

ELECTRONIC NATIONAL AGRICULTURE MARKET (e-NAM) PERFORMANCE SYMPHONY: A DYNAMIC APPRAISAL IN GUNTUR MARKET THROUGH VARIED STAKEHOLDER PERSPECTIVES

Mallela Bandhavya^{1*}, Ashok Kumar Singh² and Gyan Shukla³

¹ Assistant manager, Poshan Incubator, RARS, Tirupati, ANGRAU, Guntur - 522034

² Retired Professor, Post Graduate Department of Extension Education, Dr. Rajendra Prasad Central Agricultural University, Pusa (Samastipur) Bihar-848125

³ PhD Scholar, Department of Agricultural Extension and communication, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi (UP)-221005
Email : bandhavya912@gmail.com

ABSTRACT

In the study, a comprehensive evaluation was conducted using an ex-post facto research design to assess the performance of the National Agriculture Market (e-NAM) within the distinguished Guntur mandi of Andhra Pradesh. The selection of Guntur mandi was deliberate, considering its status as the foremost market in the state in terms of both trade volume and transaction value facilitated through e-NAM. This study involved the active participation of 100 stakeholders, and a meticulous appraisal index was crafted based on assessments provided by five key stakeholders: Farmers, Traders, FPOs, Commission Agents, and e-NAM officials. The appraisal index, calculated as the obtained score divided by the maximum obtainable score multiplied by 100, served as a quantitative measure for evaluating performance across four crucial e-NAM sub-indicators: Infrastructure, Quality Assurance, Transparency, and Market Information System. Through the collection of data via pretested interview schedule, a discerning overview emerged, indicating that, on the whole, stakeholders rated e-NAM's performance as good. It is noteworthy, however, that farmers attributed the lowest mean score to performance of e-NAM among all stakeholders. Among the sub-indicators, Market Information System garnered the highest score, underscoring its effectiveness, while Infrastructure scored the lowest, indicating areas requiring attention. The study posits strategic opportunities for enhancing e-NAM's overall performance, with a particular emphasis on the imperative need for improvements in infrastructure and other pertinent sub-indicators to unlock their full potential.

Keywords: Information and communication technology, market-led extension, national agriculture market, online marketing, performance index.

INTRODUCTION

India has relied on the agricultural industry. We have reached the right productivity levels for numerous crops and have risen to the top in several agricultural sectors. However, there has been only little improvement in the life conditions of farmers; this is because the devil lies in the conventional marketing of produce. The Indian traditional marketing system has a wide range of implications, including the following: There are not enough markets, and the market is excessively fragmented, an excessive amount of market fees or taxes, inadequate marketing infrastructure, wastes after harvest, limitations on licenses, lower payments to farmers, the expenses of mediation, the informational imbalance in the market, and the poor credit facilities (Vinaya et al., 2018). According to Deshmukh and Patil (2021), digital marketing in agriculture will help them to increase profits of farmers by removing middleman's commission. Shukla et al., (2024a) reported that farmers need market related information to sell their produce and gain higher profit. In current era,

popularization of various ICT tools and other digital media platforms among farmers enabling them to access real time information (Mallick et al., 2023; Samadder et al., 2024; Shukla et al., 2024b; Singh et al., 2024). By realizing this trend, Indian government started an electronic national agriculture market (e-NAM), an online trading platform to overcome the flaws of traditional marketing system.

The e-NAM is an online marketing platform; however, at the back end, there is a physical market that provides comprehensive support services to different stakeholders like farmers, traders, FPOs, commission agents, and e-NAM officials. Bandhavya et. al., (2023) observed that these stakeholders perceived different e-NAM services are satisfactory. The e-NAM process includes several steps like gate entry, quality assaying, online trading, weighing and invoicing online payment, and gate exit, as shown in Fig. 1. The e-NAM appears to be a great idea in theory, but in practice, at the ground level, there are about 191 APMCs at the time of the study, out of which only 22 were integrated with e-NAM (e-NAM, 2020). Here the question arises why



Fig. 1: e-NAM process

only 22 mandi were integrated with e-NAM. It was expected that e-NAM would address the marketing constraints (Sah *et al.*, 2023). Therefore, the present study was carried out with the following objective:

OBJECTIVE

To appraise the performance of the e-NAM process across its different stakeholders.

METHODOLOGY

The study was conducted to appraise the performance

of e-NAM of Guntur mandi of Andhra Pradesh during 2020. To examine the ground truth of e-NAM, the researcher ran a pilot study. According to the results of the pilot survey, there was heterogeneity in the population due to the involvement of many stakeholders. So, using a disproportionate stratified random sampling technique, a total sample size of 100 respondents was chosen out of which 30 were farmers, 30 were traders, 5 were FPOs, 25 were commission agents, and 10 were e-NAM officials. We conducted personal interviews with pre-tested interview schedule for identified respondents to get information about the performance of e-NAM.

Table 1: The disproportionate stratified random sampling method of stakeholders

Stakeholders (Strata)	Number of persons	The proportion in each stratum	Proportionate sample	Disproportionate sample
Farmers	548247	0.997	99.69	30
Traders	663	0.001	0.121	30
FPOs	315	0.001	0.057	5
Commission agents	679	0.001	0.123	25
Officials	50	0.000	0.009	10
Total	549954		100	100

Considering such a divergent population, an exhaustive study of previous literature and expert suggestions. Each respondent was personally interviewed and asked to answer questions under each component. In present study, “Performance appraisal of e-NAM” was conceptualized as “Evaluating the functioning of e-NAM with its objectives”. An index was developed for performance appraisal of e-NAM. From e-NAM objectives, four sub-indicators were selected: Infrastructure, Transparency, Quality assurance, and Market information, which constitute e-NAM performance. The score for the “e-NAM Performance Index” as given by each respondent was found by taking into account the scores for different sub-indicators of performance, i.e. Infrastructure, Transparency, Quality assurance, and Market information. Each sub-indicator Index and overall “e-NAM Performance Index” were calculated using the following formula.

$$\text{Performance Index} = \frac{\text{Obtained score}}{\text{Maximum obtainable score}} \times 100$$

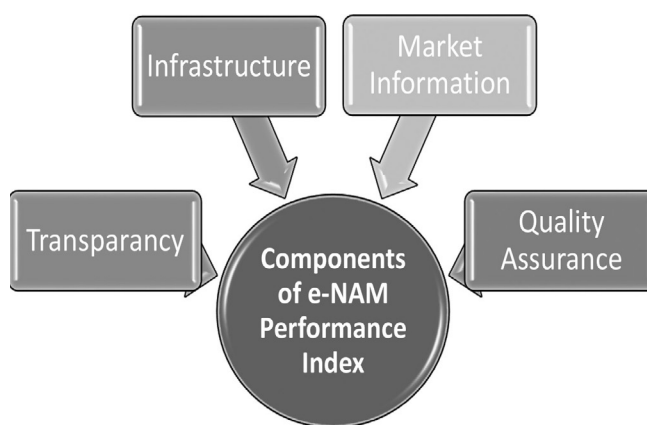


Fig. 2: Components of e-NAM performance Index

RESULTS AND DISCUSSION

Respondents were categorized into three based on the scores given to the performance of e-NAM by using the Cumulative Square Root Frequency (CSRFF) method.

The performance appraisal of e-NAM according to farmers

A close analysis of Table 2 shows the distribution of farmers' responses in 3 categories, viz. poor, average, and good, based on the score given to the "Performance Index" of the Guntur e-NAM mandi. Table 2 revealed that the highest percentages of farmers had given a good score level to Infrastructure of e-NAM, i.e., 50.00 percent, whereas 33.33 percent of farmers gave a poor-level score and 16.67 percent of farmers gave an average infrastructure level. This result depicts that Guntur e-NAM mandi has a good level of Infrastructure. Still, they are frequently undergoing repairs, which leads to a delay in the marketing of farmer produce. As the price fluctuates daily, even one-day delay may fetch a lower price for produce. Efforts must also be channelized towards development and upgradation of scientific warehouses, cold storage, refrigerated vans for perishables, awareness and training to the participants in the marketing process, high speed internet connectivity to the markets and among different components of the market (Bisen and Kumar, 2018). According to Sekhar and Bhatt (2018), about 75% of farmers reported availability of assaying, bid management

and e-auction facilities at the mandis. However, less than one-third have reported availability of sorting, drying, grading and grain storage facilities. The soil testing and cold storage facilities are not reported to be available at any of the sample mandis. If we see the transparency, the highest percentages of farmers gave the average level score (50.00%) to the transparency of e-NAM. Whereas 33.33 percent of farmers gave good, and 16.67 percent of farmers gave a poor level of score to the transparency of e-NAM. Kalamkar *et al.* (2019) reported that about 68.8 per cent of farmers from Gujarat opined that testing of quality parameters is transparent, 67 percent of farmers from Maharashtra and 60 percent of farmers from Telangana are also experienced transparent in quality parameters. From the Table 2, it can also be seen that the highest percentages of farmers gave an average level of score to quality assurance, i.e. 50.00 per cent. It was also noticed that 26.67 per cent gave a good-level score and 23.33 percent gave a poor-level score to quality assurance in the study area. We can observe that the highest percentage of farmers had given a good score to market information, i.e. 40 per cent. It was also noticed that 30 per cent were given a good-level score, and 30.00 percent of respondents had given an average score level to market information in the study area.

Table 2: Distribution of farmers based on the score given to the performance and its sub-indicators

Index	Categorization	Farmers (n=30)		Mean	SD
		f	%		
Infrastructure Index	Poor (<43.46)	10	33.33	50.59	12.88
	Average (43.46-52.14)	05	16.67		
	Good (>52.14)	15	50.00		
Transparency Index	Poor (<39.54)	05	16.67	58.79	18.76
	Average (39.54-64.43)	15	50.00		
	Good (>64.43)	10	33.33		
Quality assurance Index	Poor (<37.38)	07	23.33	54.29	20.76
	Average (37.38-64.40)	15	50.00		
	Good (>64.40)	08	26.67		
Market information Index	Poor (<74.04)	12	40.00	80.56	15.83
	Average (74.04-88.55)	09	30.00		
	Good (>88.55)	09	30.00		
Performance Index	Poor (<61.20)	21	70.00	57.80	8.45
	Average (61.20-67.40)	05	16.67		
	Good (>67.40)	04	13.33		

The Table 2 shows that the maximum number of farmers (i.e., 70.00%) gave poor score to the performance index, followed by 16.70 percent of respondents farmers who gave an average level score, and 13.33 percent of farmers gave a good level score to the performance index of e-NAM.

The performance appraisal of e-NAM according to traders

Table 3 revealed that the highest percentages of

traders had given a good score level to e-NAM, i.e. 46.67 per cent. Whereas 40.00 percent of traders gave an average-level score, and 13.33 percent gave a poor score to infrastructure level. According to Sekhar and Bhatt (2018), all the traders reported that weighing facility is available at the mandis but only 73% are satisfied with the cleaning facility and about 73% are not satisfied with the sorting, drying and grading facilities. Whereas, the highest percentage of Guntur traders i.e., 46.67 percent gave a good level score to the transparency

of e-NAM. Whereas 30.00 percent of traders gave an average, and 23.33 per cent of traders gave a good-level score to the transparency of e-NAM. From the Table 3, it can also be seen that the highest percentage of traders gave a good level of score to quality assurance, i.e. 83.33 per cent. It was also identified that 13.33 per cent gave a poor-level score, and 3.33 per cent of traders gave an average-level score to quality assurance in the study area. A large share of traders had given a good score level to market information, i.e. 53.33 per cent. It was also identified that 46.67 per cent were given a poor-level score, and 0% of traders had given an average level of score to market information in the study area.

Table 3: Distribution of traders based on the score given to the performance index and its sub-indicators

Index	Categorization	Traders (n=30)		Mean	SD
		f	%		
Infrastructure Index	Poor (<46.85)	04	13.33	54.51	10.12
	Average (46.85-54.89)	12	40.00		
	Good (>54.89)	14	46.67		
Transparency Index	Poor (<61.69)	07	23.33	70.61	14.26
	Average (61.69-78.11)	09	30.00		
	Good (>78.11)	14	46.67		
Quality assurance Index	Poor (<44.96)	04	13.33	61.90	13.17
	Average (44.96-54.99)	01	3.33		
	Good (>54.99)	25	83.33		
Market information Index	Poor (<83.90)	14	46.67	91.11	10.48
	Average (83.90-94.94)	0	0.00		
	Good (>94.94)	16	53.33		
Performance Index	Poor (<60.03)	05	16.67	65.45	6.13
	Average (60.03-67.45)	11	36.67		
	Good (>67.45)	14	46.67		

The maximum number of traders (i.e.,46.67%) gave a good score to the performance index, followed by 36.67 per cent of traders who gave an average level score. 16.67 per cent of traders gave a poor level score to the performance index e-NAM.

The performance appraisal of e-NAM according to FPOs

Table 4 revealed that the highest percentages of FPOs had given average and poor score levels to e-NAM, i.e. 40 and 40 per cent respectively. Whereas 20 per cent FPOs gave a good level score to infrastructure level. About 40 and 40 percent of FPOs gave an average and poor level score to the

transparency of e-NAM respectively. Whereas 20 per cent of FPOs gave a good level score to the transparency of e-NAM. The highest percentage of respondents gave a poor score level to quality assurance, i.e. 60 per cent. It was also noticed that 40 per cent gave a good-level score and no respondent (i.e. 0%) gave a poor-level score to quality assurance in the study area. The highest percentage of respondents had given an average score level to market information, i.e. 60 per cent. It was also found that 40 per cent were given a good-level score to the market information, and none of the respondents had given a poor level of score to market information in the study area.

Table 4: Distribution of FPOs based on the score given to the performance index and its sub-indicators

Index	Categorization	FPOs (n=5)		Mean	SD
		f	%		
Infrastructure Index	Poor (<53.18)	2	40	56.47	6.71
	Average (53.18-58.93)	2	40		
	Good (>58.93)	1	20		
Transparency Index	Poor (<78.32)	2	40	81.82	11.13
	Average (78.32-81.82)	2	40		
	Good (>81.82)	1	20		
Quality assurance Index	Poor (<72.21)	3	60	74.29	3.91
	Average (72.21-77.23)	0	0		
	Good (>77.23)	2	40		

Index	Categorization	FPOs (n=5)		Mean	SD
		f	%		
Market information Index	Poor (<83.03)	0	0	90.00	9.13
	Average (83.03-95.58)	3	60		
	Good (>95.58)	2	40		
Performance Index	Poor (<68.72)	3	60	71.22	6.49
	Average (68.72-70.96)	0	0		
	Good (>67.45)	2	40		

The maximum number of respondents (i.e., 60%) gave a poor score to the performance index, followed by 40% of respondents who gave a good level score. None of the respondents gave an average level score to the performance index of e-NAM.

The performance appraisal of e-NAM according to commission agents

Table 5 revealed that the highest share of commission agents had given a good score level to Infrastructure of e-NAM, i.e. 48 per cent. 32 per cent of commission agents gave an average-level score, and 20 per cent gave a poor infrastructure level score. The major percentage of

commission agents (60%) gave a poor level score to the transparency of e-NAM. Whereas 24 per cent of commission agents gave good, and 16 per cent of the commission agents gave an average-level score to the transparency of e-NAM. The highest percentage of respondents gave a good score level to quality assurance, i.e. 52.00 per cent. It was also found that 28 per cent gave a poor-level score, and 20 per cent of respondents gave an average-level score to quality assurance in the study area. The highest percentage of respondents had given a good score to market information, i.e. 60 per cent, whereas 24 per cent gave an average-level score, and 16 per cent of respondents had given a poor level score to market information in the study area.

Table 5: Distribution of commission agents based on the score given to the performance index and its sub-indicators.

Index	Categorization	Commission agents (n=25)		Mean	SD
		f	%		
Infrastructure Index	Poor (<43.46)	05	20	50.35	6.59
	Average (43.46-52.14)	08	32		
	Good (>52.14)	12	48		
Transparency Index	Poor (<73.92)	15	60	78.91	8.59
	Average (73.92-90.12)	04	16		
	Good (>90.12)	06	24		
Quality assurance Index	Poor (<58.14)	07	28	66.00	11.72
	Average (58.14-69.55)	05	20		
	Good (>69.55)	13	52		
Market information Index	Poor (<83.04)	04	16	90.67	12.80
	Average (83.04-94.79)	06	24		
	Good (>94.79)	15	60		
Performance Index	Poor (<63.50)	06	24	66.58	5.11
	Average (63.50-70.00)	14	56		
	Good (>70.00)	05	20		

The maximum number of respondents (i.e.,56%) gave an average level score to theperformance index, followed by 24 per cent who gave a poor level score. Only 20 per cent of respondents gave a good level score to the performance index e-NAM.

The performance appraisal of e-NAM according to e-NAM officials

Lucid examination of Table 6 indicated that the highest percentages of e-NAM Officials had given a good

score level to e-NAM, i.e. 50 per cent. Whereas 30 per cent of e-NAM Officials gave an average-level score and 20 per cent of e-NAM Officials gave a poor infrastructure level score. whereas 40 per cent of e-NAM officials gave an average level score. Another 40 per cent of officials gave a good-level score to the transparency of e-NAM, whereas 20 per cent of e-NAM officials gave a poor-level score to the transparency of e-NAM. The highest percentage of respondents gave a

good score level to quality assurance, i.e. 50 per cent. It was also identified that 30 per cent gave an average-level score, and 20 per cent gave a poor-level score. The highest share of respondents had given a good level of score to market information, i.e. 70 per cent, whereas 30 per cent were given a poor-level score, and none of the respondents had given an average level of score to market information in the study area.

Table 6: Distribution of e-NAM officials based on the score given to the performanceindex and its sub-indicators

Index	Categorization	e-NAM officials (n=10)		Mean	SD
		f	%		
Infrastructure Index	Poor (<44.49)	2	20	57.65	15.14
	Average (44.49-60.48)	3	30		
	Good (>60.48)	5	50		
Transparency Index	Poor (<88.46)	2	20	92.73	7.17
	Average (88.46-96.14)	4	40		
	Good (>96.14)	4	40		
Quality assurance Index	Poor (<64.21)	2	20	70.71	10.35
	Average (64.21-76.11)	3	30		
	Good (>76.11)	5	50		
Market information Index	Poor (<83.37)	3	30	95.00	8.05
	Average (83.37-97.08)	0	0		
	Good (>97.08)	7	70		
Performance Index	Poor (<69.47)	2	20	74.76	8.35
	Average (69.47-75.94)	3	30		
	Good (>75.94)	5	50		

The maximum e-NAM officials (i.e., 50%) gave a good level score to the performance index, followed by 30 per cent of respondents who gave an average level score, and 20 per cent of respondents gave a poor level score to the performance index e-NAM.

Overall e-NAM performance index

A close analysis of Table 7 indicated that the highest percentages of stakeholders had given a good infrastructure index, i.e. 40 per cent. Whereas 39 per cent of stakeholders gave an average infrastructure index, 21 per cent of e-NAM stakeholders gave a poor infrastructure level. About 49 per cent of e-NAM stakeholders gave an average level score, and

another 40 per cent of stakeholders gave a good level score to the transparency of e-NAM whereas, 11% of stakeholders gave a poor level score to the transparency of e-NAM. The highest percentage of stakeholders gave a good score level to quality assurance, i.e. 46 per cent. It was also noticed that 40 per cent gave an average level score, and 14 per cent of respondents gave a poor level score to quality assurance. The highest percentage of stakeholders had given good score level to market information, i.e. 49 per cent. It was also found that 33 per cent were given an average score, and 18 per cent of the respondents had given a poor level of score to market information in the study area.

Table 7: Distribution of stakeholders based on the score given to the performance index and its sub-indicators

Index	Categorization	All Stakeholders (n=100)		Mean	SD
		f	%		
Infrastructure Index	Poor (<44.43)	21	21	52.71	10.89
	Average (44.43-57.23)	39	39		
	Good (>57.23)	40	40		
Transparency Index	Poor (<53.66)	11	11	71.91	17.4
	Average (53.66-75.69)	49	49		
	Good (>75.69)	40	40		

Index	Categorization	All Stakeholders (n=100)		Mean	SD
		f	%		
Quality assurance Index	Poor (<48.04)	14	14	62.14	16.06
	Average (48.04-69.80)	40	40		
	Good (>69.80)	46	46		
Market information Index	Poor (<81.71)	18	18	88.17	13.46
	Average (81.71-94.08)	33	33		
	Good (>94.08)	49	49		
Performance Index	Poor (<58.54)	25	25	64.65	8.60
	Average (58.54-65.69)	21	21		
	Good (>65.69)	54	54		

Lucid examination of Table 7, revealed that out of 100 respondents, the maximum number of respondents, i.e. 54 percent gave a good score to “performance index”, 25 percent given category of the poor performance index. Only 21 percent gave a score of the average level for the performance index. But, still, there is much scope for the Guntur mandi to improve the performance of e-NAM. The average of performance index score was 64.65. We can conclude that Guntur mandi e-NAM performance was good from the results. But still there is lot of scope to improve performance of e-NAM. Kalamkar *et al.* (2019) reported that despite APMCs being linked and live on the e-NAM portal, actual e-trading has not been actively taking place across markets. Instead, the reported activity on the e-NAM portal merely involves the entry of agricultural produce, while the auction and sale processes continue to rely on traditional methods within the market premises. Local commission agents and traders have encountered difficulties in embracing the new system, resulting in a lack of readiness among stakeholders.

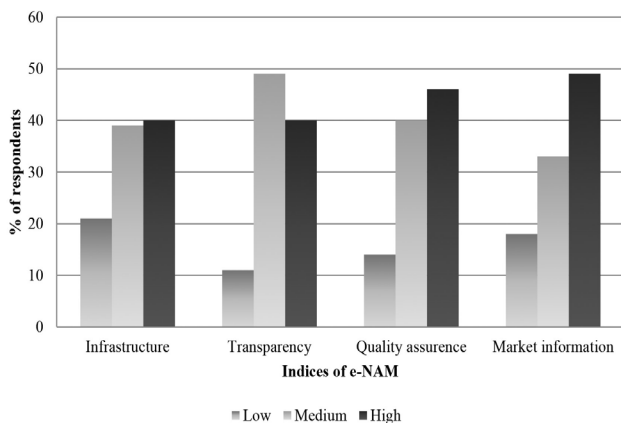


Fig. 3: Distribution of stakeholders based on the scores given to components of performance index

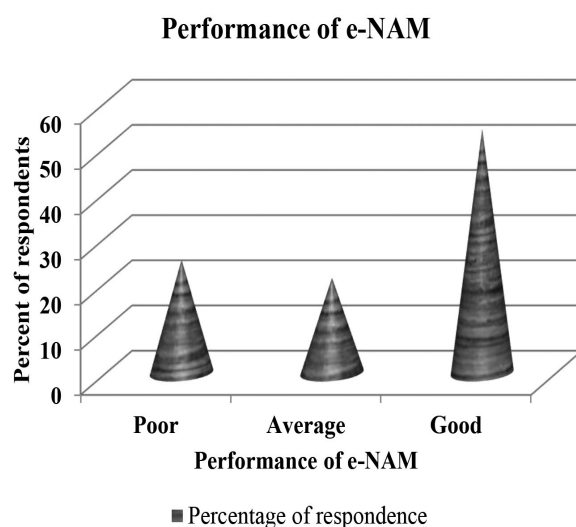


Fig. 4: Distribution of stakeholders based on the performance index

Comparison of indices of different stakeholders of e-NAM

From the Table8, it is concluded that all the stakeholders gave the highest mean score value to the market information sub-indicator, followed by transparency and quality assurance. Whereas all the stakeholders gave a poor mean score to Infrastructure compared to other sub-indicators.

The lowest mean score for Infrastructure was given by the commission agents, followed by farmers. The lowest mean score for transparency was given by farmers, followed by traders. The lowest mean score for quality assurance was also given by farmers, followed by traders. At the same time, farmers gave the lowest mean score for market information.

Table 8: Comparison of different stakeholders based on the mean score given by them towards performance index and its sub-indicators

Indicators (Mean score)	Farmers (n=30)	Traders (n=30)	FPOs (n=5)	Commission agents (n=25)	e-NAM Officials (n=10)
Infrastructure	50.59	54.51	56.47	50.35	57.65
Transparency	58.79	70.61	81.82	78.91	92.73
Quality assurance	54.29	61.90	74.29	66.00	70.71
Market information	80.56	91.11	90.00	90.67	95.00
Performance index	57.80	65.45	71.22	66.58	74.76

The relative contribution of various sub-indicators to the overall performance index was represented in a radar chart (Fig. 5). It is evident from the chart that Market information had the highest index value of 88.17 while Infrastructural security had the lowest index value of 52.71. Out of all sub-indicator, only market information had crossed the barrier of the three-fourth mark. So, we can conclude that much improvement is required in the study area in almost every aspect. The findings of Bandhavya *et al.* (2022) are supporting the results of present study.

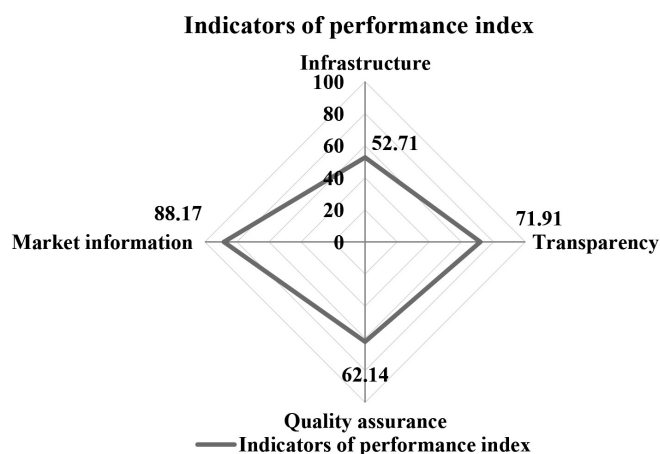
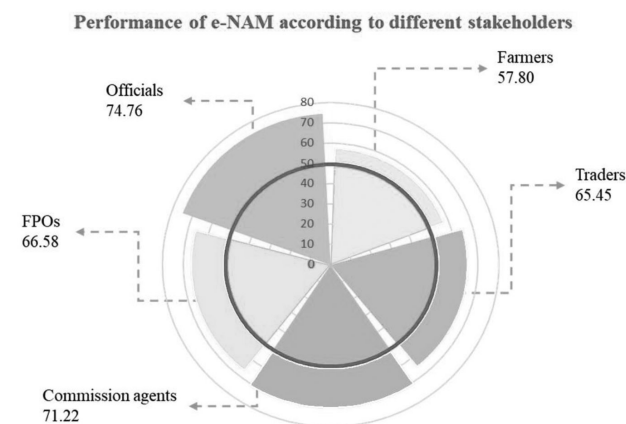


Fig.5: Contribution of different sub-indicators to the overall e-NAM performance index

From Fig 6, out of all stakeholders, the low average score for the performance of e-NAM was given by farmers and traders. This indicates that the significant purpose of implementing e-NAM (*i.e.*, to make benefit to farmers and traders) was not met. The highest average score for the performance of e-NAM was given by e-NAM officials.

Fig.6: Rose wind chart showing the contribution of different stakeholders' score to the overall e-NAM performance



CONCLUSION

Performance of e-NAM was found to be good. Farmers gave the lowest mean score to the performance of e-NAM than other stakeholders. The main aim of e-NAM is to benefit farmers and traders but they gave least score to e-NAM. Among different components of e-NAM, stakeholders gave a significantly high score to market information and the lowest score to the infrastructure of e-NAM. The relative contribution of various sub-indicators to the performance index of e-NAM, infrastructure had the lowest contribution than others and only market information had crossed the barrier of the three-fourth mark. So, still, there are a lot of scopes to improve the performance of e-NAM.

POLICY IMPLICATIONS

- (1) Infrastructure Gaps: Frequent repairs and delays in mandi infrastructure affect timely sales, causing potential losses due to daily price fluctuations.

- (2) Transparency and Quality Assurance: While e-NAM improves transparency, gaps in facilities like sorting, grading, and cold storage hinder full realization of market efficiency.

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CONFLICT OF INTEREST

All authors declare that they have no conflict of interest.

REFERENCES

- Bandhavaya, M., Singh, A. K., Lal, S. P., and 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://www.indianjournals.com/ijor.spx?target=ijor:ijee3&volume=58&issue=1&article=001>
- Bandhavaya, M., Singh, A. K., Lal, S. P., and Shukla, G. (2023). Perception of Five Diverse Stakeholders of National Agriculture Market (e-NAM) of Asia's Largest Chilli Centric Guntur Mandi in Andhra Pradesh. *Journal of Community Mobilization and Sustainable Development*. 18(3):750-758. <https://www.indianjournals.com/ijor.aspx?target=ijor:jcmsd&volume=18&issue=3&article=006>
- Bisen, J. and Kumar, R. (2018). Agricultural marketing reforms and e-national agricultural market (e-NAM) in India : a review. *Agricultural Economics Research Review*. 31(conference):167-176. <https://doi.org/10.5958/0974-0279.2018.00032.0>
- Deshmukh, S., and Patil, S. (2021). Transformation of Indian Agriculture with Digital marketing. *International Journal of Agriculture Sciences*. 13(10):10928-10931. <http://bioinfopublication.org/pages/article.php?id=BIA0005822>

Electronic National Agriculture Market (e-NAM) Manual for District Level Functionaries. (2017). https://darpg.gov.in/sites/default/files/enam_0.pdf

e-NAM (2020). <https://www.enam.gov.in/web>

Kalamkar, S. S., Ahir, K., and Bhaiya, S. R. (2019). Electronic National Agricultural Market (eNAM) in Gujarat: Review of Performance and Prospects. In *AERC Report* (Vol. 177, Issue March).

Mallick, B., Lal, S.P., and Gaur, R.S. (2023). Utilization Pattern of Diverse ICT Tools by Coastal Farmers during the Warning Stages of Cyclones. *Gujarat Journal of Extension Education* 36(2):90-96. <https://doi.org/10.56572/gjoe.2023.36.1.0017>

Nitish (2018). Economic Study of National Agriculture Market (eNAM) in Bikaner District of Rajasthan. Master's degree dissertation, Department of Agricultural Economics College of Agriculture, Bikaner Swami Keshwanand Rajasthan Agricultural University, Bikaner (Rajasthan).

Operational Guidelines for Promotion of National Agriculture Market (NAM) Through Agri-Tech Infrastructure Fund (ATIF) (2016). <https://webcache.googleusercontent.com/search?q=cache:LPjK8qGAGZAJ:https://enam.gov.in/web/docs/namguidelines.pdf+&cd=1&hl=en&ct=clnk&gl=in>

Sah, B., Chaudhary, S., Tripathi, A. K., Gangwar, R. R., and Rana, K. (2023). Electronic National Agriculture Market (e-NAM): A Review of the game changing Marketing Platform. *Agricultural Mechanization in Asia, Africa and Latin America*. 54(09): 15659-15668. <https://doi.org/10.13140/RG.2.2.22681.60001>

Samadder, S., Panday, S. P., and Lal, S. P. (2024). Utilization Pattern of ICT Tools among Potato Growers to Facilitate Appropriate Agricultural Practices. *Gujarat Journal of Extension Education* 37(1):39-45. <https://doi.org/10.56572/gjoe.2024.37.1.0006>

Sekhar, C. S. C. and Bhatt, Y. (2018). *Electronic National Agricultural Market (e-NAM): A Review of Performance and Prospects in Haryana*.

Shruti, Jha S.K., Lal, S.P., Bhakat, M. and Morya, K. (2016b). Role performance of Lay Inseminators in Karnal district of Haryana. *Indian Journal of Dairy Science*, 69 (5), 618-620. <http://dx.doi.org/10.5146/ijds.v0i0.52234>

- Shukla, G., Ansari, M. N., and Lal, S. P. (2024a). Assessment of agricultural information needs of farmers: Triangulating reliability of standardized information need index. *Gujarat Journal of Extension Education* 36(2):26-29. <https://doi.org/10.56572/gjoe.2024.37.2.0005>
- Shukla, G., Ansari, M. N., Lal, S. P., Bandhavya, M. and Singh, P. (2024b). Role of Mobile Phones in Enhancing Farmers' Information Seeking Behaviour: A Binary Logistic Regression Approach. *Indian Research Journal of Extension Education*. 24 (4): 145 –148. <https://api.seea.org.in/uploads/pdf/2024-84145148.pdf>
- Singh, P., Jirli, B., Ghadei, K., Roy, P. and Shilpa, B. (2024). Social Media Visibility of Krishi Vigyan Kendra's of India. *Journal of Community Mobilization and Sustainable Development*. 19(Special Issue):144-148. https://www.researchgate.net/publication/378803380_Social_Media_Visibility_of_Krishi_Vigyan_Kendra's_of_India
- Vinaya Kumar H. M., Patel J. B. and Chauhan, N. B. (2018). Attitude of farmers towards Agricultural Produce Market Committee. *Guj. J. Ext. Edu.* Vol. 29: Issue 2: December 2018 pp: 224-226.

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