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## Farmers' Perceived Effectiveness of e-NAM

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### ABSTARCT

*National Agriculture Market (e-NAM) is a pan-India electronic trading portal that networks the existing APMC mandis to create a unified national market for agricultural commodities. The study investigated the effectiveness of e-NAM perceived by e-NAM registered farmers in Duggirala market of Andhra Pradesh during 2019-2020. A total sample of 120 farmers was randomly selected from six mandals viz. Kollur, Kollipara, Bhattiprolu, Tenali, Mangalagiri and Duggirala of Guntur district in Andhra Pradesh. The data were collected with pre-structured interview schedule. The perceived effectiveness of e-NAM was studied and measured under three categories viz. process related effectiveness, price related effectiveness and features related effectiveness. Transparency in weighment ( $Z=1.79$ ), minimization of commission charge ( $Z=1.67$ ), enhancement of infrastructural facilities ( $Z=1.62$ ) was perceived effective by the respondents among process, price and features related effectiveness categories of e-NAM respectively. Further, it was observed that majority of the respondents (54.17%) had perceived medium level of effectiveness, followed by low (23.33%) and high (22.50%) levels of effectiveness of e-NAM. It can be recommended to provide organizational facilities and support in the form of low-cost logistics, transport facilities, adequate infrastructure and proper trainings on awareness & usage of e-NAM for enhancing its effectiveness further.*

**Key words:** National Agriculture Market; e-NAM, Perception; Effectiveness; Impact; Price; APMC; Market.

India is largely an agrarian economy, with agricultural sector constituting about half of the workforce (Vetrivel and Manigandan, 2013). The country had witnessed remarkable progress in terms of agriculture production and productivity (Sihmar, 2014; Dhaliwal, 2015). Even after the fulfilment of bountiful harvest, the farmers are still resorting to distress sale of produce (Bhanot et al., 2021). Agricultural markets in the country have been subjected to various reform processes with an aim of enhancing market accessibility, transparency in market procedures and provision of remunerative prices to the farmers (Mishra and Narayan, 2017; Manjula, 2021). 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). All the primary wholesale markets were brought under

the ambit of this act. It was mandated that agricultural products be sold only at designated regulated markets through registered market intermediaries governed by Agricultural Produce Market Committee (Aggarwal et al., 2017). 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 value chain and agricultural products. The agricultural markets in India still suffer from fragmentation, high transaction cost leading to issues like price volatility, interrupted internal flow of trade, poor incentives to enhance productivity and quality, weak market signals and poor competitiveness in the domestic and international markets (Ul-Rehman, 2012). Moreover, the farmers get a very low share of the production due to long chain of middlemen (Meena et al., 2019).



Realizing the lacunae in the existing system of agricultural marketing, Government of India has promptly launched 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 (*Raju et al., 2020*). Small Farmers Agribusiness Consortium (SFAC) is the lead agency for its implementation and Nagarjuna Fertilizers and Chemicals Ltd. is the strategic partner which is accountable for development, operation and maintenance of the platform. Directorate of Marketing and Inspection (DMI) provides technical support for harmonization of standards for different trading commodities and assaying facilities, National Information Centre (NIC) provides necessary servers to the portal (*Reddy, 2018*). The key stakeholders include Farmers, Traders, APMCs, Assaying Bodies, Farmer Producer Organisations (FPOs), Banks, Logistics operators, Warehouses, Mandi board etc. The scheme is ambitiously envisioned as an innovative agricultural marketing initiative which aims to enhance farmer's digital accessibility to multiple numbers of buyers and markets. It was intended to provide quality commensurate price realization, improve the mechanism of price discovery, streamline the procedures across the integrated agricultural markets in the country, remove information asymmetry between buyers and sellers (*Raju et al., 2021*) and also to create the "One Nation, One Market" concept for agricultural products. It also would provide the farmers with multiple options of sale of their produce and enhance market accessibility through warehouse-based sale (*Yadav and Sharma 2017*). The price of agricultural produce is mostly determined by demand, supply, climate conditions, market distance from the production area, product quality etc.

The e-NAM portal also provides single window services for all Agricultural Produce Market Committee (APMC) related information and services which includes commodity prices and arrivals, quality, settlement of e-payment settlement etc. (*Aditya and Bhaskar, 2017*). As the scheme was aimed at achieving utmost success in supporting the farming community in enhancing their farm income, the participation of the farming community be at higher side. But realistically

the scheme had not been reaching the farming community because of its operational encroachments by the other stakeholders of the e-NAM. Since the inception, the scheme had faced various challenges in its implementation. Several irregularities both at organizational and personal level hindered the ultimate goal of provision of remunerative prices for farmers produce. The value and effectiveness of any scheme can only be judged through perception and response of the beneficiaries (*Badodiya et al., 2010*). Success of this scheme largely depend upon the knowledge possessed and effectiveness perceived by the farmers towards various features, and functioning of the e-NAM (*Raju et al., 2022*). Therefore, a systematic study was conducted to measure the effectiveness of e-NAM as perceived by the beneficiary farmers

## METHODOLOGY

The study was conducted in Guntur district of Andhra Pradesh during 2019-2020 by adopting Exploratory and Ex-post facto research designs. The district lies approximately between 1500 18' to 1600 50' North latitudes and 790 10' to 800 55' East longitudes. Duggirala e-NAM integrated APMC in Andhra Pradesh was purposively selected for the study. Six mandals with highest number of Duggirala e-NAM registered farmers namely Bhattiprolu, Kollur, Kollipara, Tenali, Mangalagiri and Duggirala in Guntur district were selected purposively. From each of the selected mandal, twenty e-NAM registered farmers were selected randomly, making a total of 120 respondents. The respondent for the study was operationally defined as the farmers who registered and traded with e-NAM in Duggirala APMC of Andhra Pradesh. The primary data were collected personally with the help of an interview schedule; the interviews were conducted on farmer's field or in their homes through face-to-face contact.

Three categories such as price, process and features were studied to measure the perceived effectiveness of e-NAM. A total of 19 statements regarding 3 categories/parameters were presented to the respondents with three possible answers for each statement scored on a continuum 3 to 1 viz. good, fair and poor. The obtainable scores ranged between 57 and 19 respectively. Later the responses were tabulated and analysed by using statistical tools such as frequency and percentage. Standard normal deviation (Z) test was used to measure the effectiveness of e-NAM in terms



of identified items. Accordingly, the ranks were given to each item based on the Z value. The formula used for the purpose was given below.

$$\bar{Z} = \frac{\sum Z_i}{n} \quad Z_i = \frac{x_i - \bar{x}}{\sigma}$$

Where  $x_i$  is the score for  $i^{\text{th}}$  item,  $\bar{x}$  is the mean score of all items,  $n$  is the number of items and  $\sigma$  is the Standard deviation calculated on  $x_i$  values. The perceived effectiveness was categorized into three categories of the level of perceived effectiveness *i.e.* low, medium and high.

## RESULTS AND DISCUSSION

The data on classification of sample respondents according to their level of perceived effectiveness of e-NAM is given in Table 1. Majority of the respondents (54.17%) had perceived medium level of effectiveness, followed by low (23.33%) and high (22.50%) levels of effectiveness of e-NAM. The respondents were observed in all the categories of low, medium and high but the least proportion were found in high perceived effectiveness category and major proportion of respondents fell in the categories of medium and low. The findings are accordance with the study reported by *Badodiya et al., (2010)* and *Mukherjee et al., (2016)*.

From the Table 2, it could be inferred that more than two third (67.50%) of the respondents perceived effectiveness of e-NAM in minimization of commission charge as good followed by fair (28.33%) and poor (4.17%). It was ranked first ( $Z=1.67$ ) among the items of price related perceived effectiveness of e-NAM. This could be accounted for the reason that commission agents and brokers were not allowed

to participate in trading through Duggirala market even far before integration with e-NAM, which had completely eliminated commission charges. Less than one half (45.00%) of the respondents perceived effectiveness of e-NAM in deduction of marketing cost as fair followed by poor (44.17%) and good (10.83%). High transportation cost and high hamali charges for different operations while trading might have increased the marketing cost. On the other hand, complete absence of commission agents and brokers in market might have reduced the marketing cost to some extent. More than two third (68.33%) of the respondents perceived effectiveness of e-NAM in maintaining price stability of the commodity as poor followed by fair (29.17%) and good (2.50%). The probable reason for this trend might be due to fluctuations in market arrivals and low participation of traders in e-bidding of e-NAM. Majority (74.10%) of the respondents perceived effectiveness of e-NAM in provision of remunerative prices for agricultural produce as poor followed by fair (17.50%) and good (8.33%). The probable reason for this distribution was the low participation of traders in e-bidding at market, state and country level. The prices quoted by traders in e-bidding were not satisfactory to many farmers. Majority (87.50%) of the respondents perceived effectiveness of e-NAM in providing prices that commensurate with quality of produce as poor followed by fair (10.83%) and good (1.67%). The probable reason for this distribution might be due to continuous realization of non-remunerative prices on part of e-NAM traded farmers irrespective of quality of produce. Cartelization among local traders and lack of trust on quality assaying report by both traders and farmers might have influenced the above trend. The results were in line with the findings of *Kumar and Pant (2020)* and were partly analogous to the findings of *Bhattacharya and Chowdhury (2021)* which suggested that introduction of e-NAM had improved market integration for onion market prices in India.

From the Table 3, it could be inferred that

**Table 1. Distribution of respondents according to their level of perceived effectiveness of e-NAM (N= 120)**

Category	No.	%
Low effectiveness	28	23.33
Medium effectiveness	65	54.17
High effectiveness	27	22.50

**Table 2. Perceived effectiveness of respondents regarding price parameter of e-NAM (N=120)**

Price related effectiveness	Good	Fair	Poor	Z-value	Rank
Provision of remunerative price	10 (08.33)	21 (17.50)	89 (74.10)	-0.86	IV
Maintaining stability in price	3 (02.50)	35 (29.17)	82 (68.33)	-0.85	III
Price commensuration with quality	2 (01.67)	13 (10.83)	105 (87.50)	-1.24	V
Deduction in cost of marketing	13 (10.83)	54 (45.00)	53 (44.17)	-0.22	II
Minimization of commission charge	81 (67.50)	34 (28.33)	5 (04.17)	1.67	I



**Table 3. Perceived effectiveness of respondents regarding features parameter of e-NAM (N=120)**

Features related effectiveness	Good	Fair	Poor	Z Value	Rank
Infrastructural facilities	79 (65.83)	35 (29.17)	6 (05.00)	1.62	I
Single window information service	17 (14.17)	65 (54.17)	38 (31.67)	0.09	II
Online payment to the farmers	46 (38.33)	50 (41.67)	24 (20.00)	0.79	IV
Dispute redressal mechanism	55 (45.83)	46 (38.33)	19 (15.83)	1.02	II
Quality assaying system	7 (05.83)	45 (37.50)	68 (56.67)	-0.56	V

**Table 4. Perceived effectiveness of respondents regarding process parameter of e-NAM (N=120)**

Process related effectiveness	Good	Fair	Poor	Z Value	Rank
Transparency in auction process	6 (05.00)	43 (35.83)	71 (59.17)	-0.62	V
Increase in demand of commodity	4 (03.33)	25 (20.83)	91 (75.83)	-0.98	IX
Enhancing market arrivals	5 (04.17)	28 (23.33)	87 (72.50)	-0.90	VII
Participation of traders	3 (02.50)	32 (26.67)	85 (70.83)	-0.90	VIII
Disintermediation of markets	43 (35.83)	30 (25.00)	47 (39.17)	0.37	III
Alleviation of cartel among traders	7 (05.83)	30 (25.00)	83 (69.17)	-0.80	VI
Reduction in transaction time	23 (19.17)	41 (34.17)	56 (46.67)	-0.10	IV
Transparency in weighment	87 (72.50)	29 (24.17)	4 (03.33)	1.79	I
Transparency in payments	43 (35.83)	54 (45.00)	23 (19.17)	0.76	II

nearly two third (65.83%) of the respondents perceived effectiveness of e-NAM in enhancement of infrastructural facilities in APMC as good followed by fair (29.17%) and poor (5.00%). It was ranked first ( $Z=1.62$ ) among the items of features related perceived effectiveness of e-NAM. The probable reason for this distribution might be due to provision of various facilities like auction platform, galvalume roofing sheds, godowns, display boards, rythu rest house, electronic weighing scales, digital moisture meter, weigh bridge, free food and water supply, sale counter of fertilizer and seeds *etc.* Less than one half (45.83%) of the respondents perceived dispute redressal mechanism of e-NAM as good followed by fair (38.33%) and poor (15.83%). The probable reason for this distribution might be due to in-time response and problem solving on part of marketing officials of e-NAM. More than two fifth (41.67%) of the respondents perceived online payment in e-NAM as fair followed by good (38.33%) and poor (20.00%). This could be accounted for the reason that the farmers might have experienced substantial reduction in unscrupulous deductions while trading through e-NAM since the amount was credited directly in to their bank accounts. More than one half (54.17%) of the respondents perceived effectiveness of e-NAM in provision of single window information services through portal as fair followed by poor

(31.67%) and good (14.17%). The probable reason for this distribution might be due to dissemination of market prices and information through e-NAM mobile application & portal, display boards in mandi, newspapers and television. Less than three fifth (56.67%) of the respondents perceived quality assaying unit of e-NAM as poor followed by fair (37.50%) and good (5.83%). The probable reason for this distribution might be due to lack of trust on report of quality assaying unit on part of both farmers and traders as the prices quoted by bidders might not have matched the quality of produce. On the other hand, some farmers were unaware of existence of quality assaying unit and its functions. The results were in accordance with the findings of *Kaur et al., (2021)* and *Kumar and Pant (2020)*.

The data presented in the Table 4 revealed that majority (72.50%) of the respondents perceived transparency in weighment of e-NAM as good followed by fair (24.17%) and poor (3.33%). It was ranked first ( $Z=1.79$ ) among the items of process related perceived effectiveness of e-NAM. This could be accounted for the reason that all the weighments in Duggirala APMC must be done through electronic weighment scales in the presence of farmers. Less than one half (45.00%) of the respondents perceived transparency in payments of e-NAM as fair followed by good (35.83%) and poor (19.17%). This could be



accounted for the reason that substantial reduction in malpractices such as unscrupulous deductions and bribery in market yard. Nearly two fifth (39.17%) of the respondents perceived effectiveness of e-NAM in disintermediation of markets as poor followed by good (35.83%) and fair (25.00%). This could be accounted for the reason that cent per cent elimination of commission agents by Duggirala mandi even before implementation of e-NAM. Less than one half (46.67%) of the respondents perceived effectiveness of e-NAM in reducing transaction time as poor followed by fair (34.17%) and good (19.17%). This could be accounted for the reason that delays in payments from e-NAM to the bank accounts of farmers due to technical glitches. Nearly three fifth (59.17%) of the respondents perceived transparency in auction process of e-NAM as poor followed by fair (35.83%) and good (5.00%). This could be accounted for the reason that the prices quoted by different traders across the country to the unique lot and winner transaction details were not displayed on digital display boards by market officials, as expressed by farmers which hinders live trade experience and does not ensure transparency of auction process. More than two third (69.17%) of the respondents perceived effectiveness of e-NAM in alleviation of collusion and cartelization among traders as poor followed by fair (25.00%) and good (5.83%). The probable reason for the above distribution might be due to quotation of frequent low bids from local traders in e-bidding, low participation of the traders, and informal price quotation by the traders to the farmers even before bidding. Less than three fourth (72.50%) of the respondents perceived effectiveness of e-NAM in enhancing market arrivals of commodity as poor followed by fair (23.33%) and good (4.17%). This could be accounted for the reason that continuous lower price realization of farmers by trading in e-NAM, decreased demand for their produce in the market yard and cartelization among traders. Less than three fourth (70.83%) of the respondents perceived effectiveness of e-NAM in enhancing participation of traders in auction process as poor followed by fair (26.67%) and good (2.50%).

Lack of transport and logistics facilities might have discouraged the participation of traders from other markets across the state and country that in turn hinders interstate and intermandi trade on e-NAM platform. More than three fourth (75.83%) of the respondents perceived effectiveness of e-NAM in increasing demand of commodity as poor followed by fair (20.83%) and good (3.33%). Seasonal nature of production, lack of export-oriented production on part of farmers and low participation of traders from different states due to lack of logistics and transport facilities might have influenced for decreased demand. The findings are accordance with the studies of *Kaur et al., (2021)*, *Sonawane et al. (2020)*, *Gupta and Badal (2018)* and *Kumar and Pant (2020)*.

## CONCLUSION

It can be concluded that majority of the respondents had perceived overall medium to low effectiveness on e-NAM. The study throws light on some interventions related to auction time of each specific commodity and stresses the need of simultaneous e-bidding for each commodity across the country. Further, quality assaying should be made compulsory for trading and Government should channelize its efforts towards 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. However, it can also be recommended to provide organizational facilities and support in the form of low-cost logistics, transport facilities for procurement and delivery, storage facilities at mandi, adequate infrastructure and proper trainings on awareness & usage of e-NAM. These measures can ensure higher participation of traders across the country which in turn enhances competition, reduces cartelization among the traders and improves effectiveness of e-NAM. Thus, various strategies should be implemented to enhance the effectiveness of e-NAM.

## CONFLICTS OF INTEREST

The authors have no conflicts of interest.

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