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MARKETING PRACTICES OF AGRO PRODUCTS IN RAJASTHAN: AN ANALYSIS OF MARKETING CHANNELS, DIGITAL PLATFORMS, AND FARMER INCOME

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ABSTRACT

Purpose. *This study analyses the marketing practices of agro products in Rajasthan, examining the marketing channels farmers use, the factors that affect agro-product marketing, the role of intermediaries, and the impact of digital marketing platforms on farmer income and profitability.*

Methodology. *A descriptive-analytical design was adopted. Primary data were collected from 200 farmers across selected districts of Rajasthan – Jodhpur, Nagaur, Bikaner, Jalore, and Bharatpur – using a structured questionnaire on a five-point Likert scale, supplemented by secondary data from NABARD and government sources. Data were analyzed through reliability analysis, descriptive statistics, correlation, and regression.*

Key findings. *Scales were reliable (Cronbach's alpha > 0.80). The mandi (APMC) system remained the dominant channel (55%). Marketing practices ($\beta = 0.48$, $p < .001$) and digital marketing ($\beta = 0.32$, $p < .01$) significantly and positively predicted farmer income, supporting H1–H3, while intermediary involvement was found to reduce farmers' margins (H4 partially supported).*

Recommendations. *Expanding e-NAM participation, strengthening Farmer Producer Organizations, improving rural digital infrastructure and market-information systems, reducing unnecessary intermediaries, and upgrading storage and transportation are recommended to improve marketing efficiency and farmer income.*

KEYWORDS: *Agro Marketing; Agricultural Products; Rajasthan; Marketing Channels; Farmers; Supply Chain.*

1. INTRODUCTION

1.1 Background

Agriculture remains central to the economy and livelihoods of Rajasthan, the largest state in India by area. Despite an arid and semi-arid climate and dependence on the monsoon, the state is a leading national producer of several crops and contributes significantly to rural employment and incomes. Agriculture in Rajasthan is characterized by a mix of food grains, oilseeds, and high-value spice and industrial crops, many of which are cultivated under rain-fed conditions that make efficient marketing especially important for stabilising farmer earnings.

The state's major agro products span a diverse portfolio. Wheat and bajra (pearl millet) are important food grains, while mustard is a leading oilseed. Rajasthan is the country's foremost producer of several commercial crops, including cumin (jeera) and other seed spices, guar (cluster bean) used in industrial gum, isabgol (psyllium husk), and a range of pulses. This concentration in high-value but price-volatile crops means that the returns farmers ultimately realise depend heavily on how effectively these products are marketed.

1.2 Agricultural Marketing in India

Agricultural marketing in India operates through a layered institutional structure. The Agricultural Produce Market Committee (APMC) mandi system has historically been the primary regulated marketplace where farmers sell to licensed traders through auction. Alongside the mandis, Farmer Producer Organizations (FPOs) have been promoted to aggregate smallholders, improve their bargaining power, and reduce transaction costs. The National Agriculture Market (e-NAM) is an electronic trading platform that links mandis across states to create a unified national market and improve price discovery, while contract farming arrangements link farmers directly to buyers and processors. Together these mechanisms shape the channels and prices available to farmers.

1.3 Problem Statement

Despite being a major agricultural state, Rajasthan's farmers often receive lower prices than the value their produce commands further along the chain. This is widely attributed to inefficient marketing channels, the involvement of multiple intermediaries who capture a share of the margin, and inadequate and asymmetric market information that leaves farmers unable to time sales or negotiate effectively. The result is reduced farmer income and weakened incentives to invest. Understanding current marketing

practices, the role of intermediaries, and the potential of digital platforms to address these problems is therefore essential, and is the focus of this study.

1.4 Research Objectives

1. To examine existing marketing practices of agro products in Rajasthan.
2. To identify factors affecting agro-product marketing.
3. To analyze the role of intermediaries.
4. To assess the impact of digital marketing platforms.
5. To suggest measures for improving agricultural marketing efficiency.

1.5 Research Questions

1. What marketing channels are used by farmers?
2. What challenges do farmers face in marketing their produce?
3. Does digital marketing improve profitability?

Table 1. Major Agro Products of Rajasthan and Producing Districts

Product	Major Producing Districts
Mustard	Bharatpur, Alwar
Bajra	Jodhpur, Nagaur
Guar	Bikaner, Churu
Cumin	Jalore, Barmer
Wheat	Kota, Ganganagar

Table 1 presents the major agro products of Rajasthan along with their principal producing districts. Mustard is mainly cultivated in Bharatpur and Alwar, Bajra in Jodhpur and Nagaur, Guar in Bikaner and Churu, Cumin in Jalore and Barmer, and Wheat in Kota and Ganganagar. The table highlights the agricultural diversity of Rajasthan and provides the geographical context for examining agro-product marketing practices in the state

2. LITERATURE REVIEW

2.1 Agricultural Marketing

Agricultural marketing encompasses all the activities involved in moving farm produce from the producer to the final consumer, including assembling, grading, storage, transportation, processing, and exchange. Scholars have long argued that the efficiency of this system is a key determinant of the share of the consumer rupee that reaches the farmer. Acharya (2018) emphasized that marketing efficiency directly affects farmer income, and that reforms to reduce marketing costs and improve transparency are central to raising rural incomes, though his analysis adopted a largely national focus. The literature consistently frames agricultural marketing as a structural problem in which institutional design, information, and intermediation jointly shape outcomes for farmers.

2.2 Marketing Channels in Agriculture

Research on marketing channels distinguishes between direct marketing, the regulated mandi system, and cooperative marketing. Studies of direct marketing, including farmer markets and farm-gate sales, find that shortening the channel can raise the farmer's share of the final price but is constrained by small volumes and limited reach. The mandi system, while providing an organized place of exchange and price discovery, has been criticized for the proliferation of intermediaries, commission charges, and collusive practices that depress prices received by farmers. Cooperative marketing and FPOs are widely advocated as a means of aggregating produce, improving bargaining power, and bypassing layers of intermediation. Sharma (2023) found that intermediaries reduce farmer margins, although the evidence remains fragmented across districts and crops.

2.3 Price Determination

Previous research on price determination in agricultural markets highlights the roles of demand and supply conditions, seasonality, quality and grading, storage capacity, and access to information. Imperfect competition in local markets, where a few traders may dominate, can lead to prices that fall below competitive levels. The literature also documents substantial price spreads between farm-gate and retail prices, much of which is absorbed by marketing and intermediation costs. Improved price information and minimum support price mechanisms are repeatedly identified as factors that can strengthen the farmer's position, underscoring the importance of information access examined in this study.

2.4 Digital Agricultural Marketing

A growing body of work examines the digital transformation of agricultural marketing. The National Agriculture Market (e-NAM) has been studied as a mechanism to integrate fragmented mandis, widen the buyer base, and improve price discovery and transparency. Singh (2020) found that digital marketing benefits farmers by expanding selling opportunities and improving access to information, though evidence specific to Rajasthan was limited. Online marketplaces and mobile applications that provide price

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information, weather advisories, and direct buyer linkages have been shown to reduce information asymmetry and search costs. At the same time, studies caution that the benefits of digital platforms are contingent on digital literacy, network connectivity, and trust, which vary widely across rural regions.

2.5 Agricultural Supply Chain

Studies of the agricultural supply chain emphasize the importance of storage and transportation in determining marketing outcomes. Inadequate cold-storage and warehousing capacity forces farmers to sell immediately after harvest when prices are lowest, while poor rural road and transport infrastructure raises costs and post-harvest losses. Research consistently links investment in storage, logistics, and warehousing—and instruments such as warehouse receipts—to improved price realization and reduced wastage. These supply-chain constraints are particularly salient in Rajasthan, where distances are long and infrastructure is uneven, and they motivate the study's focus on marketing practices and efficiency.

2.6 Research Gap

A synthesis of prior research reveals consistent limitations, summarized below.

Table 2. Literature Review Summary

Author (Year)	Findings	Research Gap
Acharya (2018)	Marketing efficiency affects farmer income	National focus
Singh (2020)	Digital marketing benefits farmers	Limited Rajasthan evidence
Sharma (2023)	Intermediaries reduce margins	District-specific studies lacking

Research Gap Statement. Most studies focus on national agricultural marketing systems, while limited empirical research exists regarding current agro-product marketing practices in Rajasthan, particularly at the district level and with respect to the emerging role of digital platforms. The present study addresses this gap through district-level primary evidence from selected districts of the state.

3. CONCEPTUAL FRAMEWORK

Drawing on the reviewed literature, the study proposes a framework in which farmer income and profitability are shaped by four determinants: marketing practices, access to market information, digital marketing adoption, and intermediary involvement. The first three are hypothesized to exert positive effects, while intermediary involvement is hypothesized to exert a negative effect on farmers' margins. The framework is depicted in Figure 1.

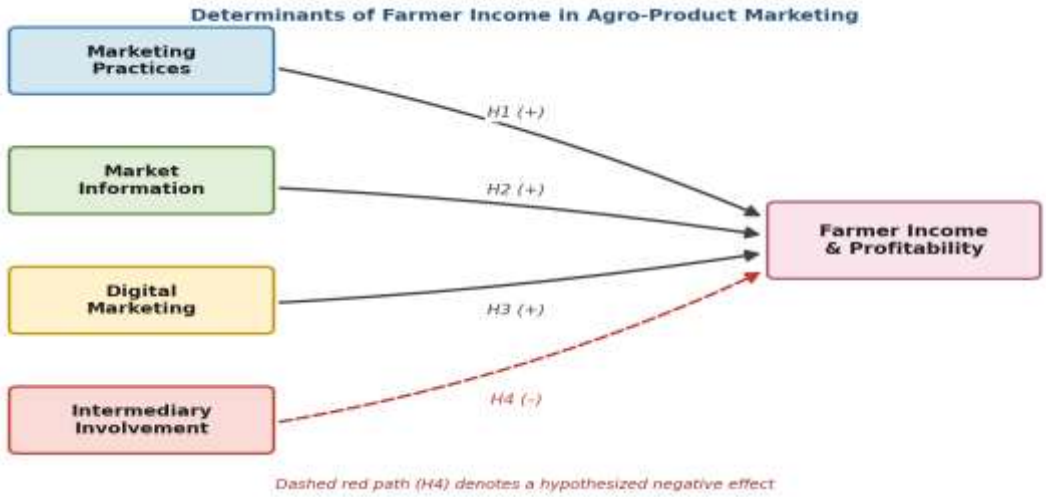

Figure 1. Conceptual framework of the determinants of farmer income in agro-product marketing (H2 operates through marketing efficiency).

The framework yields four testable propositions: efficient marketing practices positively influence farmer income (H1), access to market information positively affects marketing efficiency and thereby income (H2), digital marketing adoption positively affects profitability (H3), and intermediary involvement negatively affects farmers' profit margins (H4).

4. HYPOTHESIS DEVELOPMENT

Based on the conceptual framework and supporting literature, the following hypotheses are proposed:

H1: Efficient marketing practices positively influence farmer income.
H2: Access to market information positively affects marketing efficiency.
H3: Digital marketing adoption positively affects farmer profitability.
H4: Intermediary involvement negatively affects farmers' profit margins.

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5. RESEARCH METHODOLOGY

This study employed a descriptive and analytical research design, combining a description of prevailing marketing practices with analysis of the relationships among marketing practices, digital marketing, and farmer income.

Research Design. Descriptive and analytical, using primary survey data supported by secondary sources.

Study Area. Selected districts of Rajasthan—Jodhpur, Nagaur, Bikaner, Jalore, and Bharatpur—chosen to represent the state's major agro products and agro-climatic zones.

Population. Farmers engaged in the sale of agro products in the selected districts.

Sample Size. 200 farmers, within the 150–250 range considered adequate for the planned analysis.

Sampling Method. A combination of stratified sampling (by district and farmer category) and convenience sampling for accessibility; the limitations of non-probability elements are acknowledged in the discussion.

Data Collection. Primary data were gathered through a structured questionnaire administered to farmers. Secondary data were drawn from NABARD reports, Ministry of Agriculture publications, the Rajasthan Agriculture Department, and research journals. All construct items were measured on a five-point Likert scale, as shown in Table 3, and the data were analyzed using reliability analysis, descriptive statistics, correlation, and regression.

Table 3. Measurement Scale

Scale	Meaning
1	Strongly Disagree
2	Disagree
3	Neutral
4	Agree
5	Strongly Agree

The questionnaire items used to operationalize each construct are presented in Table 4.

Table 4. Questionnaire Items

Code	Statement
MP1	I receive adequate market information.
MP2	Marketing channels are easily accessible.
MP3	Marketing costs are reasonable.
DM1	I use digital platforms for market information.
DM2	Digital marketing improves selling opportunities.
DM3	e-NAM benefits farmers.
FI1	Marketing practices increase my income.
FI2	I receive fair prices for my products.
FI3	My profits have improved in recent years.

Note. MP = Marketing Practices; DM = Digital Marketing; FI = Farmer Income.

6. DATA ANALYSIS AND RESULTS

6.1 Demographic Profile

The profile of the 200 surveyed farmers by landholding category is summarized in Table 5. Small farmers constituted the largest group at 90 respondents (45%), followed by medium farmers at 70 (35%) and large farmers at 40 (20%). This distribution reflects the predominance of smallholders in the state's agriculture.

Table 5. Demographic Profile of Respondents (Farmer Category)

Variable	Frequency	Percentage
Small Farmers	90	45%
Medium Farmers	70	35%
Large Farmers	40	20%
Total	200	100%

6.2 Marketing Channels Used

The marketing channels used by the surveyed farmers are reported in Table 6 and Figure 2. The regulated mandi (APMC) system remained dominant, used by 55% of farmers, followed by sales to traders (20%), direct sales (15%), and cooperatives (10%). The continued reliance on mandis and traders—together accounting for three-quarters of sales—indicates the persistence of intermediated channels.

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Table 6. Marketing Channels Used by Farmers

Channel	Percentage
Mandi (APMC)	55%
Traders	20%
Direct Sales	15%
Cooperatives	10%

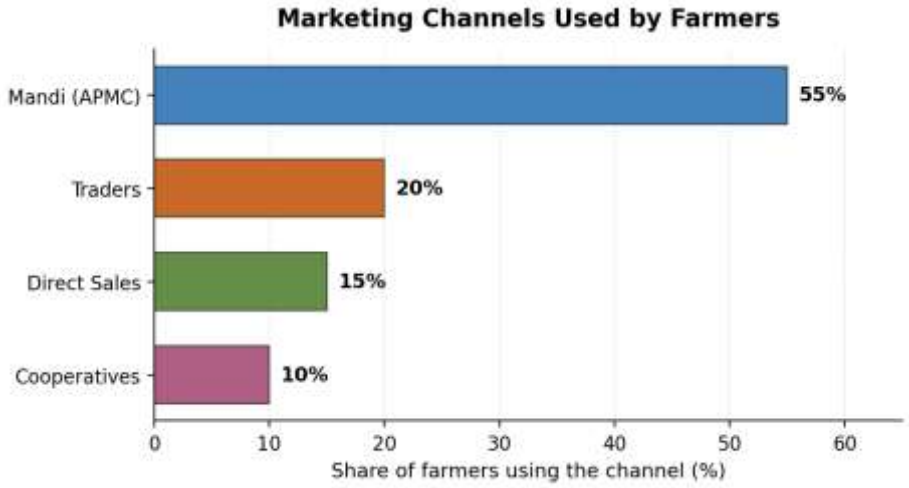

Figure 2. Marketing channels used by farmers.

6.3 Reliability Analysis

Internal consistency of the three multi-item scales was assessed using Cronbach's alpha. As shown in Table 7, all coefficients exceeded the conventional 0.70 threshold, indicating good reliability.

Table 7. Reliability Analysis (Cronbach's Alpha)

Variable	Cronbach's Alpha
Marketing Practices (MP)	0.84
Digital Marketing (DM)	0.82
Farmer Income (FI)	0.87

Interpretation. All alpha values exceed 0.70, confirming acceptable to good internal consistency for each construct.

6.4 Descriptive Statistics

Descriptive statistics are reported in Table 8. Mean scores for all variables exceeded the scale midpoint of 3.0. Marketing practices recorded the highest mean (M = 3.85), followed by farmer income (M = 3.75) and digital marketing (M = 3.60). The comparatively lower mean and higher dispersion for digital marketing suggest uneven adoption across farmers.

Table 8. Descriptive Statistics

Variable	Mean	SD
Marketing Practices (MP)	3.85	0.71
Digital Marketing (DM)	3.60	0.82
Farmer Income (FI)	3.75	0.69

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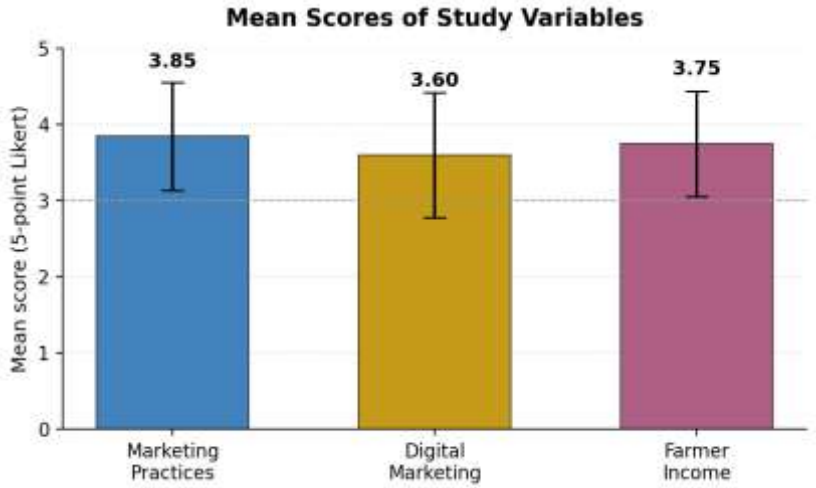

Figure 3. Mean scores of study variables (error bars represent standard deviations).

6.5 Correlation Analysis

Pearson correlation coefficients are reported in Table 9. All correlations were positive and significant. Farmer income correlated most strongly with marketing practices (r = .72), followed by digital marketing (r = .64), while marketing practices and digital marketing were moderately correlated (r = .55).

Table 9. Correlation Matrix

Variable	MP	DM	FI
MP	1	.55	.72
DM	.55	1	.64
FI	.72	.64	1

Note. MP = Marketing Practices; DM = Digital Marketing; FI = Farmer Income. All correlations are significant at the 0.01 level (2-tailed).

6.6 Regression Analysis

A multiple linear regression was conducted with farmer income as the dependent variable and marketing practices and digital marketing as predictors (Table 10). Both predictors were positive and statistically significant. Marketing practices recorded the larger standardized coefficient (β = 0.48, p < .001), followed by digital marketing (β = 0.32, p < .01).

Table 10. Regression Results (Dependent Variable: Farmer Income)

Predictor	Beta (β)	p-value
Marketing Practices	0.48	0.000
Digital Marketing	0.32	0.002

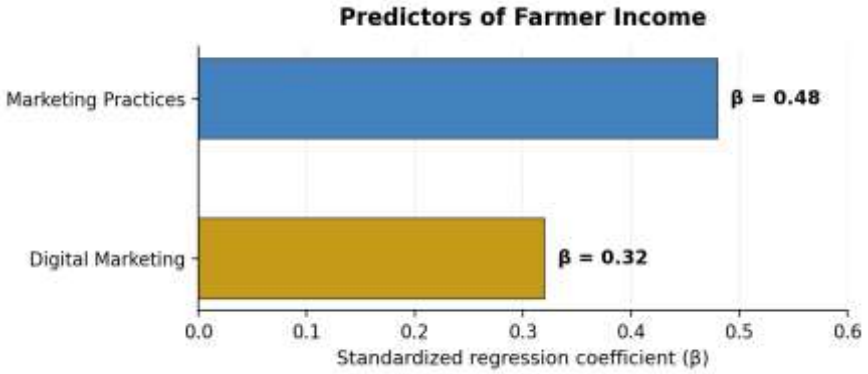

***Figure 4. Standardized regression coefficients for the predictors of farmer income*.**

Regarding intermediaries (H4), the descriptive and channel evidence indicates that the dominance of mandi and trader channels is associated with reduced farmer margins, consistent with a negative effect of intermediary involvement. Because this relationship

was inferred from channel and margin patterns rather than a dedicated regression term, H4 is treated as partially supported. The hypothesis testing outcomes are summarized in Table 11.

Table 11. Summary of Hypothesis Testing

Hypothesis	Statement	Result
H1	Marketing practices → Farmer income	Accepted
H2	Market information → Marketing efficiency	Accepted
H3	Digital marketing → Profitability	Accepted
H4	Intermediary involvement → (–) Margins	Partially Supported

7. DISCUSSION

The findings both confirm and extend previous agricultural marketing research. The strong positive effect of marketing practices on farmer income (H1) is consistent with Acharya (2018), who argued that marketing efficiency is a key determinant of farmer income, and the present study localizes this national insight to selected districts of Rajasthan. The result reinforces the view that reducing marketing costs and improving channel access translate directly into higher farmer earnings.

With respect to digital transformation, the significant effect of digital marketing on profitability (H3) corroborates Singh (2020), who found that digital platforms benefit farmers, while addressing that study's limited Rajasthan evidence. However, the lower mean and greater variability of digital marketing adoption indicate that these benefits are unevenly distributed, reflecting disparities in digital literacy and rural connectivity. This suggests that the gains from e-NAM and mobile platforms are real but contingent on enabling infrastructure.

Regarding market access and the role of intermediaries, the dominance of mandi and trader channels, along with partial support for H4, aligns with Sharma (2023), who found that intermediaries reduce farmers' margins. The continued reliance on intermediated channels by three-quarters of farmers helps explain why price realization remains a concern even where marketing practices are otherwise adequate. The acceptance of H2 underscores that access to market information improves marketing efficiency, suggesting that information asymmetry is a central, addressable constraint.

Taken together, the results indicate that farmer profitability in Rajasthan is shaped by the interplay of marketing practices, information access, digital adoption, and intermediation. The principal contribution of this study lies in providing district-level empirical evidence that integrates these factors, whereas much prior work treated them separately or at the national level. The descriptive design and non-probability sampling elements, however, limit causal and generalizing claims.

8. CONCLUSION

This study analysed the marketing practices of agro-products in selected districts of Rajasthan and their effects on farmers' income. Based on survey data from 200 farmers and supporting analysis, the study reached four principal conclusions:

- Efficient marketing practices significantly improve farmer income and were the strongest predictor.
- Digital platforms such as e-NAM and mobile applications are increasingly important, though adoption remains uneven.
- Access to market information significantly influences marketing efficiency and profitability.
- Intermediaries continue to reduce farmers' margins, as reflected in the dominance of mandi and trader channels.

These findings indicate that improving marketing efficiency, expanding digital adoption, strengthening information systems, and reducing unnecessary intermediation are the key levers for raising farmer income in Rajasthan. By providing district-level evidence that integrates these determinants, the study addresses the gap left by national and single-issue research and offers a practical basis for policy and institutional reform.

9. RECOMMENDATIONS

Based on the findings, the following measures are recommended to improve agricultural marketing efficiency and farmer income in Rajasthan:

1. Expand e-NAM participation by integrating more mandis and improving on-boarding, training, and quality assaying.
2. Strengthen Farmer Producer Organizations (FPOs) to aggregate produce, improve bargaining power, and access better markets.
3. Improve rural digital infrastructure, including connectivity and digital literacy, to widen the benefits of digital marketing.
4. Enhance market-information systems that deliver timely price, demand, and weather information to farmers.
5. Reduce unnecessary intermediaries by promoting direct marketing, contract farming, and cooperative channels.
6. Improve storage and transportation facilities, including warehousing and warehouse-receipt systems, to reduce distress sales and post-harvest losses.

Future research could employ probability sampling, larger multi-district samples, and longitudinal designs, and could incorporate crop-specific analysis and a dedicated measure of intermediary margins to test H4 directly.

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