



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; SP-12(9): 1974-1978
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www.thepharmajournal.com
Received: 25-07-2023
Accepted: 30-08-2023

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Assessing the impact of eNAM in Vidarbha region

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Abstract

The purpose of the study is to document the changes in commodity prices brought about by the eNAM scheme in the agricultural markets of the Vidarbha region. The Vidarbha region of Maharashtra has remained agriculturally backward and has witnessed many farmer suicides due to crop failure, erratic rainfall pattern and lower market rate to their produce. Agricultural marketing is an important part of the agricultural economy, and it acts as a bridge between the agriculture and non-agriculture sector. eNAM has a virtual market which has an APMC market at the backend. The study was mainly based on the quantity and prices of soybean obtained from APMC Nagpur and APMC Akola between October 3 to October 8, 2022, via the official websites of eNAM and Agmarknet. According to the data analysis, there is a significant difference between the physical and eNAM trading modes for soybeans in APMC Nagpur regarding quantity ($P = 0.01$) and model price ($P = 0.000$). There is also a significant difference in the quantity ($P = 0.0000$) and maximum price ($P = 0.03$) of soybean traded in the APMC Akola. The results indicate that, despite technological advancements in the Nagpur region, physical trading is more prevalent than eNAM trading in the APMC Nagpur. The results also highlight the fact that the minimum price in both APMC Nagpur and APMC Akola is lower than the Minimum Support Price of Rs. 4300 per quintal. Additionally, there is a pattern of excessive trading through the physical mode, which indicates that farmers are still unsure about the payment system and require cash for payments. Therefore, it is essential to create a better digital ecosystem that enables farmers to add value to their produce while also making agricultural marketing and selling easier for them.

Keywords: Vidarbha, eNAM, APMC markets, prices

Introduction

India, a country of 138 crore population has 6,62,748 villages, 7,228 blocks, 7,020 sub-districts, 763 districts, 28 states, and 8 union territories. Nearly 70% population of India resides in these 6 lakh plus villages and 54.6% of the total workforce is engaged in agriculture and allied sector activities (Census 2011) ^[19] and accounts for 18.8% (First Advance Estimates) of the country's Gross Value Added (GVA) for the year 2021-22 (at current prices) (Annual Report 2021-22) ^[2]. The agriculture sector in India holds the record for the second-largest agricultural land in the world (Agriculture in India: Industry Overview, Market Size, Role in Development. IBEF, n.d.). In India, out of 14.6 crore farmers, more than 85% are smallholders, which means they have operational land holding less than 2 hectares. In some states, like Bihar, West Bengal, and Kerala, the proportion of marginal farmers (<1.0 ha holding) is more than 80 percent. Farming when undertaken on a smaller scale is a challenging business. Farmers face numerous risks daily ranging from the procurement of farm inputs to the selling of the produce. The adverse weather conditions, pest and disease attacks, water crisis, access to credit, procurement of quality seeds and fertilizers, labor availability, storage facilities, high transportation costs, market accessibility, price instability, and the government's laws and regulations create obstacles for them which sometimes put them in severe poverty and even death traps for many. Despite this, total crop production in India has been increasing consistently (Kumar *et al.*, 2020) ^[9, 10]. We are ranked first in the production of pulses, second in paddy and wheat, and fourth in the production of oilseeds in the world.

Condition of Farmers and Agricultural Sector in Vidarbha Region

Vidarbha region of Maharashtra has remained backward agriculturally as well as industrially. 65% of the region's rural population lives in the eleven districts namely Akola, Amravati, Bhandara, Buldhana, Chandrapur, Gadchiroli, Gondia, Nagpur, Wardha, Washim, and Yavatmal are dependent on agriculture and allied activities. Agriculture in this region is less productive in comparison to the State and National averages (Vidarbha Intensive Irrigation Development Programme (VIIDP), n.d.).

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The problems of crop failure, irrigation facilities, erratic rainfall patterns, and mismatch of cost of cultivation to market price have put the farmers in a debt trap leading to a death trap. There have been more than 200,000 farmer suicides in Maharashtra in a decade, of which 70% are in the 11 districts of the Vidarbha region (Wikipedia contributors, 2022). The condition of farmers in the two administrative regions of Vidarbha is worse than in the rest of Maharashtra and India.

Condition of Agricultural Marketing Sector

Economic liberalization and deregulations had created a very favorable environment for private sector investments in non-agriculture sectors which have led to significant improvement in its performance, pulling up the overall growth rate of the economy. Similar reforms in agriculture are either missing or remain patchy (Chand R & Singh J, 2016) ^[5]. The government plays a prominent role in enabling the growth of agriculture. The laws, regulations, and schemes implemented by the government influence the cost of production, acquiring credits, marketing, and trade. Supportive regulations facilitate farmers' participation in agricultural value chains, whereas unnecessary burdens prevent them from reaping the benefits of the increasing global food demand (World Bank Group, 2019) ^[18]. To feed and sustain such a huge population, Indian agriculture needs a paradigm shift from just a production unit to a marketing unit. The changes experienced by the agriculture economy and agricultural marketing sectors have made marketing very important for the overall development of the agriculture and welfare of the farmers. The problems in the current systems are a) a large number of intermediaries; b) high transaction costs (margins); c) long lead times for payment; d) no proper system to store produce thus leading to wastage; e) inadequate price information; and f) poor infrastructure in markets (Baskar & Shalendra, 2022) ^[4]. Therefore, India needs a robust agricultural marketing system for tackling the challenges faced by various stakeholders in the agricultural value chain, and supply chain and promote ease of doing agribusiness.

Agricultural Marketing

Agricultural marketing supports the growth of the economy as a whole apart from the food and nutrition needs of the country (Rathore & Panda, 2019) ^[12]. The marketing of agricultural produce serves as a bridge between the farm sector and all other sectors of the economy. An efficient marketing system helps in the optimization of resource use, output management, increase in farm incomes, widening of markets, growth of agro-based industry, and addition to national income through value addition and employment creation. Agricultural marketing usually refers to all the activities involved in the supply of farm inputs and output including all those operations which are related to the procurement, collecting, grading, storing, food and agro-processing, transportation, financing, and selling of the agricultural produce (Kumar *et al.*, 2020) ^[9, 10]. In India, agricultural marketing was governed by a set of publicly owned wholesale markets which were established during the colonial period under the APMC Act. The regulatory mechanism, which is more than 100 years old, no doubt, has put in place some good marketing practices but the system is also fighting with a few shortcomings due to various regulatory mechanisms and restrictions on the trading of agricultural commodities (Kumar A D & Pant, 2020) ^[9, 10]. The state of Maharashtra has there are 306 main markets and 618 sub-markets functioning in the state. Specifically, the

Vidarbha region has 105 main markets and 179 sub-markets functioning in Nagpur and Amravati divisions. The reforms in laws, regulations, and schemes related to agricultural marketing will make an extensive difference in the value chain so the Ministry of Agriculture & Farmers' Welfare, Department of Agriculture & Farmers' Welfare (DA&FW), introduced the eNAM on 1st July 2015.

eNAM

National Agriculture Market is a pan-India electronic trading (e-trading) portal that seeks to network the existing physical APMCs through a virtual platform to create a unified national market for agricultural commodities. eNAM is a "virtual" market, but it has a physical market (mandi) at the back end (Annual Report (2021-22) ^[2]. eNAM promotes uniformity, and streamlining of procedures across the integrated markets removes the information gap between buyers and sellers, and promotes real-time price discovery based on actual demand and supply in the market. It provides transparency in the auction process and access to a nationwide market for both parties (Kumar A D & Pant, 2020) ^[9, 10]. eNAM seeks to address and reverse this process of fragmentation of markets, ultimately lowering intermediation costs, wastage, and prices for the final consumer. It builds on the strength of the local mandi and allows it to offer its produce at the national level (Deshmukh *et al.*, 2018) ^[6]. The eNAM portal provides a single window service for all APMC-related information and services, including commodity arrivals, prices, bids, and offers. Some of the expected benefits from eNAM include accessibility of farmers to a common agriculture market; real-time price discovery; transparency in the agriculture marketing system; reduction in the transaction costs of buyers and sellers; real-time information on prices, market arrivals; bidding on quality parameters of commodities; online bidding for more transparency; online payment system to reduce the payment risk and ensure timely payments to farmers, cleaning, sorting, grading and weighing facilities and additional services such as soil testing laboratories at the eNAM (Kalamkar *et al.*, 2019) ^[8]. The agriculture sector needs competitive and well-functioning markets for farmers to sell their produce (Annual Report 2021-22) ^[2].

Objectives

The objectives of the study are:

- To understand the benefit of trading on eNAM over the non-eNAM (physical mode).
- To assess the acceptance of farmers in utilizing the services provided by the eNAM over the physical mode based on prices of commodities.
- To study the benefits and constraints perceived by the farmers in the adoption of eNAM.

Materials and Methods

This study was mainly based on the data collected from APMCs and government websites. The study puts up the changes brought by the eNAM scheme on prices of commodities in the agricultural markets of the Vidarbha region. The study also exhibits the challenges and benefits of the shareholders associated with the agriculture supply chain from the new market regime. Two APMCs were selected and integrated with the eNAM system for data collection: APMC Nagpur and APMC Akola. The study was carried out on the prices of soybean as it is the second largest Kharif crop in this region, it is also an important oil-seed crop and the harvesting

of soybean starts at the end of September. The minimum support price (MSP) announced by the Central Government for soybean (yellow) in the marketing season of Kharif 2022-23 is Rs. 4300 per quintal.

Sample and Data

The data was collected from October 3rd to October 8th 2022 from Agriculture Market Produce Committee, Nagpur and Akola. In this process, there were many interactions with various stakeholders of the marketing process namely, the farmers, the commission agents, the buyers or traders, and the APMC officials. The study comprises primary data from APMC Nagpur and secondary data was collected from government websites namely eNAM, Agmarknet, and APMC Nagpur. These websites were used to obtain trading data for APMC Nagpur and APMC Akola. From both the APMC's and eNAM portals the daily trade prices of commodities like the minimum price, maximum price, modal price, daily arrivals, quantity traded, and other details regarding the trade were collected.

Analytical Tools

For the analysis of the data mean, standard deviation, and t-test were computed using the Analysis ToolPak which is an Excel add-in program.

Results and Discussion

The agriculture sector needs structured and functional markets, to drive growth, employment, remunerative prices, and economic prosperity in rural areas of the country. To remove restrictive and monopolistic practices of the present marketing system, reduce the intermediaries in the supply chain, reduce wastages by way of promoting an integrated supply and value chain, and benefit farmers through access to global markets, reforms in agricultural markets have to be

perceived as an ongoing process (Annual Report 2021-22). There are many studies conducted on the assessment and acceptance of eNAM by farmers and other stakeholders in the marketing system. But with such a wide variation in results, it is difficult to understand the scenario of the success of eNAM in the Vidarbha region of Maharashtra state which has been in the limelight for the unfortunate news of farmer's distress and suicides whereas the state of Maharashtra tops the chart of farmer's friendly reforms across Indian states (Chand R & Singh J, 2016)^[5].

Table 1: District wise APMCs and eNAMs

District	Area of the District (sq. m.)	Number of APMCs	APMC with eNAMs
Akola	2,096	8	3
Amravati	4,724	12	7
Bhandara	1,435	5	1
Buldhana	3,730	13	5
Chandrapur	4,418	13	5
Gadchiroli	5,565	5	2
Gondia	2,021	6	4
Nagpur	3,819	13	4
Wardha	2,440	7	4
Washim	1,990	6	5
Yavatmal	5,244	17	4
Total	37,482	105	44

Table 1, manifests that there are 105 main markets in the Vidarbha region out of which only 44 are integrated with eNAM which is less than 50 percent of the total number of markets. The Yavatmal district is the largest in terms of area (5244 sq. m.) and has the maximum number of APMC markets (17). The maximum number of APMC markets with eNAM are present in the Amravati district (7). Washim district has more than 80 percent APMC markets integrated with eNAM which is the highest among all the other sections.

Table 2: Comparison between Soybean Quantity and Prices at APMC Nagpur

Day	eNAM				Physical Mode			
	Quantity (qt.)	Min. Price (Rs)	Max. Price (Rs)	Modal Price (Rs)	Quantity (qt.)	Min. Price (Rs)	Max. Price (Rs)	Modal Price (Rs)
03-10-2022	210	4051	5084	4200	441	4300	5084	4863
04-10-2022	468	4000	5151	4350	1753	4300	5151	4938
06-10-2022	655	4000	4780	4200	1774	4300	4780	4660
07-10-2022	738	4000	4901	4200	1944	4300	4901	4751
08-10-2022	762	4000	4766	4000	2085	4200	4777	4633
Mean	566.6a	4010.2	4936.4	4190	1599.4	4280	4938.6	4769
Standard Deviation	230.357982	22.8078934	175.063703	124.498996	661.537074	44.7213595	172.436365	130.4779675
t Stat	-3.2968177	-12.01737	-0.0200196	-7.178905747	-3.2968177	-12.01737	-0.0200196	-7.178905747
P(T<=t) two-tail	0.0109105	2.12E-06	0.98451804	9.4378E-05	0.0109105	2.12E-06	0.98451804	9.4378E-05

The data in Table 2, depicts that the maxim quantity traded in APMC Nagpur by eNAM mode is 762 quintals whereas by physical mode it is 2085 quintals. The mean quantity traded through the physical mode is 2.82 times more than the eNAM mode. The highest modal price by eNAM mode is Rs. 4350 whereas by physical mode it is Rs. 4938. The statistical analysis of the data presented in Table - 2 shows that there is a significant difference in the quantity ($P = 0.01$) and model price ($P = 0.000$) of soybean traded in APMC Nagpur concerning eNAM mode and physical mode. As per the

analysis, it is observed that the farmers have majoritively chosen the physical mode as it is fetching more price than the eNAM mode. Another reason for excess trading through the physical mode suggests that farmers are still not confident about the payment system and farmers need hard cash for payment of labors and transportation charges. The results coincide with the findings of Kumar *et al.* (2020)^[9, 10] as they found no price advantage in eNAM over APMC Markets and Bachaspati and Pathak (2018)^[3] even reported a decline in the prices after the introduction of eNAM in Chhattisgarh.

Table 3: Comparison between Soybean Quantity and Prices at APMC Akola

Day	eNAM				Physical Mode			
	Quantity (qt.)	Min. Price (Rs)	Max. Price (Rs)	Modal Price (Rs)	Quantity (qt.)	Min. Price (Rs)	Max. Price (Rs)	Modal Price (Rs)
03-10-2022	396	4,220	4,890	4,745	990	4000	5100	4570
04-10-2022	342	4,070	4,805	4,400	720	4200	4895	4600
06-10-2022	313	4,085	4,750	4,750	880	4000	4900	4555
07-10-2022	330	3,995	4,825	3,995	960	4150	4950	4500
08-10-2022	160	4135	4940	4220	760	3995	5005	4600
Mean	308.2	4101	4842	4422	862	4069	4970	4565
Standard Deviation	88.4771157	83.3216658	74.2125326	329.9734838	119.247641	98.386991	85.2203027	41.23105626
t Stat	-8.3397183	0.55499211	-2.532792	-0.961563208	-8.3397183	0.55499211	-2.532792	-0.961563208
P(T<=t) two-tail	3.2332E-05	0.59407353	0.0351025	0.36442766	3.2332E-05	0.59407353	0.0351025	0.36442766

The data in Table 3, depicts that the maximum quantity traded in APMC Akola by eNAM mode is 396 quintals whereas by physical mode it is 990 quintals. The mean quantity traded through the physical mode is 2.79 times more than the eNAM mode. The highest modal price by eNAM mode is Rs. 4750 whereas by physical mode it is Rs. 4600. The statistical analysis of the data presented in Table 3, shows that there is a significant difference in the quantity ($P = 0.0000$) and maximum price ($P = 0.03$) of soybean traded in APMC Akola concerning eNAM mode and physical mode. As per the analysis, it is noticed that the modal price ($P = 0.3$) is insignificant. The result showcases the same observation as the modal prices in both modes do not have a major gap and on some days the eNAM modal prices are outperforming the physical mode's modal prices. Gupta (2018)^[7] and Reddy and Mehjabeen (2019)^[13] also noted a positive effect of e-NAM on the prices of various commodities.

The statistical analysis between the eNAM mode of APMC Nagpur and APMC Akola computed that there is a significant difference in the quantity ($P = 0.04$), this may be due to the better understanding and penetration of technology in the Nagpur region than the Akola region and also there is a significant difference in the minimum price ($P = 0.04$). The minimum prices recorded in the Akola market is greater than those in the Nagpur market but in both markets, the minimum price is less than the minimum support price of Rs. 4300 declared by the government for the Kharif marketing season 2022-23.

The statistical analysis between the physical mode of APMC Nagpur and APMC Akola computed that there is a significant difference in the quantity ($P = 0.03$), minimum price ($P = 0.002$), and modal price ($P = 0.01$). The findings suggest that despite technological advancement in the Nagpur region the trading done by physical mode is way more than eNAM mode in the Nagpur market and physical mode in the Akola market. The minimum price recorded through physical mode in the Nagpur market is greater than in the Akola market but in both markets, the minimum price is less than the minimum support price. The modal is also higher in the Nagpur market than Akola market. It is observed that due to eNAM farmers are getting more options to trade their produce as both local traders and traders on the eNAM platform are both bidding for the produce creating healthy competition. This is further leading to higher bids and the local trader having the advantage of trust and transfer of payment in cash is winning the bid thus, the transactions through the physical modes are higher.

Therefore eNAM has been envisaged as a win-win solution for all stakeholders. For the farmers, eNAM has more options for sale at the mandi. For the local trader in the mandi, eNAM offers the opportunity to access a larger national market for

secondary trading. Bulk buyers, processors, exporters, etc. benefit from being able to participate directly in trading at the local mandi level through the eNAM platform, thereby reducing their intermediation costs. The gradual integration of all the markets in the states into eNAM will ensure common procedures for the issue of licences, levy of fees, and movement of produce leading towards better prices for the produce.

(Tyngkan, 2021)^[15] implies that e-marketing can improve farmers' income if implemented efficiently by eliminating various bottlenecks that hindered trading activities under the e-platform. The result coincides that the farmers of the Vidarbha region are receiving higher prices due to the integration of eNAM.

The eNAM now is also facilitating the emergence of integrated value chains in major agricultural commodities across the country and is helping to promote scientific storage and movement of Agri goods throughout the country. So, on 14th July 2022, the government launched the Platform of Platforms (PoP) on eNAM which will facilitate the empanelment and integration of service providers such as Trading, Warehousing, Transportation, Quality Assaying, etc with the eNAM portal thereby, developing a bigger digital ecosystem, enabling farmers to add value to their produce and facilitate them with ease of agriculture produce marketing. eNAM PoP is a step towards the concept of "one nation, one market" which will enhance farmers' accessibility digitally to multiple numbers of markets, buyers, and value-added services (Annual Report (2021-22))^[2].

Conclusion

The study concluded that eNAM is still not a very acceptable mode of trading agricultural produce for Vidarbhan farmers. With the introduction of eNAM, there is a positive effect on the modal prices of soybean in the physical mode of trading. In fact, with the integration of eNAM with APMC there is greater competition for the products, resulting in higher prices and more e-transactions. In a few years, we can expect a significant benefit through eNAM to the farmers as they tend to receive higher returns, lower transaction costs, and stable prices.

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