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Constraints faced by farmers in utilizing e-NAM services in Jharkhand: A Garrett ranking analysis

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Abstract

The Electronic National Agriculture Market (e-NAM) was introduced to improve market access, transparency, and price discovery for farmers through a unified digital trading platform. The present study was conducted in three districts of Jharkhand, namely East Singhbhum, Hazaribagh, and Garhwa, during 2022-23 to identify and prioritise the constraints faced by farmers availing e-NAM services. A total of 60 respondents were selected through snowball sampling, and Garrett Ranking Technique was employed for analysis. The findings revealed that poor digital literacy was the most severe constraint, followed by the inability to sell the entire produce through e-NAM, lower prices compared to traditional mandis, and server-related issues. The study highlights the need for digital capacity building, improved platform efficiency, and stronger institutional support to enhance farmers' participation in e-NAM and promote effective digital agricultural marketing.

Keywords: e-NAM, agricultural marketing, digital literacy, Garrett ranking

Introduction

Despite technological innovations and the advent of Industry 4.0, which have transformed various sectors of the economy, Indian farmers continue to face considerable challenges in accessing markets efficiently and obtaining fair and remunerative prices for their agricultural produce. Studies indicate that the share of farmers in the consumer's rupee ranges from 28 to 78 percent across different agricultural commodities, reflecting substantial variations in marketing efficiency and often inadequate returns to producers (Bhoi *et al.*, 2019) [1]. Limited educational attainment, inadequate market intelligence, and weak bargaining power further constrain farmers' ability to make informed marketing decisions, leaving them vulnerable to economic exploitation.

The agricultural marketing system in India has traditionally been characterised by fragmented markets, the dominance of intermediaries, and the presence of numerous small-scale market actors. Such inefficiencies have restricted effective price transmission and reduced the benefits of market competition for farmers (Chand, 2016) [4]. Consequently, producers often fail to realise fair and competitive prices for their produce.

To overcome the persistent challenges in agricultural marketing across the country, the Government of India launched the Electronic National Agriculture Market (e-NAM) in 2016, drawing inspiration from the successful Karnataka model. e-NAM is a pan-India electronic trading platform designed to integrate Agricultural Produce Market Committee (APMC) mandis and create a unified national market for agricultural commodities. Through a transparent and competitive online bidding system, the platform aims to ensure fair price discovery and provide farmers with access to a wider market beyond geographical boundaries.

The e-NAM platform offers farmers enhanced marketing opportunities by facilitating online trading, competitive price discovery, and direct electronic payment into their bank accounts. It promotes greater transparency, improves market accessibility, and reduces information asymmetry in agricultural marketing. Acting as a centralised portal, e-NAM provides a range of market-related services, including information on commodity arrivals, quality parameters, prevailing market prices, buy and sell offers, and online settlement of transactions. In addition, the platform enables farmers to access valuable market intelligence such as commodity price trends, weather information, and agricultural input prices, thereby

supporting informed decision-making. By connecting farmers, traders, and buyers on a common digital platform, e-NAM facilitates efficient market transactions, strengthens market integration, and enhances the potential for farmers to secure better returns for their produce.

However, despite the numerous advantages offered by the e-NAM platform, farmers availing its services continue to encounter several challenges that hinder the transition towards digital agricultural marketing. Farmers in the selected districts faced several challenges in utilising e-NAM services, primarily due to poor digital literacy, limited knowledge of e-trading procedures (Kaur *et al.* 2021) [5] and difficulties in payment realisation, often requiring multiple visits to banks.

In view of the above context, the present study was conducted to identify and prioritise the constraints experienced by farmers availing e-NAM services in Jharkhand through Garrett ranking analysis. The study seeks to assess farmers' perceptions of various production and marketing challenges and determine their relative importance. The findings are expected to support the formulation of targeted policy measures, strengthen the functioning of e-NAM, and facilitate the sustainable development of the agriculture marketing sector in the state.

Methodology

The present study was conducted during 2022-23 in three districts of Jharkhand, namely East Singhbhum, Hazaribagh, and Garhwa, to analyse the constraints faced by farmers associated with the Electronic National Agriculture Market (e-NAM). A total of 60 respondent farmers availing e-NAM services were selected through the snowball sampling technique, comprising 20 respondents from each district. Primary data were collected through personal interviews using a pre-tested and structured interview schedule specifically designed for the study. The collected data were systematically classified, tabulated, and analysed using appropriate statistical tools. To identify and prioritise the constraints based on their perceived severity, the Garrett Ranking Technique was employed. This technique converts the ranks assigned by respondents into numerical scores, thereby facilitating meaningful comparison and prioritisation of the constraints encountered by farmers in utilising e-NAM services. Each respondent was asked to rank the identified constraints from most severe to least severe. The ranks assigned by each respondent were

converted into percent positions using the formula suggested by Garrett and Woodworth (1981) [9]:

$$\text{Percent Position} = 100 (R_{ij} - 0.50) / N_{ij}$$

where R_{ij} denotes the rank assigned to the i th item by the j th respondent, and N_{ij} represents the total number of items ranked by the j th respondent.

The calculated percent positions were then converted into Garrett scores using the Garrett Conversion Table. The scores obtained for each constraint from all respondents were summed to derive the total Garrett score. Subsequently, the total Garrett score was divided by the number of respondents to obtain the Garrett Mean Score for each constraint. The constraints were finally ranked based on their Garrett Mean Scores, with higher scores indicating greater severity and importance.

Result and Discussion

The constraints presented in Table 1 highlight the major challenges encountered by farmers in utilising e-NAM services effectively. A total of 15 constraints were identified through preliminary surveys and the identified constraints encompass technological, informational, operational, and institutional aspects of digital agricultural marketing. Table 2 presents the percentage positions corresponding to the ranks assigned by respondents to the identified constraints. As each respondent ranked twelve constraints ($N = 15$), the percent position for each rank was calculated using Garrett's prescribed formula. The computed percent positions ranged from 3.33 percent for the first rank to 96.67 percent for the fifteenth rank, indicating the relative standing of each rank within the ranking scale. These percentage positions served as the basis for converting qualitative rank data into quantitative measures.

Table 3 shows the Garrett scores corresponding to the calculated percent positions, obtained from the standard Garrett and Woodworth conversion table. Each percent position was assigned a specific Garrett score, with higher-ranked constraints receiving higher scores. For example, the first rank, with a percent position of 3.33 percent, was assigned a Garrett score of 82, whereas the fifteenth rank, with a percent position of 96.67 percent, received a score of 14. This procedure enabled the transformation of respondents' ordinal rankings into numerical values, thereby facilitating the aggregation, comparison, and prioritisation of the constraints based on their perceived severity.

Table 1: Constraints faced by farmers availing e-NAM

S. No.	Constraints
1.	Poor digital literacy
2.	Sometimes not able to sell whole quantity of produce through e-NAM platform.
3.	Sometimes, e-NAM price was less than the mandi price
4.	Server issue
5.	Shortage of labour in marketing activities
6.	Time-consuming e-NAM auction process
7.	Lack of training about e-NAM
8.	Incomplete information about e-NAM
9.	Multiple visits to bank for payment
10.	Lack of awareness about e-NAM
11.	Appealing method of advertisement not used
12.	Inconsistent grading
13.	Local traders and extension workers do not communicate with the people
14.	Farmer does not understand content displayed on the computer and projector screen.
15.	Dominance of English language.

Table 2: Percent Position Calculation (N = 15) for constraints faced by farmers availing e-NAM

Rank	100 (Rij-0.5)/Nj	Percent Position (%)
I	100(1-0.5)/15	3.33
II	100(2-0.5)/15	10.00
III	100(3-0.5)/15	16.67
IV	100(4-0.5)/15	23.33
V	100(5-0.5)/15	30.00
VI	100(6-0.5)/15	36.67
VII	100(7-0.5)/15	43.33
VIII	100(8-0.5)/15	50.00
IX	100(9-0.5)/15	56.67
X	100(10-0.5)/15	63.33
XI	100(11-0.5)/15	70.00
XII	100(12-0.5)/15	76.67
XIII	100(13-0.5)/15	83.33
XIV	100(14-0.5)/15	90.00
XV	100(15-0.5)/15	96.67

Table 3: Garrett values corresponding to percent positions of constraints faced by farmers availing e-NAM.

Rank	Percent Position (%)	Garrett Value
I	3.33	82
II	10.00	70
III	16.67	63
IV	23.33	58
V	30.00	54
VI	36.67	51
VII	43.33	48
VIII	50.00	45
IX	56.67	42
X	63.33	39
XI	70.00	36
XII	76.67	32
XIII	83.33	28
XIV	90.00	22
XV	96.67	14

Table 4: Total and Mean Garrett Score for constraints faced by farmers availing e-NAM

Sl. No.	Statements	Total Garrett Score	Mean Garrett Score	Rank
1.	Poor digital literacy	4502	75.03	I
2.	Sometimes not able to sell whole quantity of produce through e-NAM platform.	4247	70.78	II
3.	Sometimes, e-NAM price was less than the mandi price.	3907	65.11	III
4.	Server issue	3802	63.36	IV
5.	Shortage of labour in marketing activities	3630	60.50	V
6.	Time-consuming e-NAM auction process	3226	53.76	VI
7.	Lack of training about e-NAM	2806	46.76	VII
8.	Incomplete information about e-NAM	2993	49.88	VIII
9.	Multiple visits to bank for payment	2587	43.11	IX
10.	Lack of awareness about e-NAM	2492	41.53	X
11.	Appealing method of advertisement not used	2421	40.35	XI
12.	Inconsistent grading	2217	36.95	XII
13.	Local traders and extension workers do not communicate with the people	2181	36.35	XIII
14.	Farmer does not understand content displayed on the computer and projector screen.	2111	35.18	XIV
15.	Dominance of English language.	1815	30.25	XV

The total Garrett score (Table 4) for each constraint was derived by aggregating the Garrett scores assigned by all respondents. Subsequently, the mean Garrett score was computed by dividing the total Garrett score by the number of respondents. The identified constraints were then prioritised based on their mean Garrett scores and arranged in descending order. A higher mean Garrett score indicated a greater level of severity and importance of the constraint as perceived by the respondents.

The findings reveal that poor digital literacy emerged as the most severe constraint faced by farmers in utilising the e-NAM platform, registering the highest Garrett score of 4502 and securing Rank I. This was followed by the constraint of being unable to sell the entire quantity of produce through e-NAM (Rank II), e-NAM prices occasionally being lower than prevailing mandi prices (Rank III), and server-related issues (Rank IV). Other important constraints identified were a shortage of labour in marketing activities (Rank V), time-consuming e-NAM auction procedures (Rank VI), lack of training on e-NAM (Rank VII), and incomplete information regarding e-NAM services (Rank VIII).

Further, multiple visits to banks for payment settlement (Rank IX), lack of awareness about e-NAM (Rank X), and the absence of appealing promotional and advertisement methods (Rank XI) were perceived as moderately important constraints. Relatively lower-ranked constraints included inconsistent grading practices (Rank XII), limited communication by local traders and extension personnel

(Rank XIII), and difficulty in understanding the content displayed on computer and projector screens (Rank XIV). The dominance of the English language was assigned the lowest Garrett score of 1815 and was ranked XV, indicating that it was perceived as the least severe constraint among the respondents.

It can be inferred from the above findings that poor digital literacy emerged as the most critical constraint, emphasising the need for farmer training and digital capacity-building initiatives. Furthermore, challenges such as incomplete sales of produce, lower prices compared to traditional markets, and technical issues on the platform highlight the need for improved market linkages, platform efficiency, and institutional support to enhance farmers' participation in e-NAM.

Conclusion

The study reveals that the adoption and effective utilisation of e-NAM by farmers are influenced by a combination of technological, market-related, and operational constraints. Among the identified challenges, poor digital literacy emerged as the most critical impediment, indicating that a significant proportion of farmers lack the necessary skills and confidence to effectively navigate digital marketing platforms. Other major constraints, including the inability to sell the entire quantity of produce through e-NAM, lower price realisation compared to conventional mandi markets, server-related issues, and the time-consuming nature of the

auction process, further limit farmers' willingness to participate in the platform.

The study suggests that while e-NAM has considerable potential to enhance market transparency, improve price discovery, and expand marketing opportunities for farmers, the realisation of these benefits remains contingent upon addressing the existing barriers.

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