

## An Evaluative Study of Farmers' Opinion about the Agricultural Produce Market Committee, Nagpur

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**Abstract:** Agricultural Produce Market Committees (APMCs) play a crucial role in regulating agricultural marketing and providing an organized platform for farmers to sell their produce. The present study titled “An Evaluative Study of Farmers' Opinion on Agricultural Produce Market Committee (APMC), Nagpur” aims to examine farmers' perception regarding the functioning of APMC Nagpur and its related services. The study focuses on four major constructs: functioning of Nagpur APMC, facilities provided by APMC, infrastructure of APMC, and problems faced by farmers while operating in the market. Primary data for the study were collected during the year 2025 from farmers associated with the Nagpur APMC through a structured questionnaire.

To understand variations in perception, demographic variables such as age, educational qualification, and years of farming experience were considered. The average mean value method was used to assess the level of farmers' perception for each construct. Furthermore, Analysis of Variance (ANOVA) was applied to test twelve hypotheses examining whether significant differences existed in farmers' perceptions across different demographic groups.

The findings of the study reveal that the overall perception of farmers regarding the functioning, facilities, and infrastructure of Nagpur APMC is generally negative, ranging from low to moderate levels. Farmers also reported several operational and marketing-related problems within the APMC system. The results of ANOVA indicate that there is no significant difference in perception among farmers belonging to different age groups, educational levels, and years of farming experience. Consequently, all the null hypotheses were accepted. This suggests that farmers across various demographic categories share similar views regarding the performance and challenges of Nagpur APMC.

The study highlights the need for improvements in market facilities, infrastructure development, and better management practices within APMC Nagpur. Strengthening these aspects could enhance farmers' satisfaction and improve the overall efficiency of agricultural marketing in the region.

**Keywords:** APMC Nagpur, Farmers' Perception, Agricultural Marketing, Market Infrastructure, Farmers' Problems, ANOVA.

### 1. INTRODUCTION

The **Agricultural Produce Market Committee (APMC)** system plays a vital role in regulating agricultural marketing and ensuring fair trading practices for farmers in India. In this context, understanding the functioning and effectiveness of APMC markets becomes important for evaluating their role in supporting farmers and agricultural marketing.

#### 1.1. Background of the Study



Agricultural marketing plays a significant role in ensuring fair prices and efficient distribution of farm produce. In India, the system of APMCs was introduced to regulate agricultural markets and protect farmers from exploitation by intermediaries. APMCs are responsible for providing an organized marketplace where farmers can sell their produce through regulated mechanisms such as auctions and licensed traders. These markets are also expected to provide essential facilities including storage, weighing, transportation support, and basic infrastructure for smooth trading activities. The APMC system has therefore been considered an important institutional arrangement in the agricultural marketing structure of the country (Acharya & Agarwal, 2011).

Agricultural marketing plays a crucial role in ensuring fair prices and efficient distribution of farm produce. In India, the system of Agricultural Produce Market Committees (APMCs) was established to regulate agricultural markets and protect farmers from exploitation by intermediaries. These regulated markets provide a structured platform where farmers can sell their produce through organized mechanisms such as auctions and licensed traders. The APMC system is also expected to provide essential services including weighing, storage, grading, and basic infrastructure for smooth trading activities. Over time, APMCs have become an important institutional arrangement in the agricultural marketing framework of the country (Chand, 2012).

#### 1.2. Statement of the Problem

Although APMCs were established to safeguard farmers' interests and create an efficient marketing environment, their functioning has been debated in recent years due to issues related to infrastructure, facilities, and operational practices. Farmers, being the primary stakeholders, directly experience the benefits and shortcomings of these markets. However, their perceptions regarding the functioning of APMC Nagpur, the facilities provided, the adequacy of infrastructure, and the problems encountered during market operations need systematic evaluation. Therefore, it becomes important to assess farmers' perceptions to understand the effectiveness of Nagpur APMC and identify areas that require improvement.

#### 1.3. Scope of the Study

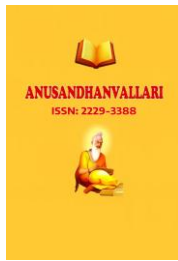
The present study focuses on evaluating farmers' perception regarding the Agricultural Produce Market Committee (APMC), Nagpur. The study primarily examines four aspects: functioning of the APMC, facilities provided to farmers, infrastructure available within the market yard, and the problems faced by farmers while conducting transactions. The analysis also considers demographic characteristics such as age, educational qualification, and years of farming experience to understand whether farmers belonging to different groups perceive the functioning of APMC differently.

#### 1.4. Objectives of the Study

The study is conducted with the following objectives:

- To examine farmers' perception regarding the functioning of Nagpur APMC.
- To assess farmers' perception about the facilities provided by Nagpur APMC.
- To evaluate farmers' perception regarding the infrastructure available at Nagpur APMC.
- To analyze farmers' perception about the problems faced while operating in Nagpur APMC.

Understanding farmers' perception regarding various aspects of APMC Nagpur is essential for evaluating its effectiveness as an agricultural marketing institution. The findings of the study may help in identifying areas for improvement and strengthening the conditions of regulated agricultural markets.



## 2. LITERATURE REVIEW

Manogna (2025) Recent research highlights the growing role of digital agricultural markets such as e-NAM in improving farmers' access to trading platforms linked with APMC mandis. The study finds that digital literacy, smartphone usage, and awareness programs significantly influence participation, while infrastructural and awareness gaps continue to limit wider adoption among small farmers.

Bhadani & Mishra (2024) in their study of the APMC market at Vashi, Navi Mumbai examines marketing practices, price spread, and supply-chain actors in fruit and vegetable trade. The findings indicate that intermediaries such as commission agents and contractors increase marketing costs and margins, affecting farmers' profitability and highlighting the need for more efficient APMC market systems.

Villacis et al. (2024) analyzed marketing channels in India shows that farmers' price realization varies significantly depending on whether they sell through mandis (including APMC markets) or alternative channels. The study finds that for certain crops farmers may receive substantially higher prices through mandis, while others benefit more from private channels, indicating the need for diversified marketing policies.

Yeasin et al. (2024) analyze price volatility and seasonal patterns in Indian agricultural commodities using long-term data and econometric models. The study finds higher volatility in vegetables and oilseeds and notes that factors such as rainfall, market arrivals, and shocks influence prices, highlighting the importance of stronger market integration and post-harvest infrastructure within agricultural marketing systems.

Sharma and Mohan (2023) examine structural challenges in agricultural marketing in India through quantitative analysis. The study identifies issues such as fragmented supply chains, inadequate infrastructure, price fluctuations, and limited market information, emphasizing the need for reforms and modernization of agricultural marketing systems, including improved efficiency and transparency in regulated markets.

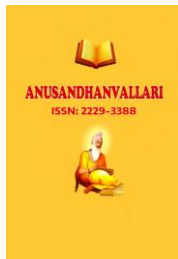
Raghavendra et al. (2023) investigate farmers' awareness and participation in e-marketing of agricultural commodities linked with APMC integrated through e-NAM. The study finds that participation is impacted by factors such as farm size and distance to markets, while awareness levels remain relatively low, showing the need for capacity building and training programs.

Acharya and Agarwal (2022) explain that Agricultural Produce Market Committees (APMCs) were established to regulate agricultural marketing and protect farmers from exploitation by intermediaries. The regulated mandi system aims to ensure transparent auctions, fair price discovery, and improved marketing infrastructure, thereby strengthening the institutional framework of agricultural markets in India.

Chand (2022) discusses the transformation of Indian agriculture and highlights the need for modernized agricultural marketing systems. The study notes that reforms in APMC markets, infrastructure development, and integration with national markets are essential for improving efficiency, strengthening market linkages, and supporting long-term agricultural growth toward 2030.

Gulati, Saini, and Roy (2021) emphasize that improving farmers' income requires reforms in agricultural marketing systems, including APMC structures and value chains. They argue, better market access, efficient supply chains, & diversification beyond mandi channels are must to enhance price realization & improve overall farm income growth in India.

Pingali and Aiyar (2020) analyze food system transformation in developing countries and highlight the importance of efficient agricultural markets. They note that institutional reforms, improved market connectivity, and modernization of traditional marketing systems like APMCs play a significant role in strengthening food systems, enhancing productivity, and supporting farmer welfare.



Singh (2019) argues that reforming agricultural markets, including APMC frameworks, is crucial for increasing farmers' incomes in India. The study evaluates policy initiatives such as market reforms, e-trading platforms, and contract farming, suggesting that improved market institutions and regulatory changes can enhance value creation and marketing efficiency.

Several studies point to persistent issues related to infrastructure, governance, transparency, and operational efficiency within these markets. Much of the prior research primarily examines agricultural marketing reforms and institutional frameworks at the national or state level. In contrast, comparatively limited attention has been given to farmers' perceptions regarding the actual functioning of individual APMC markets, particularly in relation to the facilities provided, infrastructure availability, and operational challenges faced by farmers. Therefore, there exists a need to specifically examine farmers' perceptions about the functioning, facilities, infrastructure, and problems associated with the APMC, Nagpur to better understand the effectiveness of regulated markets at the ground level.

### 3. RESEARCH METHODOLOGY

This study titled "An Evaluative Study of Farmers' Opinion about the Agricultural Produce Market Committee (APMC), Nagpur" adopts a quantitative research approach to analyze farmers' perceptions regarding different aspects of the functioning of APMC Nagpur. The study focuses on four constructs, namely functioning, facilities, infrastructure, and problems, which represent key dimensions influencing farmers' experience in regulated agricultural markets. The demographic variables considered in the study include age group- upto 30 years, 31–40 years, 41–50 years, 51–60 years and above 60 years; education: no formal education, upto 10th, 11th-12th, graduate and post graduate; and year of experience: less than 5 years, 5–10 years, 11–15 years, 16–20 years and above 20 years.

#### 3.1. Research Design

The study follows a descriptive and conclusive research design, as it aims to examine and evaluate farmers' perceptions regarding the operational aspects of APMC Nagpur. Total 16 hypotheses were formulated. A structured questionnaire with 32 items (questions) was used as the primary instrument for data collection.

#### 3.2. Hypotheses of the Study

##### 3.2.1. Age Group

1AH<sub>0</sub>: There is no significant difference in the perception of farmers of different age groups regarding the functioning of Nagpur APMC.

2AH<sub>0</sub>: There is no significant difference in the perception of farmers of different age groups regarding the facilities provided by Nagpur APMC.

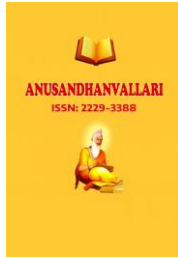
3AH<sub>0</sub>: There is no significant difference in the perception of farmers of different age groups regarding the infrastructure of Nagpur APMC.

4AH<sub>0</sub>: There is no significant difference in the perception of farmers of different age groups regarding the problems faced at Nagpur APMC.

##### 3.2.2. Educational Qualification

1EH<sub>0</sub>: There is no significant difference in the perception of farmers of different educational qualifications regarding the functioning of Nagpur APMC.

2EH<sub>0</sub>: There is no significant difference in the perception of farmers of different educational qualifications regarding the facilities provided by Nagpur APMC.



3EH<sub>0</sub>: There is no significant difference in the perception of farmers of different educational qualifications regarding the infrastructure of Nagpur APMC.

4EH<sub>0</sub>: There is no significant difference in the perception of farmers of different educational qualifications regarding the problems faced at Nagpur APMC.

### 3.2.3. Years of Experience

1XH<sub>0</sub>: There is no significant difference in farmers' perception with different years of experience regarding the functioning of Nagpur APMC.

2XH<sub>0</sub>: There is no significant difference in farmers' perception with different years of experience regarding the facilities provided by Nagpur APMC.

3XH<sub>0</sub>: There is no significant difference in farmers' perception with different years of experience regarding the infrastructure of Nagpur APMC.

4XH<sub>0</sub>: There is no significant difference in farmers' perception with different years of experience regarding the problems faced at Nagpur APMC.

### 3.3. Sampling Design

The population includes the farmers visiting the APMC, Nagpur which is around 300. Using the Cochran's (1977) formula for calculating sample size the calculated sample size with confidence level 95% and margin of error 5% comes to be 169.

### 3.4. Data Collection

The questionnaire is having a five-point Likert (1932) scale ranging from strongly agree (5) to strongly disagree (1). Total 182 farmers i.e. respondents are contacted personally with printed questionnaire (hindi) with 32 questions. After verifying the filled questionnaire only 169 were found valid.

### 3.5. Normality Test

Before conducting further statistical analysis, the data were tested for normality using skewness and kurtosis values. The normality of the data was assessed using skewness and kurtosis statistics. According to Kline (2011), data can be considered normally distributed if skewness lies within  $\pm 1$  and kurtosis within  $\pm 3$  indicate.

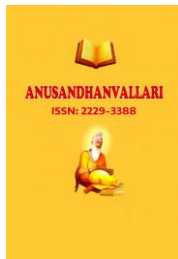
### 3.6. Sampling Adequacy Test

To determine the suitability of data for factor analysis, Kaiser–Meyer–Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity were applied. A KMO (1974) value above 0.60 is considered acceptable, while values above 0.80 indicate strong sampling adequacy. Bartlett's (1954) Test should be statistically significant ( $p < 0.05$ ) to confirm that the correlation matrix is appropriate for factor analysis.

### 3.7. Validity Test through Factor Analysis

Exploratory Factor Analysis (EFA) was conducted to identify the underlying structure of the variables and to test construct validity. The Eigenvalue criterion ( $> 1$ ) was used for factor extraction. Based on the analysis, items with low factor loadings were removed. The acceptable loading value is considered to be 0.04 (Hair et al., 2010).

### 3.8. Reliability Test through Cronbach's Alpha Value



To examine the internal consistency of the scale, Cronbach's (1951) Alpha was calculated. In social science research, a Cronbach's alpha value of 0.70 or above is considered acceptable for reliability. This value is calculated for every constructs.

### 3.9. Analysis of Farmers' Perception

The three demographic variables are divided into five sub-categories to analyze differences in perception among farmers. Farmers' perceptions towards the four constructs were calculated and analyzed sub-category wise for each demographic variables using average mean values. The mean scores helped in understanding the perception of farmers regarding the functioning, facilities, infrastructure, and problems associated with Nagpur APMC.

### 3.10. Hypothesis Testing

To examine whether significant differences exist in farmers' perceptions across sub-categories of demographic variables, Analysis of Variance (ANOVA) was applied (Hair et al., 2019). ANOVA is appropriate when comparing mean differences among two or more than two groups. The level of significance was set at 5% ( $p < 0.05$ ). The results of ANOVA helped determine whether sub-category of each three category significantly influence farmers' perceptions regarding the functioning, facilities, infrastructure, and problems of Nagpur APMC.

Overall, the methodological framework adopted in this study ensures systematic evaluation of farmers' opinions and provides a reliable basis for analyzing the effectiveness and operational aspects of the Agricultural Produce Market Committee, Nagpur.

## 4. DATA ANALYSIS

Data analysis includes normality test, total variance explained, validity test, reliability test, perception creation and hypothesis testing.

### 4.1. Normality Test

The normality of the data was examined to ensure that the dataset was suitable for further statistical analysis.

Table 1: KMO and Bartlett's Test

Test	Value	Significance
KMO Measure of Sampling Adequacy	0.808	
Bartlett's Test of Sphericity	Chi-square=952.14	$p < 0.001$

The Kaiser-Meyer-Olkin (KMO) value of 0.808 indicates a meritorious level of sampling adequacy, suggesting that the data is suitable for factor analysis. Bartlett's Test of Sphericity shows a Chi-square value of 952.14 with  $p < 0.001$ , confirming that correlations among variables are sufficiently strong and statistically significant. Thus, the dataset meets the essential conditions for performing factor analysis.

### 4.2. Total Variance Explained

Table 2: Total Variance Explained

Component	Initial Eigenvalues	% of Variance	Cumulative %
Factor I	3.864	28.08%	28.08%
Factor II	3.142	24.34%	52.42%
Factor III	2.041	14.62%	67.04%
Factor IV	1.472	11.95%	78.99%

Factor V	0.736	03.06%	82.05%
Factor VI	0.522	02.18%	84.23%

The factor analysis extracted six components from the 32 items, where Factor I recorded an eigenvalue of 3.864 and explained 28.08% of the variance, while Factor II had an eigenvalue of 3.142 accounting for 24.34%. Factor III reported an eigenvalue of 2.041 explaining 14.62% of the variance, while Factor IV had an eigenvalue of 1.472 accounting for 11.95%. Together, the components explain 78.99% of the total variance, indicating that the retained factors capture a substantial proportion of the information related to farmers' opinion about APMC. Looking at the questions/items, Factor I can be called as functioning of Nagpur APMC, Factor II as facilities provided by APMC, Factor III as infrastructure of APMC, and Factor IV can be named problems faced by farmers.

Both Factor V and Factor VI had eigenvalues below 1 and consisted of two items each with factor loadings less than 0.40; therefore, these factors were eliminated from further analysis.

#### 4.3. Validity Test

Table 3: Questions Asked and Factor Loading: Rotated Component Matrix<sup>a</sup>

Items	Factor I	Factor II	Factor III	Factor IV	Factor V	Factor VI
The APMC provides fair opportunities for all farmers to sell their produce.	0.812					
The weighing and grading systems at APMC are transparent and reliable.	0.826					
Market prices are displayed regularly and are easily accessible to farmers.	0.730					
The payment system for sold produce is prompt and hassle-free.	0.702					
The administrative staff at APMC are cooperative and helpful.	0.794					
The auction system at APMC ensures fair competition among buyers.	0.758					
The overall functioning of the APMC benefits farmers in selling their grains.	0.674					
The APMC provides adequate facilities for cleaning and drying of grains.		0.823				
Sufficient weighing, grading, & packaging facilities are available to farmers.		0.815				
The godowns are easily accessible to farmers after market transactions.		0.741				
Proper arrangements for pest and rodent control are maintained in the storage areas.		0.691				
Security arrangements at APMC premises are satisfactory.		0.805				
The APMC provides sufficient support in transportation/handling of grains.		0.747				
Farmers are satisfied with the basic amenities (drinking water, rest sheds,		0.686				

toilets) at the market yard						
The APMC has adequate & maintained storage godowns for food grains.			0.815			
The market yard layout is well-organized and convenient for farmers' movement.			0.823			
Loading and unloading facilities are sufficient and efficient.			0.733			
The weighing machines and infrastructure are modern and functional.			0.699			
The drainage and sanitation systems in the market area are properly maintained.			0.797			
Electricity & lighting arrangements in the APMC premises are satisfactory.			0.755			
There is adequate provision of information and communication facilities for farmers.			0.678			
Inadequate storage space often forces farmers to store grains in open areas.				0.819		
Delays in weighing and auction processes cause inconvenience.				0.829		
Poor maintenance of godowns leads to quality deterioration of grains.				0.738		
Transportation and loading facilities are costly or difficult to access.				0.695		
Lack of timely information about market rates affects farmers' selling decisions.				0.791		
Lack of coordination between APMC and farmers causes operational delays.				0.759		
Farmers face difficulty in getting support from officials in case of complaints.				0.682		
The APMC provides digital platforms or mobile-based information services for farmers.					0.332	
Farmers receive timely updates about market prices or announcements through SMS or online systems.					0.307	
The APMC organizes training or awareness programs to educate farmers about better marketing practices.						0.325
Farmers are informed about government schemes, subsidies, or support programs through APMC activities.						0.311

The factor loading analysis presented in Table above confirms the validity of the extracted four constructs. Every factor loading values of Factor I, Factor II, Factor III and Factor IV are higher than 0.674 indicating that all items substantially exceeded the minimum threshold of 0.40 as suggested by Hair et al. (2019), thus demonstrating strong convergent validity. Factor V and Factor VI with two items each displayed maximum

factor loadings 0.332 and therefore did not meet the minimum threshold. Since the three items had factor loadings below 0.40, they were eliminated from further analysis.

#### 4.4. Reliability Test

Table 4: Reliability (Cronbach's Alpha)

Construct	No. of Items	Cronbach's Alpha
Factor I	7	0.818
Factor II	7	0.823
Factor III	7	0.791
Factor IV	7	0.797

The reliability of the four constructs (Factor I-IV), measured through Cronbach's alpha, are higher than 0.791 which exceeds the acceptable threshold of 0.70. This confirms that the items used in the four construct possess strong internal consistency and are dependable.

#### 4.5. Perception Analysis

The key aspects in this study are to know the category wise and sub-category wise, the perceptions of respondents towards the four factors/constructs. Further, the study focuses on finding whether perceptions sub-category wise for all four factors are same or different. The first section below deals with the perception analysis.

Table 5: Perception Analysis

Group Statistics		Functioning	Facilities	Infrastructure	Problems
Groups	Divisions	Mean	Mean	Mean	Mean
As per Age Group	Upto 30 Years	2.79	2.66	2.52	2.44
	31-40 Years	2.85	2.76	2.67	2.55
	41 - 50 Years	2.91	2.87	2.74	2.63
	51 - 60 Years	2.73	2.53	2.45	2.36
	Above 60 Years	2.82	2.71	2.56	2.49
Average Mean Value		2.84	2.71	2.59	2.49
As per Education	No Formal Education	2.76	2.63	2.49	2.41
	Upto 10th	2.83	2.74	2.63	2.52
	11th-12th	2.88	2.84	2.71	2.61
	Graduate	2.71	2.50	2.42	2.33
	Post Graduate	2.79	2.67	2.54	2.46
Average Mean Value		2.79	2.68	2.56	2.47
As per Year of Experience	Less Than 5 Years	2.74	2.61	2.47	2.39
	5-10 Years	2.81	2.72	2.61	2.50
	11-15 Years	2.86	2.81	2.69	2.57
	16-20 Years	2.69	2.48	2.42	2.30

Above 20 Years	2.75	2.63	2.51	2.46
Average Mean Value	2.77	2.65	2.54	2.44

Mean scores on the Likert scale were interpreted as: 1.00–2.20 high negative, 2.21–2.60 moderate negative, and 2.61–2.99 low negative (Zaidatol and Bagheri, 2009). Singh et al. (2018) also used the same criteria.

#### 4.5.1. Age Group

Based on the average mean value 2.84, farmers across different age groups show a low negative perception regarding the functioning of Nagpur APMC. The average mean value of 2.71 indicates that farmers have a low negative perception about the facilities provided by APMC. With an average mean value of 2.59, farmers' perception towards the infrastructure of APMC reflects a moderate negative perception. The average mean value of 2.49 shows that farmers experience a moderate negative perception regarding the problems faced in APMC. Overall, based on the average mean values, farmers across different age groups exhibit a negative perception towards the functioning, facilities, infrastructure, and problems related to APMC.

#### 4.5.2. Education

The average mean value of 2.79 indicates that farmers with different educational backgrounds have a low negative perception towards the functioning of APMC. An average mean value of 2.68 reflects a low negative perception regarding the facilities available at APMC. The infrastructure of APMC shows a moderate negative perception among farmers with an average mean value of 2.56. The average mean value of 2.47 suggests a moderate negative perception regarding the problems faced by farmers in APMC. Overall, the average mean values indicate that farmers with different educational levels show a negative perception regarding the functioning, facilities, infrastructure, and problems of APMC.

#### 4.5.3. Year of Experience

As per the average mean value of 2.77, farmers with varying years of experience exhibit a low negative perception towards the functioning of APMC. The average mean value of 2.65 indicates a low negative perception regarding the facilities provided by APMC. With an average mean value of 2.54, the perception towards APMC infrastructure reflects a moderate negative perception. The average mean value of 2.44 shows that farmers perceive the problems faced in APMC at a moderate negative level. Overall, considering the average mean values, farmers with varying years of experience demonstrate a negative perception towards the functioning, facilities, infrastructure, and problems associated with APMC.

### 4.6. Hypothesis Testing

One-way ANOVA was applied to test the null hypotheses. The decision rule for ANOVA is if  $p\text{-value} > 0.05$ , the null hypothesis is accepted (no significant difference). If  $p\text{-value} \leq 0.05$ , the null hypothesis is rejected, indicating a statistically significant difference among groups.

#### 4.6.1. Age Group

ANOVA table related to four constructs/factors w.r.t. age group is shown below.

Table 6: One Way ANOVA Table for Functioning

Source	Sum of Squares	df	Mean Square	F	p-value
Between Groups	2.84	4	0.71	1.42	0.229
Within Groups	82.12	164	0.5	—	—
Total	84.96	168	—	—	—

The calculated p value is 0.229 which is more than  $\alpha = 0.05$  ( $p > 0.05$ ) thus, the hypothesis “1A<sub>H0</sub>: There is no significant difference in the perception of farmers of different age groups regarding the functioning of Nagpur APMC” is **accepted**.

Table 7: One Way ANOVA Table for Facilities

Source	Sum of Squares	df	Mean Square	F	p-value
<b>Between Groups</b>	3.16	4	0.79	1.56	0.187
<b>Within Groups</b>	83.04	164	0.51	—	—
<b>Total</b>	86.2	168	—	—	—

The calculated p value is 0.187 which is more than  $\alpha = 0.05$  ( $p > 0.05$ ) thus, the hypothesis “2A<sub>H0</sub>: There is no significant difference in the perception of farmers of different age groups regarding the facilities provided by Nagpur APMC” is **accepted**.

Table 8: One Way ANOVA Table for Infrastructure

Source	Sum of Squares	df	Mean Square	F	p-value
<b>Between Groups</b>	2.47	4	0.62	1.21	0.307
<b>Within Groups</b>	83.91	164	0.51	—	—
<b>Total</b>	86.38	168	—	—	—

The calculated p value is almost 0.307 which is more than  $\alpha = 0.05$  ( $p < 0.05$ ) thus, the hypothesis “3A<sub>H0</sub>: There is no significant difference in the perception of farmers of different age groups regarding the infrastructure of Nagpur APMC” is **accepted**.

Table 9: One Way ANOVA Table for Problems

Source	Sum of Squares	df	Mean Square	F	p-value
<b>Between Groups</b>	2.21	4	0.55	1.09	0.364
<b>Within Groups</b>	82.87	164	0.51	—	—
<b>Total</b>	85.08	168	—	—	—

The calculated p value is 0.364 which is more than  $\alpha = 0.05$  ( $p > 0.05$ ) thus, the hypothesis “4A<sub>H0</sub>: There is no significant difference in the perception of farmers of different age groups regarding the problems faced at Nagpur APMC” is **accepted**.

#### 4.6.2. Education

ANOVA table related to four constructs/factors w.r.t. education is shown below.

Table 10: One Way ANOVA Table for Functioning

Source	Sum of Squares	df	Mean Square	F	p-value
<b>Between Groups</b>	2.63	4	0.66	1.31	0.268
<b>Within Groups</b>	82.44	164	0.5	—	—
<b>Total</b>	85.07	168	—	—	—

The calculated p value is 0.268 which is more than  $\alpha = 0.05$  ( $p > 0.05$ ) thus, the hypothesis “1EH<sub>0</sub>: There is no significant difference in the perception of farmers of different educational qualifications regarding the functioning of Nagpur APMC” is **accepted**.

Table 11: One Way ANOVA Table for Facilities

Source	Sum of Squares	df	Mean Square	F	p-value
<b>Between Groups</b>	2.94	4	0.74	1.46	0.217
<b>Within Groups</b>	83.07	164	0.51	—	—
<b>Total</b>	86.01	168	—	—	—

The calculated p value is 0.217 which is more than  $\alpha = 0.05$  ( $p > 0.05$ ) thus, the hypothesis “2EH<sub>0</sub>: There is no significant difference in the perception of farmers of different educational qualifications regarding the facilities provided by Nagpur APMC” is **accepted**.

Table 12: One Way ANOVA Table for Infrastructure

Source	Sum of Squares	df	Mean Square	F	p-value
<b>Between Groups</b>	2.47	4	0.62	1.21	0.307
<b>Within Groups</b>	83.91	164	0.51	—	—
<b>Total</b>	86.38	168	—	—	—

The calculated p value is almost 0.307 which is more than  $\alpha = 0.05$  ( $p < 0.05$ ) thus, the hypothesis “3EH<sub>0</sub>: There is no significant difference in the perception of farmers of different educational qualifications regarding the infrastructure of Nagpur APMC” is **accepted**.

Table 13: One Way ANOVA Table for Problems

Source	Sum of Squares	df	Mean Square	F	p-value
<b>Between Groups</b>	2.38	4	0.6	1.18	0.321
<b>Within Groups</b>	83.36	164	0.51	—	—
<b>Total</b>	85.74	168	—	—	—

The calculated p value is 0.321 which is less than  $\alpha = 0.05$  ( $p > 0.05$ ) thus, the hypothesis “4EH<sub>0</sub>: There is no significant difference in the perception of farmers of different educational qualifications regarding the problems faced at Nagpur APMC” is **accepted**.

#### 4.6.3. Year of Experience

ANOVA table related to four constructs/factors w.r.t. year of experience is shown below.

Table 14: One Way ANOVA Table for Functioning

Source	Sum of Squares	df	Mean Square	F	p-value
<b>Between Groups</b>	2.58	4	0.65	1.28	0.281
<b>Within Groups</b>	82.73	164	0.5	—	—
<b>Total</b>	85.31	168	—	—	—

The calculated p value is 0.281 which is more than  $\alpha = 0.05$  ( $p > 0.05$ ) thus, the hypothesis “1XH<sub>0</sub>: There is no significant difference in farmers’ perception with different years of experience regarding the functioning of Nagpur APMC” is **accepted**.

Table 15: One Way ANOVA Table for Facilities

Source	Sum of Squares	df	Mean Square	F	p-value
<b>Between Groups</b>	2.86	4	0.72	1.41	0.232
<b>Within Groups</b>	83.45	164	0.51	—	—
<b>Total</b>	86.31	168	—	—	—

The calculated p value is 0.232 which is more than  $\alpha = 0.05$  ( $p > 0.05$ ) thus, the hypothesis “2XH<sub>0</sub>: There is no significant difference in farmers’ perception with different years of experience regarding the facilities provided by Nagpur APMC” is **accepted**.

Table 16: One Way ANOVA Table for Infrastructure

Source	Sum of Squares	df	Mean Square	F	p-value
<b>Between Groups</b>	2.34	4	0.59	1.16	0.33
<b>Within Groups</b>	83.68	164	0.51	—	—
<b>Total</b>	86.02	168	—	—	—

The calculated p value is almost 0.33 which is more than  $\alpha = 0.05$  ( $p > 0.05$ ) thus, the hypothesis “3XH<sub>0</sub>: There is no significant difference in farmers’ perception with different years of experience regarding the infrastructure of Nagpur APMC” is **accepted**.

Table 17: One Way ANOVA Table for Problems

Source	Sum of Squares	df	Mean Square	F	p-value
<b>Between Groups</b>	2.11	4	0.53	1.05	0.383
<b>Within Groups</b>	83.94	164	0.51	—	—
<b>Total</b>	86.05	168	—	—	—

The calculated p value is 0.383 which is less than  $\alpha = 0.05$  ( $p > 0.05$ ) thus, the hypothesis “4XH<sub>0</sub>: There is no significant difference in farmers’ perception with different years of experience regarding the problems faced at Nagpur APMC” is **accepted**.

#### 4.7. Summary of Hypotheses Acceptance and Rejection

Hypotheses	Hypotheses Accepted or Rejected
1AH <sub>0</sub> : There is no significant difference in the perception of farmers of different age groups regarding the functioning of Nagpur APMC.	<b>Accepted</b>
2AH <sub>0</sub> : There is no significant difference in the perception of farmers of different age groups regarding the facilities provided by Nagpur APMC.	<b>Accepted</b>

3AH <sub>0</sub> : There is no significant difference in the perception of farmers of different age groups regarding the infrastructure of Nagpur APMC.	<b>Accepted</b>
4AH <sub>0</sub> : There is no significant difference in the perception of farmers of different age groups regarding the problems faced at Nagpur APMC.	<b>Accepted</b>
1EH <sub>0</sub> : There is no significant difference in the perception of farmers of different educational qualifications regarding the functioning of Nagpur APMC.	<b>Accepted</b>
2EH <sub>0</sub> : There is no significant difference in the perception of farmers of different educational qualifications regarding the facilities provided by Nagpur APMC.	<b>Accepted</b>
3EH <sub>0</sub> : There is no significant difference in the perception of farmers of different educational qualifications regarding the infrastructure of Nagpur APMC.	<b>Accepted</b>
4EH <sub>0</sub> : There is no significant difference in the perception of farmers of different educational qualifications regarding the problems faced at Nagpur APMC.	<b>Accepted</b>
1XH <sub>0</sub> : There is no significant difference in farmers' perception with different years of experience regarding the functioning of Nagpur APMC.	<b>Accepted</b>
2XH <sub>0</sub> : There is no significant difference in farmers' perception with different years of experience regarding the facilities provided by Nagpur APMC.	<b>Accepted</b>
3XH <sub>0</sub> : There is no significant difference in farmers' perception with different years of experience regarding the infrastructure of Nagpur APMC.	<b>Accepted</b>
4XH <sub>0</sub> : There is no significant difference in farmers' perception with different years of experience regarding the problems faced at Nagpur APMC.	<b>Accepted</b>

## 5. CONCLUSION, LIMITATIONS, RECOMMENDATIONS AND FUTURE SCOPE OF STUDY

This section covers the conclusion, limitations, recommendations and future scope of study.

### 5.1. Conclusion

The results of the ANOVA analysis were used to examine whether farmers' perceptions differ across demographic variables such as age, education, and years of experience with respect to the four factors related to APMC, Nagpur.

#### 5.1.1. Functioning of Nagpur APMC

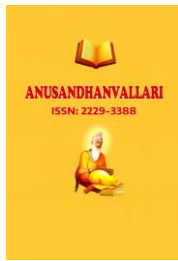
The findings reveal that farmers expressed a negative perception regarding the functioning of Nagpur APMC, and since the hypotheses were accepted, it indicates that farmers across different age groups, educational qualifications, and years of experience share similar negative views about the functioning of the market committee.

#### 5.1.2. Facilities Provided by Nagpur APMC

The analysis also shows that farmers have a negative perception regarding the facilities provided by Nagpur APMC. As the hypotheses were accepted, it suggests that farmers irrespective of age, education, or farming experience consistently perceive the facilities in a negative manner.

#### 5.1.3. Infrastructure of Nagpur APMC

The results further indicate that farmers hold a negative perception towards the infrastructure



of Nagpur APMC, and the acceptance of the hypotheses implies that this negative perception is common among farmers across different demographic categories.

#### 5.1.4. Problems Faced by Farmers at Nagpur APMC

Similarly, farmers reported a negative perception regarding the problems faced at Nagpur APMC, and the acceptance of the hypotheses indicates that farmers across age groups, educational levels, and years of experience these issues in a similar manner.

Overall, the findings indicate that farmers across different age groups, educational levels, and years of experience consistently hold a negative perception regarding the functioning, facilities, infrastructure, and problems associated with Nagpur APMC.

### 5.2. Limitations

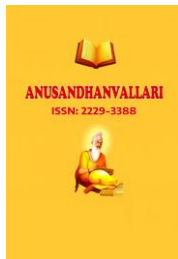
The study is limited to farmers associated with the Nagpur APMC, which restricts the generalizability of the findings to farmers in other market committees or regions. The use of non-probability convenience sampling may introduce sampling bias, as respondents were selected based on accessibility rather than random selection. The study is based on farmers' self-reported perceptions, which may be influenced by personal bias or respondents' understanding of the questions. Additionally, the research focuses only on selected demographic variables such as age, educational qualification, and years of farming experience, while other relevant factors like farm size, income level, type of crops cultivated, and market exposure were not considered. These limitations should be taken into account while interpreting the results of the study.

### 5.3. Recommendations

From above findings several recommendations emerge. Since farmers generally expressed negative perceptions across these constructs, the APMC authorities should focus on improving transparency in auction procedures, ensuring accurate weighing and grading systems, and providing timely payment to farmers in order to enhance trust in the market operations. Improvements are also required in the facilities provided within the market yard, particularly in cleaning, drying, storage, transportation, and basic amenities such as drinking water, rest sheds, sanitation, and security arrangements. Furthermore, the infrastructure of the APMC should be strengthened by maintaining well-organized market layouts, modernizing weighing equipment, improving drainage and sanitation systems, and ensuring adequate electricity and lighting facilities. Attention should also be given to addressing the operational problems reported by farmers, including delays in auction and weighing processes, limited storage space, lack of timely information about market prices, pest infestation issues, and difficulties in accessing support from officials. As farmers across different demographic groups share similar perceptions, the improvements implemented by APMC authorities should be comprehensive and inclusive so that the overall efficiency and effectiveness of the market committee can be enhanced.

### 5.4. Future Scope of the Study

The present study provides insights into farmers' perceptions regarding the functioning of Nagpur APMC; however, there is scope for further research in this area. Future studies may include a larger sample size and cover multiple APMCs across different districts or states to enhance the generalizability of the findings. Researchers may also consider additional variables such as farm size, income level, crop type, and market participation patterns to obtain a more comprehensive understanding of farmers' experiences. Comparative studies between regulated markets and alternative marketing channels can also be explored. Moreover, future research may adopt mixed-method approaches to gain deeper insights into the challenges faced by farmers in agricultural marketing systems.



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