-NAM adoption among farmers and traders.

Environmental impacts of e-NAM, particularly its influence on sustainable farming practices and organic agriculture, require thorough investigation. Gender disparities in e-NAM adoption should be examined to identify barriers faced by female farmers and develop inclusive strategies. Furthermore, studies should explore the role of digital literacy in e-NAM usage, devising educational tools to enhance farmers' technological proficiency. Long-term assessments of e-NAM's economic effects on rural communities, including poverty alleviation and income distribution, are paramount. Lastly, soliciting and analysing stakeholder feedback is essential for refining e-NAM and ensuring its effectiveness in transforming India's agricultural markets.

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Reference:

Ashalatha, D., Rao, As., & Yamuna, M. (2022). ASSESSMENT OF E-NAM (ELECTRONIC-NATIONAL AGRICULTURE MARKET) ON JAGGERY PRODUCERS IN VISAKHAPATNAM DISTRICT, ANDHRA PRADESH. In *Peer Reviewed and Refereed Journal* (Issue 7). http://ijmer.in.doi./2022/11.07.94

Bandhavya, M. (2022). Procedural Impediments in e-NAM System Faced by Stakeholders in Guntur Mandi of Andhra Pradesh. *Indian Research Journal of Extension Education*, *22*(4), 106–111. https://doi.org/10.54986/irjee/2022/oct_dec/106-111

Bandhavya, M., Singh, A. K., Lal, S. P., & Shukla, G. (2022a). Performance of e-nam and its determinants in the largest market of Andhra Pradesh. *Indian Journal of Extension Education*, *58*(1), 1–7. https://doi.org/10.5958/2454-552x.2022.00010.x

Barman, D., Katoch, S., & Anoop, M. (2023). Assessment of Awareness Level of e-NAM among the Jute Farmers of Cooch Behar District in West Bengal. *Agricultural Reviews*, 01–06.

Bhattacharya, R., & Chowdhury, S. (2024). How effective is e-NAM in integrating food commodity prices in India? Evidence from Onion Market. *Economic & Political Weekly*, *58*(35). https://www.nipfp.org.in/publications/working-papers/1933/

Bisen, J., & Kumar, R. (2018). Agricultural marketing reforms and e-national agricultural market (e-NAM) in India: a review. *Agricultural Economics Research Review*, *31*(conf), 167. https://doi.org/10.5958/0974-0279.2018.00032.0

Chand, R. (2016). *e-Platform for National Agricultural Market*.

Chaudhary, S., & Suri, P. (2020). Examining Adoption of eNAM Platform for Transforming Agricultural Marketing in India. In *Transforming Organizations Through Flexible Systems Management* (pp. 243–256). https://doi.org/10.1007/978-981-13-9640-3_14

Gautam, S., Supriya, ., Srivastava, A. B., & Bohra, D. (2022). Factors Constraining Farmer's Adoption of the E-National Agriculture Market (eNAM) in Sultanpur District of Uttar Pradesh. *Asian Journal of Agricultural Extension, Economics & Sociology*, 501–506. https://doi.org/10.9734/ajaees/2022/v40i121830

Gautam, S., Supriya, Mishra, H., Gupta, V., Kumar, P., & Shakya, A. K. (2023). Ascertain the Farmers and Traders' Willingness to Participate in E-National Agriculture Market (eNAM): Binary Logistic Regression Analysis. *International Journal of Environment and Climate Change*, *13*(8), 1961–1968. https://doi.org/10.9734/ijecc/2023/v13i82153

Goyal, M., & Kaur, A. (2021). Status and performance appraisal of electronic national agricultural markets (e-NAM) in Punjab. *Indian Journal of Economics and Development*, *17*(3), 647–652. https://doi.org/10.35716/IJED/21012

Gupta, S., Dayal, D., Singh Badal, P., & Badal, P. S. (2018). E-national Agricultural Market (e-NAM) in India: A Review. *BHU Management Review*, *06*(1 & 2), 48–57. https://www.researchgate.net/publication/343240633

Hiremath, G. M., Chandargi, D. M., Jainuddin, S. M., & Satihal, D. G. (2022). Participation of different stakeholders in electronic national agriculture market : An assessment. *Journal of Farm Sciences*, *34*(5). http://hdl.handle.net/10454/18077

Jatana, R., & Goswami, M. (2021). AN ANALYTICAL STUDY ON THE FUNCTIONING OF eNAM (WITH SPECIAL REFERENCE TO RAJASTHAN). *INTERNATIONAL JOURNAL OF RESEARCH CULTURE SOCIETY*, *5*(1). https://ssrn.com/abstract=3775938

Joharapurkar, S., Deshmukh, V., & Sarap, S. (1974). Assessing the impact of eNAM in Vidarbha region. *The Pharma Innovation Journal*, *9*, 1974–1978. www.thepharmajournal.com

Kalamkar, S. S., Ahir, K., & Bhaiya, S. R. (2019). Status of Implementation of Electronic National Agriculture Market (eNAM) in selected APMCs of Gujarat. *SEEG National Symposium* , 112–122.

Kaushal, N., Ghalawat, S., Pratap, R., & Kaurav, S. (2021). *Nepotism Concept Evaluation: A Systematic Review and Nepotism Concept Evaluation: A Systematic Review and Bibliometric Analysis Bibliometric Analysis Nepotism Concept Evaluation: A Systematic Review and Bibliometric Analysis*. https://digitalcommons.unl.edu/libphilprac

Kiran, Gupta, D., Kanawjia, A., & Thakur, B. (2023). Empowering Farmers of Himachal Pradesh through E-NAM. *Current Journal of Applied Science and Technology*, *42*(39), 32–37. https://doi.org/10.9734/cjast/2023/v42i394255

Kumar, M., Dhingra, A., Ghalawat, S., Bishnoi, D., Bhardwaj, N., & Yadav, K. (2023). Status of Marketing Infrastructure under e-NAM: The Perception of Farmers of Haryana. *International Journal of Education and Management Studies*, *13*(3), 335–337.

Kumar, M., Dhingra, A., Ghalawat, S., Bishnoi, D., Bhardwaj, N., & Yadav, K. K. (2023). Problems and intricacies in operating through e-NAM: The perception of farmers of Haryana. *The Pharma Innovation*, *12*(5), 1668–1672. www.thepharmajournal.com

Kumar, R., Jhajharia, A., Kumar, R., Kumar, S., & Shubham. (2023). Attitude of Registered Farmers and Traders Toward e-NAM. *Indian Research Journal of Extension Education*, *23*(1), 55–58. https://doi.org/10.54986/irjee/2023/jan_mar/55-58

Kumar, R., Kumar, S., Meena, P. C., Ganesh, B., & Sivaramane, K. N. (2020). *Strengthening E-NAM in India: Way Forward*. http://www.enam.gov.in

Meena, G. L., Singh Burark, S., Singh, H., & Sharma, L. (2019). Electronic-National Agricultural Market (e-NAM): Initiative towards Doubling the Farmers' Income in India. *International Archive of Applied Sciences and Technology*, *10*(2), 162–171. https://doi.org/10.15515/iaast.0976-4828.10.2.162171

Mehta, P., Thakur, R., Raina, K. K., Thakur, P., & Mehta, R. (2019). Farmers' perception towards Electronic-National Agriculture Market (e-NAM) systems adopted by APMC market, Solan, Himachal Pradesh. *AgricINTERNATIONAL*, *6*(1), 51. https://doi.org/10.5958/2454-8634.2019.00010.x

Mini, G., & Kaur, A. (2020). Adoption performance of electronic national agricultural markets (e-NAM) in Punjab. *Journal of Agricultural Development and Policy*, *30*(2). https://doi.org/10.5958/0974-0279.2018.00005.8

Mishra, A., & Rathore, V. (2020). Analysis of Impact of eNAM on the stakeholders of Tikamgarh Region, Madhya Pradesh. *JNKVV Research Journal*, *54*(1–3), 11–19.

Mishra, G., & Bhatt, N. (2019). Evaluation of e-NAM adoption: A case of Jetalpur Mandi, Gujarat. In *Lecture Notes in Networks and Systems* (Vol. 75, pp. 21–29). Springer. https://doi.org/10.1007/978-981-13-7150-9_3

Nair, R. (2023). A Study on the Evolution & Functioning of E-NAM with Special Reference to J&K. *Agro-Economist*, *10*(1). https://doi.org/10.30954/2394-8159.01.2023.5

Nookathoti, T., & Behera, B. (2022). A study on functional efficiency of electronic national agriculture market in selected Mandis of Odisha. *Economic and Political Weekly*, *57*(40), 67–72.

Pahlevan-Sharif, S., Mura, P., & Wijesinghe, S. N. R. (2019). A systematic review of systematic reviews in tourism. *Journal of Hospitality and Tourism Management*, *39*, 158–165. https://doi.org/10.1016/j.jhtm.2019.04.001

Panday, H., Kumar, A., & Maurya, N. (n.d.). *Technology and Sciences (SHUATS) Allahabad; 5 ICAR-National Bureau of Soil Survey and Land Use Planning (NBSS&LUP) Nagpur Hukumraj Kharbikar National Bureau of Soil Survey and Land Use Planning*. https://e-NAM.gov.in/web/state-unified-

Pavithra, S., Gracy, C. P., Saxena, R., & Patil, G. G. (2018). Innovations in agricultural marketing: a case study of e-tendering system in Karnataka, India. *Agricultural Economics Research Review*, *31*(1), 53. https://doi.org/10.5958/0974-0279.2018.00005.8

Pawar, S. S., & Walke, S. G. (2023). ANALYSIS OF THE IMPLEMENTATION AND FUNCTIONING OF THE eNAM PORTAL IN MAHARASHTRA FOR STRENGTHENING THE AGRICULTURAL MARKETING SECTOR. *Journal of Current Research and Review (JCRR)*, *1*(1), 11–16. https://zapjournals.com/Journals/index.php/JCRR

Prabhakar, K. L. (2018). *Status of Marketing Infrastructure under Electronic National Agriculture Markets - A Quick Study*. www.youtube.com/nabardonline

Prajapati, B., Sreedhar, R., Narmatha, A., & Manimaran, M. (2023). e-NAM: An Overview of Economic and Trade in South India. *The Pharma Innovation*, *12*(9S), 1576–1579. https://doi.org/10.22271/tpi.2023.v12.i9su.22972

Punia, A., & Kumar Bishnoi, V. (2022). Exploring Challenges In The Adoption And Implementation Of The E-NAM Platform In Indian Agricultural Marketing. *Journal of Namibian Studies*, *32*, 2197–5523.

Raju, M. S. (2022). Farmers' Perceived Effectiveness of e-NAM. *Indian Research Journal of Extension Education*, *22*(3), 43–48. https://doi.org/10.54986/irjee/2022/jul_sep/43-48

Raju, M. S., Devy, M. R., & Gopal, P. V. S. (2022). Knowledge of Farmers on Functioning of e-NAM. *Indian Journal of Extension Education*, 26–29. https://doi.org/10.48165/ijee.2022.58205

Reddy, A. A., & Mehjabeen. (2019). Electronic National Agricultural Markets, Impacts, Problems and Way Forward. *IIM Kozhikode Society and Management Review*, *8*(2), 143–155. https://doi.org/10.1177/2277975218807277

Reddy, A., Pradesh, A., Nirmal, I. K., Kumar, R., & Nirmal, K. (2023). e-Nam market participation intensity of chilli (Dry) farmers in Guntur district of Andhra Pradesh. *The Pharma Innovation*, *12*(4), 1355–1358. www.thepharmajournal.com

Saini, S., Jirli, B., & Padhan, S. R. (2023). Analysis of factors promoting the usage of electronic National Agriculture Market in Rajasthan, India. *Current Science*, *125*(6), 643–648. https://doi.org/10.18520/cs/v125/i6/643-648

Saini, S., Jirli, B., & Ranjan Padhan, S. (n.d.). *Awareness Mapping of National Agriculture Market (e-NAM) Provisions in Rajasthan Article in Journal of Community Mobilization and Sustainable Development · July 2023 CITATIONS 0 READS 170*. https://www.researchgate.net/publication/372400266

Samantaray, S., Farhan, M., Singh, P., & Kakkar, A. (2023). Impact of e-NAM on organic agriculture farmers' economic growth: a SmartPLS approach. *Organic Agriculture*, *14*, 1–18. https://doi.org/10.21203/rs.3.rs-2630332/v1

Samantaray, S., & Kanungo, E. (n.d.). *A Study on Growth of Electronic-National Agriculture Market in Odisha*. https://www.researchgate.net/publication/368468605

sandhya_dasegowda,+12. (n.d.).

Sekhara, C., Nuthalapati, R., Bhatt, Y., & Beero, S. K. (2020). *Electronic National Agricultural Market (e-NAM) A Review of Performance and Prospects*. http://www.iegindia.org

Singh, N. K., & Alagwadi, M. (2021). *Electronic National Agriculture Market (e-NAM): A Paradigm shift in agricultural marketing*. https://www.researchgate.net/publication/358353295

Singh, N. K., Pnaduranga, V., & Alagawadi, M. (2021). Impact of E-NAM (Electronic-National Agriculture Market) in Doubling Farmers Income. *Proceedings of the International Conference on Advances in Management Practices (ICAMP 2021)*, 1–13. https://ssrn.com/abstract=3992422

Singh, S. R., Chandra, S., & Sathyendra, A. D. (2020). *"Performance Evaluation of e-National Agriculture Market" Research Team*. www.ccsniam.gov.in

Sonawane, H., Shirke, V., & Tarde, V. (2020). e-NAM Awareness and Constraints faced by the Farmers in Marketing of Farm Produce. *Asian Journal of Extension Education*, *38*, 47–54.

Srivastava, K. A., Noel, S. A., & Paul, A. (2020). Impact of eNAM on Farmer's Income in India. *Journal Global Values*, *XI*, 23–29.

Subash, S. P., Aditya, K. S., & Pavithra, K. S. (2018). Role of e-NAM in Realizing Remunerative Price to Farmers. In *Compendium of Training on Strengthening Value Chain in Wheat and Barley for Doubling Farmers Income* (pp. 18–25). http://planningcommission.nic.in/aboutus/committee/wrkgrp12/agri/weg_rep_market.pdf

Swain, P. K., Jamir, C., Dinerstien, M., & Narula, S. (2022). Impact of development of National Agriculture Market (e-NAM) on farmers. *Indian Journal of Agricultural Sciences*, *92*(12), 1484–1489. https://doi.org/10.56093/ijas.v92i12.127701

Venkatesh, P., Singh, D. R., Sangeetha, V., Balasubramanian, M., & Jha, G. K. (2021). The changing structure of agricultural marketing in India: A state-level analysis of e-NAM. *Agricultural Economics Research Review*, *34*(conf), 97–109. https://doi.org/10.5958/0974-0279.2021.00018.5

Wadhwa, A., & Nandal, S. (2023). Assessing the Socioeconomic Impact of Minimum Support Price and e-NAM on Smallholder Farmers in Haryana. *International Journal For Multidisciplinary Research*, *5*(6). https://doi.org/10.36948/ijfmr.2023.v05i06.9375