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Exploring farmers perceived constraints of e-NAM

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Abstract
National Agriculture Market (e-NAM) was launched on 14th April 2016 as a pan-India electronic trading portal by the Government of India to network the existing Agricultural Produce Market Committees to create a unified agricultural commodities market in the country. It intends to provide remunerative prices to agricultural produce of farmers and real-time price discovery based on actual demand and supply. However, several anomalies, both at personal and organizational levels, thwarted the ultimate goal of providing remunerative prices for the farmer's produce. Since its inception, the scheme has faced various challenges in its implementation. The present investigation was undertaken in 2020 by using an exploratory research design to identify and analyse various constraints and suggestions perceived by e-NAM registered farmers. For constraints and suggestions analysis, a sample of 120 e-NAM registered farmers was taken purposively from Bhattiprolu, Kollur, Kollipara, Tenali, Mangalagiri and Duggirala mandals of Guntur district. The data were collected by personal interview method through a semi-structured interview schedule. Lack of remunerative prices (85.83%), cartelization of traders (80.83%) and lack of comprehension of the e-NAM trading process (75.83%) were the major economic, operational and technological constraints respectively faced by the e-NAM registered farmers. The major suggestions expressed by them were bid prices should start from MSP (94.16%), payment settlement on the same day of trading (90.83%) and Provision of live trading experience (89.16%). The integration process of APMCs, FPO trading modules, warehouse-based trading modules etc. should be hastened.

Keywords: APMC, e-NAM, constraints, farmers, market, suggestions, policy implications

Introduction
The agriculture sector plays an important role in the Indian economy. Almost two-thirds of the population directly or indirectly depend upon agriculture for their livelihood. Agriculture employs 41.5 per cent of the workforce, generating about 20.2 per cent of the nation's Gross Value Added (GVA). The country had witnessed spectacular advancement in terms of agriculture production and productivity. Even after the attainment of a bumper harvest, the farmers are still resorting to the distress sale of produce (Raju *et al*., 2022) [1]. Agriculture being a state subject, the state government is primarily responsible for the growth and development of the agriculture sector. Agricultural markets in the country have been subjected to various reform processes with the aim of enhancing market accessibility, transparency in market procedures and provision of remunerative prices to the farmers (Mishra and Narayan, 2017) [2]. The Agricultural Produce Marketing (Regulation) Act (APMRA) was enacted by most Indian states in the 1960s and 1970s to govern agricultural commodities markets (Chand, 2016) [3]. Regulated marketing structures, especially e-tendering systems, can help farmers for better

price realization (Vivek and Sahana, 2021) [4]. Though the APMC Act has had various reforms in the past, it has played a significant role in bringing order to agricultural markets. However, the agricultural markets fail to evolve in pace with the changing dynamics of the value chain and agricultural products. The agricultural markets in India still suffer from fragmentation, high transaction costs leading to issues like price volatility, interrupted the internal flow of trade, poor incentives to enhance productivity and quality, weak market signals and poor competitiveness in the domestic and international markets (Jairath and Shalendra, 2016; Behera and Modak, 2022) [5, 6]. Moreover, the farmers get a very low share of the production due to a long chain of middlemen.

Realizing the lacunae in the existing system of agricultural marketing, the Government of India promptly launched the National Agriculture Market (e-NAM) on 14th April 2016. It was envisioned as a virtual platform that interconnects physical existing wholesale markets across states and union territories (UTs) to enable online trade of agriculture and horticulture commodities using a transparent price discovery mechanism and to enable farmers to get remunerative prices for their produce (Reddy, 2018; Tyngkan *et al*., 2021) [7, 8].

The initiative had made its own mark in fulfilling its own goals and objectives towards the welfare of the farming community. However, several anomalies, both at the organizational and personal level, thwarted the ultimate goal of provision of remunerative prices for farmers' produce. There is a requirement to develop a scientific method of sensitization and organization of training programmes to enhance understanding and popularize the e-NAM among the farmers. As there was a wider gap between intent and execution, the scheme needs a thorough analysis to identify the ground level difficulties in its operation (Raju *et al*., 2022) [9]. Therefore, it was felt imperative to undertake a study to unearth the constraints faced by the farmers in electronic trading as well as the ways and means to overcome constraints as perceived by the farmers.

Methodology

Duggirala e-NAM integrated APMC in Andhra Pradesh was purposively selected for the study as it was the only e-NAM in the state having cent per cent online transactions during the investigation period and was actively marketing a single commodity, *i.e.,* Turmeric. Six mandals with the highest number of farmers registered and traded with Duggirala e-NAM integrated APMC, namely Bhattiprolu, Kollur, Kollipara, Tenali, Mangalagiri and Duggirala in Guntur district, were selected purposively for the study. The district lies approximately between 1500° 18' to 1600° 50' North latitudes and 790° 10' to 800° 55' East longitudes. A complete list of farmers who had successfully registered and traded Duggirala e-NAM integrated APMC was prepared in consultation with the staff of the e-NAM. From each of the selected mandal, twenty e-NAM registered and traded farmers were selected randomly, making a total of 120 respondents. The study was conducted in 2020 in the Guntur district of Andhra Pradesh. An exploratory research design was employed for the study. Constraints were operationalised as the bottlenecks perceived by the respondents in utilizing e-NAM and were organised and presented under three categories *viz.* technological constraints, operational constraints and economic constraints. Technological constraints represent any factor distinctive and unique to the respondent which prevents him or her from effective use of the intervention due to lack of technical knowledge/ literacy. Operational constraints include those factors which hinder the effective utilization and implementation of the scheme. Economic constraints were those economic factors which discouraged the respondents from utilising this innovative marketing platform. The responses were tabulated and analysed by using SPSS software. Simple statistical tools such as frequency, percentage, standard deviation and overall rank were applied to analyse the data and report the results as per the objectives framed for the study. The percentage is calculated by dividing the frequency of a particular category by the total number of respondents and multiplying by 100. The formula used for the purpose is given below.

$$\% = \frac{\text{Actual Number respondents}}{\text{Total respondents}} \times 100$$

The overall ranks were given on the basis of the highest to the lowest frequency.

Results and Discussion
Constraints faced by the respondents

To get a broad view of the constraints experienced and suggestions perceived by the respondents with respect to trading, the analysis was conducted under 3 major categories *viz.* technological constraints, operational constraints and economic constraints. It is evident from Table 1 that the major constraint faced by the respondents was the lack of remunerative price. Moreover, they also face distinctive problems of cartelization of traders, lack of comprehension of e-NAM trading process, price incommensurate with quality of produce, substantial decrease in bid prices of re-bidding, low participation of traders, difficulty to meet immediate cash requirements, poor functioning of quality assaying unit, lack of digital literacy, lack of live trading experience, high hamali charges, delay in payments, high transportation cost and lack of intermandi and interstate trade.

Table 1: Constraints faced by the respondents

(n=120)

S. No.	Constraint	Total	Rank Over Class	Overall Rank
	Technological constraints			
1.	Lack of comprehension of e-NAM trading process	91 (75.83)	1	III
2.	Lack of digital literacy	70 (58.33)	2	IX
	Operational constraints			
3.	Lack of live trading experience	63 (52.50)	5	X
4.	Poor functioning of quality assaying unit	73 (60.83)	4	VIII
5.	Lack of intermandi and interstate trade	37 (30.83)	7	XIV
6.	Cartelization of traders	97 (80.83)	1	II
7.	Substantial decrease in bid prices of re-bidding	82 (68.33)	2	V
8.	Low participation of traders	79 (65.83)	3	VI
9.	Delay in payments	51 (42.50)	6	XII
	Economic constraints			
10.	High hamali charges	55 (45.83)	4	XI
11.	High transportation cost	49 (40.83)	5	XIII
12.	Difficult to meet immediate cash requirements	75 (62.50)	3	VII
13.	Lack of remunerative price	103 (85.83)	1	I
14.	Price incommensurate with quality of produce	86 (71.67)	2	IV

(Source: Author's computation) (Figures in parentheses indicate percentages) (n=Number of respondents)

In the case of technological constraints, a lack of comprehension of the e-NAM trading process (75.83%) and a lack of digital literacy (58.33%) were identified as the primary constraints. Good comprehension skills, more time, curiosity and full involvement in every stage of trade are needed to be aware of the procedure flow, features and operational mechanism of e-NAM. Therefore, farmers perceived it as a complex trading process. Lack of digital literacy was the problem as most of the farmers were from rural backgrounds with less education; they had difficulty accessing smartphones, mobile apps and other online features like modal price, arrivals, pre-registration, previous day transactions trend, market information, *etc*. Bandhavya *et al*. (2022) [10] found that farmers had limited awareness of e-NAM due to their absence from the market. Many farmers sent their produce through commission agents, who primarily handled the e-NAM procedure, leaving the farmers less informed about the process. This was often because farmers needed to manage other field operations at home. Kumar *et al*. (2023) [11] concluded that the e-NAM process poses challenges for illiterate individuals.

In the case of constraints related to the operation of e-NAM, cartelization of traders (80.83%) was perceived as one of the most important constraints by the respondents and was ranked first in the problem hierarchy. Cartelization is a secret informal agreement among the traders to avoid competition in e-bidding by prefixing the bid prices to be quoted among themselves. The second-ranked constraint was a substantial decrease in bid prices in case of re-bidding (68.33%). When a farmer is dissatisfied with the final bid price in the first round of e-bidding, he/she can reject the bid and can participate in further rounds of e-bidding i.e., re-bidding. According to the respondent farmers, in rebidding, they were experiencing lower bids than the previous round of bidding due to collusion and repeated participation of the same local traders. Low participation of traders (65.83%) was ranked third. The probable reason behind the low participation of traders might be that in e-NAM, every transaction must be recorded, digitalized and monitored which might have made them reluctant to participate in online trading due to fear of coming under the tax bracket. Poor functioning of the quality assaying unit (60.83%) was ranked fourth because both farmers and traders did not have confidence in the reports of the quality assaying unit. Traders strictly rely on physical inspection to assess the quality of produce. On the other hand, a considerable proportion of farmers were not even aware of the existence of quality assaying units (Raju *et al*., 2022) [9]. Lack of live trading experience (52.50%), delay in payments (42.50%) and lack of inter-mandi and interstate trade (30.83%) were ranked fifth, sixth and seventh, respectively, in the problem hierarchy. Lack of live trading experience was perceived as a problem which might be due to lack of exhibition of live e-bidding through display boards in the market yard. The probable reason behind the delay in payments might be the technical glitches of e-NAM software and some procedural

anomalies. The lack of inter-mandi and inter-state trade might be due to the mandatory nature of a single trade license, the absence of provision of proper secondary transport and logistics facilities and mistrust of reports of quality assaying units on the part of traders.

When it comes to economic constraints, lack of remunerative prices (85.83%) was the major constraint and it was ranked first among all the constraints faced by the e-NAM registered farmers. Remunerative price realization is the main factor that determines the success of the farmer. The traders participating in e-bidding were local and few in number. Lack of competition and cartel formation of traders might be the main reasons behind low price realization. On the other side, substantial increases in input prices and transport costs had also declined crop income. The second ranked constraint was price incommensurate with the quality of produce (71.67%). Cartelization, lack of competition and low participation of traders in e-bidding might be the major reasons behind it. Difficult to meet immediate cash requirements (62.50%) was ranked third, which might be due to the fact that farmers need immediate cash payments to settle their expenses like transportation costs, hamali charges, grading charges, repayment to money lenders and input dealers, etc., and purchasing of agricultural inputs for the next season. For the same, farmers need cash immediately after the sale of produce. On the other side, they may also fear that if money is directly transacted to their bank accounts, the banks may deduct their unpaid overdue loan amount without their consent. High hamali charges (45.83%) were ranked fourth, which might be due to the reason that irrespective of the price realized, the farmer must pay the notified hamali charge immediately. Moreover, a few sample farmers expressed that the hamli charges that were being paid by them were not in proportion with the price realized on selling their produce in the market yard. High transportation cost (40.83%) was ranked fifth as it was a problem which might be due to the higher hiring charges of the transport agencies. It was very difficult for small and marginal farmers who were located in distant places to incur transportation costs, especially during peak seasons of the market. Noopur *et al*. (2023)[12] pointed out that small and marginal farmers face challenges due to high transportation costs and a lack of storage facilities, hampering their ability to market produce effectively.

The findings are in accordance with the studies reported by Bandhavya *et al*. (2022)[10], Kaur *et al*. (2021) [13], Bisen and Kumar (2018) [14], Nirmal (2017) [15], Gohain and Singh (2018) [16], Kala *et al*. (2020) [17] and Sonawane *et al*. (2020) [18].

Suggestions expressed by the respondents to overcome constraints
The responses to the suggestions expressed by the respondents while trading through e-NAM are furnished in Table 2.

Table 2: Suggestions given by the respondents to overcome constraints

(n=120)

S. No.	Suggestion	Frequency (f)	Percentage (%)	Rank
1.	Trainings on post-harvest management	81	67.50	VIII
2.	Dissemination of market information	93	77.50	VI
3.	Payment settlement on the same day	109	90.83	II
4.	Hamali charges regulation	89	74.16	VII
5.	Bid prices should start from MSP	113	94.16	I
6.	Proper awareness and trainings on e-NAM	104	86.67	IV
7.	Logistics and transport	73	60.83	X
8.	Effective feedback mechanism	99	82.50	V
9.	Provision of live trading experience	107	89.16	III
10.	Efficient functioning of quality assaying unit	76	63.33	IX

(Source: Author's computation) (n=Number of respondents)

It is evident from Table 2. that bid prices should start from the Minimum Support Price (MSP) (94.16%) was the major suggestion, and it was ranked first among all the suggestions given by the respondents. As the price quoted by traders was not remunerative, the farmers might have suggested that bids by default should start at least from the minimum support price. On the other side, most of the respondent farmers were not aware of the provision that e-bidding allows them to set up the minimum selling price of their respective lot in the portal.

Payment settlement on the same day of trading (90.83%) was ranked II by the respondents. After the successful online payment by a trader to e-NAM account, e-NAM takes at least one business day to credit the amount in the bank account of the farmers. Farmers need immediate cash to meet their expenses like transportation, loading, unloading, procurement of inputs etc. Live trading experience (89.16%) was ranked III by the respondents. As farmers were reluctant about the online trading process, they opined that there should be a provision of an auction hall with a display board/projector screen showing the bids quoted by trades to their respective lots. Display in the local language will provide more live trading experience to farmers. Further, pop-up messages to registered mobile numbers for every bid quotation make the process more transparent.

Proper awareness and training on e-NAM (86.67%) was ranked next which might be due to the reason that most of the respondent farmers were not aware of the guidelines and operation procedure of e-NAM, organization of need-based awareness and training programmes can improve their understanding and participation. Effective feedback mechanism (82.50%) was ranked next which might be due to the fact that feedback is an effective tool to improve the performance of any scheme. Farmers suggested that e-NAM officials should take feedback at the end of trade which provides them an opportunity to express their problems and suggestions that help to reform policies and procedures for better utilization of this innovative marketing platform. Dissemination of market information (77.50%) was ranked next. The probable reason might be that most of the farmers were not aware of both e-NAM mobile application and the online portal that provides market information on a daily basis. As market intelligence is one of the factors that determine the success of the farmer, they might have suggested disseminating daily market information through SMS, print media and other electronic means. Hamali

charges regulation (74.16%) was ranked next because farmers opined that costs incurred for loading & unloading of produce in the market were very high. They suggested that the government should make a provision to reduce that cost burden on them.

Training on post-harvest management (67.50%) was ranked next which might be to meet the better-quality standards. The efficient functioning of the quality assaying unit (63.33%) was ranked next. Due to a lack of credibility on the report of the quality assaying unit, traders from other mandis were not participating in e-bidding of e-NAM, which in turn decreased competition among them. Even the local traders rely on the physical inspection of produce. Hence, the reports of quality assaying units were of namesake and were used merely to enter into records only. Therefore, respondent farmers might have suggested the provision of a trusted and efficient quality assaying unit. Logistics and transport facilities (60.83%) were ranked next as the farmers incur heavy transportation charges due to the long distance of the market from their farm. It was difficult to find a transport vehicle with reasonable cost during the peak season of marketing, especially for small and marginal farmers. On the other side, the lack of proper transport and logistics facilities in the market hinders the participation of traders from other mandis across the country. Hence, they might have suggested providing logistics and transport facilities at a reasonable cost. Sravani *et al*. (2022) [19] stressed the importance of designing effective strategies, including training programs, demonstrations, and the development of regulated marketing policies such as Minimum Support Price, along with provisions for storage facilities. Marbaniang *et al*. (2020) [20] accentuated the importance of enhancing agricultural marketing systems with price information, technology transfer, and strong linkages for broader market access, emphasizing the need for intensified research and innovation in marketing policies and technologies.

These findings are in agreement with the findings of Gupta and Badal (2018) [21], Gohain and Singh (2018) [16], Reddy and Mehjabeen (2019) [22] and Sonawane *et al*. (2020) [18].

Conclusion

It is evident from the study that the transition towards electronic trading of farmers' produce is not without constraints. The major economic, operational and technological constraints faced by the respondents were lack of remunerative prices, cartelization of traders and lack of

comprehension of the e-NAM trading process. The major suggestions were MSP as a minimum bid price, payment settlement on the same day of trading and provision of live trading experience. There is a wider gap between the intent and execution of e-NAM. The National Agricultural Market (e-NAM) is undoubtedly a milestone initiative that may go a long way to ensure remunerative prices and transparent price discovery for farmers. However, the success of this scheme will largely depend upon the effective participation of stakeholders. There is a requirement to develop a scientific method of sensitization and organization of training programmes to enhance understanding and popularize the e-NAM among the farmers.

Policy implications
The major findings of the present study have significant implications for extension workers, planners, policymakers, and administrators. Some of the important implications are given below.

- Extension agents and concerned marketing officials should organize and impart different training programmes followed by hands-on experience using the e-NAM portal/ mobile application so that farmers develop confidence in this electronic trading initiative and improve their socio-economic condition.
- The government should create adequate infrastructure facilities such as sophisticated e-auction halls, grading/ sorting/ packaging/ storage facilities, drying platforms, and quality assaying equipment. The required manpower should also be recruited to address the needs of the farmers during the peak season arrival period.
- Inter-mandi and inter-state trade should be encouraged by the provision of incentives to the traders/ buyers.
- Farmers should be connected to mandi and facilitated with basic infrastructure facilities, especially cold stores, godowns, platforms, assaying labs, and sorting/ grading/ packaging facilities, which may increase the value of their produce.
- A live lot tracking system should be adopted to trace the current status of their produce by the respective seller/ farmer.
- Quality assaying should be made compulsory for trading, and the Government should channel its efforts towards the creation and development of an efficient and cost-effective third-party quality assaying unit with harmonized tradable parameters that can be accepted by the farmers and traders across the country. Further, an Automated/ Artificial intelligence-based quality assaying system should be established to prevent the manual feeding of manipulated data of quality parameters of farmers' produce by the quality analysts in the e-NAM portal.
- The e-NAM portal/ mobile application should be available in local languages so that its stakeholders across the country can better utilize it.
- The government should take measures to hasten the integration of a greater number of APMCs, FPO trading modules, warehouse-based trading modules, and private markets with e-NAM in order to enhance farmers' participation, accessibility, and utilization of the platform.

- It is recommended to harmonize the auction time of each specific commodity, and simultaneous e-bidding of each specific commodity should be implemented across the country.
- It can also be recommended to provide organizational facilities and support in the form of low cost logistics and transport facilities.
- Regular workshops, capacity development programmes, and training programmes need to be organized for farmers, traders, and market officials. Farmers should also be sensitized about tradable parameters and ranges of produce to be sold through e-NAM.
- These measures can ensure the higher participation of traders across the country, which in turn enhances competition, reduces cartelization among the traders and improves the functioning of e-NAM in an efficient and effective manner.

Conflict of Interest
The authors have no conflicts of interest.

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