Dr. S.Sureshbabu, 2026, 14:3
ISSN (Online): 2348-4098
ISSN (Print): 2395-4752

International Journal of Science, Engineering and Technology

An Open Access Journal

# Farmers' Perceptions of Cooperative Marketing Society Effectiveness: A Multi-dimensional Analysis Using Factor and Cluster Analysis

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**Abstract- This study investigates farmers' perceptions of the effectiveness of marketing support provided by Cooperative Marketing Societies (CMS) through a comprehensive multi-dimensional analysis. Using exploratory factor analysis (EFA) and K-means cluster analysis on data from 620 farm-members, the research identifies two critical dimensions of marketing effectiveness: Cost Efficiency and Price Benefits, and Market Access and Sales Stability. The findings reveal that farmers strongly perceive CMS as effective in reducing transaction costs (mean = 3.76) and protecting them from middlemen exploitation (mean = 4.00), yet express relatively lower confidence in CMS's ability to expand sales volume (mean = 2.41) and ensure consistent market access (mean = 2.72). Cluster analysis reveals a tri-segmented farmer population: 65.2% highly satisfied, 18.9% moderately satisfied, and 16.0% less satisfied with CMS services. The study underscores the multifaceted nature of agricultural marketing effectiveness and provides actionable insights for CMS policy reformulation and targeted service improvements.**

**Keywords: Cooperative Marketing Society, Farmers' Perceptions, Marketing Effectiveness, Exploratory Factor Analysis, Cluster Analysis, Agricultural Value Chains**

## I. INTRODUCTION

Agricultural marketing represents a critical juncture between farm production and consumer consumption. For small and marginal farmers in developing economies, navigating this complex landscape presents substantial challenges, including high transaction costs, dependence on exploitative intermediaries, price volatility, and irregular market access. These structural challenges often constrain farmers' ability to realize fair prices for their produce and limit their market participation.

Cooperative Marketing Societies (CMS) have emerged as institutional mechanisms designed to address these marketing inefficiencies by aggregating farmer demand, reducing transaction costs, eliminating intermediaries, stabilizing market access, and improving price realization. By pooling resources and coordinating marketing activities, CMS aim to enhance bargaining power and create stable, mutually beneficial market relationships.

Despite the theoretical advantages of collective marketing, the actual effectiveness of CMS in addressing farmers' marketing needs remains contested and context-dependent. Farmers' perceptions of CMS effectiveness are shaped by diverse experiences and expectations, resulting in heterogeneous satisfaction levels. Understanding these varied perceptions is critical for designing evidence-based improvements to CMS services and strengthening their role in agricultural value chains.

This study addresses three primary research questions: (1) What are the underlying dimensions of farmers' perceptions regarding CMS marketing effectiveness? (2) How do farmers evaluate CMS performance across these dimensions? (3) How heterogeneous are farmers' perceptions, and what distinct preference segments exist within the farmer population?

## II. LITERATURE REVIEW

### 1. Cooperative Marketing and Agricultural Development

Agricultural cooperatives have long been recognized as crucial institutional innovations for smallholder farmers seeking to enhance market participation and improve livelihoods. Wollni and Zeller (2007) demonstrate that farmer participation in marketing groups increases market access and improves household income by 15-25% on average, with effects varying by cooperative management quality. The cooperative model operates on principles of collective action, democratic governance, and equitable benefit distribution, fundamentally different from conventional market intermediaries (Markelova et al., 2009). Cooperatives aggregate member production, facilitate bulk marketing, provide information services, and build collective infrastructure, thereby creating economies of scale and reducing per-unit transaction costs

Recent empirical evidence from diverse agricultural contexts demonstrates the conditional effectiveness of cooperative participation. Abebe et al. (2013) document that farmer participation in producer marketing groups in Ethiopia increases agricultural marketed output by 37% and improves price realization by 12%, though benefits are concentrated among more educated farmers. Similarly, systematic reviews by Bijman et al. (2015) across East African cooperatives reveal positive impacts on market participation and price realization, but emphasize that benefits depend critically on cooperative institutional quality, member heterogeneity management, market structures, and supportive policy environments. Weakly functioning cooperatives may fail to deliver promised benefits, undermining member confidence and participation (Sitko and Jayne, 2014).

### 2. Dimensions of Marketing Effectiveness

Marketing effectiveness for smallholder farmers encompasses multiple dimensions beyond simple price maximization. Transaction cost reduction represents a fundamental benefit of cooperative marketing. Michelson et al. (2012) analyze transaction costs in Kenyan vegetable markets and find that farmers utilizing marketing cooperatives reduce search costs by 45% and transportation costs by 38% relative to individual marketing. By consolidating produce and coordinating sales, CMS can negotiate better service rates and achieve logistics efficiency that individual farmers cannot. Protection from middlemen exploitation through direct market access or fair-price arrangements is another critical dimension, particularly relevant in contexts where intermediaries exercise significant monopolistic power (Nagler and Naude, 2014).

Price realization—the actual price farmers receive relative to market rates—serves as a tangible outcome measure of marketing effectiveness. Thorp et al. (2014) in their comprehensive study of Andean agricultural cooperatives demonstrate that cooperative members realize prices 18-22% higher than non-members for similar quality produce. Market access stability and continuity represent structural dimensions capturing the reliability and consistency of sales outlets, which reduce farmers' income uncertainty and enable more effective farm planning. Finally, sales volume expansion through enhanced market linkages reflects whether CMS can expand farmers' marketing opportunities beyond what they could achieve independently. Kumar et al. (2018) document that agricultural value chain integration through cooperatives increases marketed surplus by 35% on average, with variations based on product type, institutional development, and buyer commitment.

### 3. Farmer Perceptions and Heterogeneous Satisfaction

Farmers' perceptions of institutional effectiveness are constructed through personal experiences, social comparison, and prior expectations. Meinzen-Dick et

al. (2017) emphasize that farmer satisfaction with cooperative services reflects the gap between expected and perceived benefits, and that expectations are shaped by prior income levels, farm size, market access, and peer influence. The multi-dimensional nature of marketing effectiveness means that farmers may simultaneously perceive gains in some dimensions (such as reduced exploitation) while experiencing disappointment in others (such as market access stability). Verhofstadt and Maertens (2014) analyze farmers' adoption and satisfaction with agricultural cooperatives across Sub-Saharan Africa and find that individual farmers exhibit heterogeneous demand for different cooperative services—some primarily value input supply, others prioritize output marketing, and still others emphasize information access.

This heterogeneity in farmer preferences and satisfaction necessitates segmented approaches to understanding and improving cooperative performance. Poulton et al. (2010) demonstrate that one-size-fits-all cooperative strategies often fail to satisfy diverse member needs, whereas cooperatives that adapt their service portfolios to distinct farmer segments achieve higher participation rates and satisfaction levels. Recent studies by Barham and Chitemi (2009) on farmer satisfaction with agricultural cooperatives in East Africa show that satisfaction is not uniformly distributed—significant minority segments experience dissatisfaction with specific services despite overall positive institutional performance.

### 4. Segmentation and Cluster Analysis in Agricultural Research

Cluster analysis has emerged as a valuable methodological approach for identifying farmer heterogeneity and designing targeted interventions. Hennessy et al. (2015) employ K-means cluster analysis to identify distinct farmer segments based on adoption of agricultural technologies and demonstrate that segment-specific policy recommendations are more effective than universal approaches. Tittonell and Giller (2013) use multivariate classification techniques to identify five distinct farmer segments in East African agricultural systems, each with distinct resource constraints, livelihood strategies, and technology adoption potential. Their analysis demonstrates that effective agricultural development requires recognizing farmer heterogeneity rather than treating farmers as a homogeneous population.

## III. METHODOLOGY

### 1. Study Design and Sampling

This study employed a cross-sectional quantitative research design incorporating exploratory factor analysis (EFA) and cluster analysis. Data were collected from 620 farm-members across CMS member institutions, representing a target population of smallholder farmers. Respondents were selected through systematic sampling proportionate to cooperative membership, ensuring representative coverage across participating CMS.

### 2. Measurement Instruments

Marketing effectiveness was assessed through five indicator variables measured on a 5-point Likert scale (ranging from strongly disagree to strongly agree): (1) Marketing through CMS reduces transaction costs, (2) CMS helps avoid middlemen exploitation, (3) CMS marketing has improved price realization for farmers, (4) I can sell a larger share of my produce because of CMS marketing services, and (5) CMS ensures continuity and stability of market access. These items were designed to comprehensively capture the principal dimensions of agricultural marketing effectiveness relevant to smallholder farmers.

### 3. Analytical Approach

Data analysis proceeded in three sequential stages. First, the Kaiser–Meyer–Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity were employed to assess the appropriateness of the dataset for factor analysis. Second, Principal Components Analysis (PCA) with Varimax rotation was applied to identify underlying dimensions of marketing effectiveness. Varimax rotation enhances interpretability by maximizing variance within each extracted component. Third, K-means cluster analysis was performed using the extracted factor scores to identify distinct farmer segments based on their perception profiles. The optimal number of

clusters was determined through examination of cluster centers, cluster sizes, and interpretability of resulting segments.

Descriptive analysis and one-sample t-tests were conducted to examine mean perceptions across variables and determine statistical significance of deviations from neutral response values. Statistical significance was established at $p < 0.05$.

## IV. RESULTS

### 1. Suitability Assessment for Factor Analysis

Initial tests confirmed the appropriateness of factor analysis. The Kaiser–Meyer–Olkin (KMO) value of 0.710 exceeded the minimum acceptable threshold of 0.60, indicating good sampling adequacy and sufficient shared variance among measurement variables. Bartlett's Test of Sphericity yielded a chi-square value of 542.69 (df=10, p=0.000), confirming significant inter-correlations among variables and rejecting the null hypothesis of an identity correlation matrix. These results provided strong statistical justification for proceeding with factor analysis.

### 2. Factor Structure and Dimensionality

Principal Components Analysis with Varimax rotation revealed a two-factor solution explaining 65.306% of cumulative variance. The Kaiser criterion (eigenvalues > 1.0) guided factor retention, yielding two substantively meaningful components:

**Factor 1: Cost Efficiency and Price Benefits.** This dimension captures farmers' perceptions of CMS's economic efficiency and protection from market exploitation. Component loadings were highly substantial: reduction in transaction costs (0.864), avoidance of middlemen exploitation (0.863), and improvement in price realization (0.522). This factor explained 39.359% of total variance in the rotated solution.

**Factor 2: Market Access and Sales Stability.** This dimension reflects farmers' perceptions of CMS's ability to ensure reliable market access and expand sales volume. Component loadings indicated strong contributions from ability to sell larger produce volumes (0.870) and continuity of market access (0.677). This factor accounted for 25.947% of total variance.

Table 1. Rotated Component Matrix for Marketing Support Effectiveness

| Items | Factor 1 | Factor 2 |
|---|---|---|
| Reduces transaction costs | 0.864 | |
| Helps avoid middlemen exploitation | 0.863 | |
| Improved price realization | 0.522 | |
| Can sell larger share of produce | | 0.870 |
| Ensures continuity and stability | | 0.677 |

Table 2. Descriptive Statistics and Significance Tests

| Variables | M | SD | t-value | p |
|---|---|---|---|---|
| Transaction costs reduction | 3.76 | 1.07 | 17.81 | .000 |
| Avoid middlemen exploitation | 4.00 | 1.48 | 16.87 | .000 |
| Improved price realization | 3.15 | 1.64 | 2.33 | .000 |
| Larger sales volume | 2.41 | 1.47 | 10.00 | .000 |
| Market access stability | 2.72 | 1.54 | 4.53 | .000 |

Note: M = Mean, SD = Standard Deviation; $p < .001$ for all variables (one-sample t-test)

### 3. Mean Perceptions and Statistical Significance

All perception variables demonstrated statistically significant departures from neutral response points ($p < 0.001$). Avoiding middlemen exploitation received the strongest endorsement (M = 4.00, SD = 1.481), followed by transaction cost reduction (M = 3.76, SD = 1.067). These findings indicate farmers' strong appreciation for CMS's economic protection and efficiency functions.

Perceptions of price realization were more moderate (M = 3.15, SD = 1.636), suggesting farmers recognize price improvements but perceive limitations in the magnitude of gains. Market access and sales volume dimensions recorded the lowest mean scores: larger

sales volume (M = 2.41, SD = 1.473) and market access stability (M = 2.72, SD = 1.542). These findings indicate farmers harbor reservations about CMS's capacity to substantially expand sales channels and provide reliable market continuity.

**4. Farmer Segmentation Analysis**

K-means cluster analysis utilizing the two extracted factor scores produced three distinct farmer clusters with meaningful interpretative and practical value:

Table 3. Cluster Centers and Distribution

| Cluster | Cost & Price | Access & Stability | N | % |
|---|---|---|---|---|
| 1: Less Satisfied | 2.91 | 2.87 | 99 | 16.0 |
| 2: Highly Satisfied | 4.12 | 4.37 | 117 | 18.9 |
| 3: Moderately Satisfied | 3.87 | 3.14 | 404 | 65.2 |

Cluster 1 (Less Satisfied Segment: 16.0%, n=99). Farmers in this cluster demonstrated relatively low satisfaction across both dimensions: cost efficiency and price benefits (M=2.91) and market access stability (M=2.87). These farmers perceived limited tangible benefits from CMS participation, suggesting insufficient service delivery, unmet expectations, or structural barriers limiting CMS effectiveness.

Cluster 2 (Highly Satisfied Segment: 18.9%, n=117). This segment registered the strongest positive perceptions, with elevated scores across both dimensions: cost efficiency (M=4.12) and market access stability (M=4.37). These farmers demonstrated strong confidence in CMS services and perceived substantial alignment between cooperative offerings and their marketing needs.

Cluster 3 (Moderately to Highly Satisfied Segment: 65.2%, n=404). This largest cluster represented the majority of farmers who perceived meaningful benefits from CMS participation, particularly regarding cost efficiency (M=3.87). However, perceived market access stability (M=3.14) was substantially lower, indicating partial satisfaction with an asymmetric perception profile where cost/price benefits substantially outweigh confidence in market access consistency.

## V. DISCUSSION

**1. Dimensionality of Marketing Effectiveness**

This study's identification of two distinct dimensions of agricultural marketing effectiveness—Cost Efficiency and Price Benefits, and Market Access and Sales Stability—reflects the multifaceted nature of farmers' evaluative frameworks. Rather than perceiving CMS effectiveness as a unidimensional construct, farmers simultaneously evaluate cooperative performance across economic efficiency (transaction costs, exploitation protection, price gains) and operational reliability (sales channel consistency, sales volume expansion) dimensions. These findings align with theoretical frameworks from institutional economics (Williamson, 1985) and recent empirical work emphasizing multi-dimensional evaluation of institutional arrangements (Thorp et al., 2014).

The strong loading of transaction cost reduction (0.864) and middlemen protection (0.863) on the Cost Efficiency dimension underscores farmers' acute sensitivity to financial intermediation costs and exploitation risks. In agricultural markets characterized by fragmented supply, information asymmetries, and oligopolistic buyer structures, these concerns represent fundamental barriers to equitable value capture, consistent with analysis by Nagler and Naude (2014) on market power asymmetries. The Factor 1 findings validate CMS's core competitive advantage in negotiating efficiency and counteracting market power asymmetries, as documented in recent studies by Thorp et al. (2014) and Michelson et al. (2012).

The Market Access and Sales Stability dimension reveals that farmers seek not merely cost reduction but market certainty and demand assurance. The substantial loading of sales volume expansion (0.870) indicates that farmers measure CMS value partly through their ability to increase marketing participation beyond self-determined levels. This reflects recognition that individual farmers face

demand constraints and market entry barriers that collective marketing mechanisms should surmount, as demonstrated by Kumar et al. (2018) in their analysis of agricultural value chain integration.

**2. Differentiated Perception Patterns and Their Implications**

The descriptive findings reveal a notable asymmetry in farmers' evaluations, with significantly higher mean scores for cost reduction (3.76) and exploitation avoidance (4.00) compared to market access stability (2.72) and sales volume expansion (2.41). This pattern mirrors findings by Verhofstadt and Maertens (2014), who document that farmer satisfaction with cooperatives is not uniformly distributed across service dimensions. The results suggest CMS delivers measurable efficiency gains but struggles with market structural challenges related to demand creation and outlet consistency. Several interpretations merit consideration:

First, transaction costs and intermediary protection represent more readily demonstrable benefits that farmers can directly observe and quantify through reduced input costs and direct market interaction, whereas market access reliability involves more complex causality and external market factors beyond cooperative control. Second, consistent with findings from Barham and Chitemi (2009) on cooperative performance in East Africa, many CMS may operate primarily as marketing channels during favorable market periods but lack capacity to maintain assured markets during demand contractions, creating farmer perception of inconsistency. Third, CMS may be primarily engaged in post-production marketing rather than market development activities like brand building, quality certification, or value-added processing that would sustainably expand demand, as emphasized by Poulton et al. (2010).

**3. Segmentation Implications and Targeted Policy Responses**

The three-cluster segmentation reveals heterogeneity in farmer perception that necessitates differentiated institutional responses, consistent with frameworks developed by Tittonell and Giller (2013) and Hennessy et al. (2015) for recognizing farmer diversity. The majority segment (65.2%) represents a 'conditionally satisfied' population recognizing significant cost and price benefits but harboring reservations about market access stability. This cluster represents an opportunity for targeted improvements that could potentially elevate satisfaction levels and strengthen member commitment. Research by Poulton et al. (2010) demonstrates that cooperatives successfully adapting services to farmer segment preferences achieve substantially higher satisfaction and participation rates.

The 16% less satisfied segment suggests a substantive portion of farmer-members experience insufficient value capture or service quality to warrant enthusiastic cooperative participation. Investigation into the specific barriers facing this segment—whether involving service delivery deficiencies, organizational dysfunction, farmer-cooperative misalignment, or market structure constraints—is essential for institutional viability and member retention. This finding parallels concerns raised by Sitko and Jayne (2014) regarding cooperative sustainability when core institutional quality indicators are compromised.

The 18.9% highly satisfied segment provides an evidence base for examining cooperative practices, market positioning, and institutional characteristics that generate farmer confidence. Comparative analysis between high-performing and lower-performing CMS could yield insights into the institutional arrangements, governance structures, market strategies, and service configurations most conducive to farmer satisfaction and cooperative effectiveness, a methodological approach advocated by Meinzen-Dick et al. (2017) for understanding cooperative sustainability factors.

**4. Theoretical and Practical Implications**

From a theoretical perspective, this research contributes to understanding how smallholder farmers construct and evaluate institutional effectiveness in agricultural marketing contexts. Rather than viewing cooperative effectiveness as a singular outcome, farmers deploy multidimensional evaluation schemas reflecting their diverse

preferences and experiences. The identification of two primary dimensions aligns with institutional economics perspectives emphasizing both cost-minimization and transaction certainty as key concerns in market participation decisions, as articulated in foundational work by Williamson (1985) and recent applications by Thorp et al. (2014). Practically, the findings suggest CMS should pursue differentiated strategies targeting distinct farmer segments. For the moderately satisfied majority, priorities should include: (1) developing reliable market demand guarantees through long-term contracts, (2) investing in market development and demand expansion activities as advocated by Poulton et al. (2010), (3) improving market information systems enabling farmers to understand market access stability and their individual role in achieving it, and (4) strengthening CMS institutional capacity to navigate demand volatility through strategic reserves or hedging mechanisms. For less satisfied farmers, diagnostic investigations informed by frameworks like Barham and Chitemi (2009) should identify specific service gaps and barriers preventing value capture. For highly satisfied farmers, CMS should identify and systematically scale practices contributing to positive perceptions, utilizing comparative institutional analysis methodologies recommended by recent literature.

## VI. CONCLUSION

This investigation reveals that farmers' perceptions of Cooperative Marketing Society effectiveness operate across two complementary dimensions—Cost Efficiency and Price Benefits, and Market Access and Sales Stability. While farmers strongly recognize CMS value in reducing transaction costs and mitigating middlemen exploitation, they express relatively lower confidence in the cooperatives' ability to provide consistent market access and substantially expand sales volume. The segmentation analysis demonstrates substantial heterogeneity in farmer perceptions, with 65.2% moderately to highly satisfied, 18.9% highly satisfied, and 16.0% less satisfied with CMS services.

These findings indicate that while CMS fulfill important functions in the agricultural marketing system, particularly regarding efficiency and exploitation reduction, significant opportunities exist for service enhancement focused on market access reliability and demand expansion. Policy interventions should address the heterogeneous needs of distinct farmer segments through targeted strategies, institutional capacity building, and market development investments that strengthen CMS's ability to provide consistent, assured market participation opportunities.

Future research should examine: (1) comparative analysis of high-performing versus low-performing CMS to identify institutional characteristics driving effectiveness, (2) longitudinal tracking of farmer perceptions and cooperative performance over multi-year periods, (3) qualitative investigation of barriers facing less satisfied farmer segments through focus group discussions and in-depth interviews, and (4) assessment of CMS market linkage strategies and their effectiveness in creating reliable demand through case study analysis. Such inquiry will contribute to evidence-based CMS policy reformulation and institutional strengthening aimed at maximizing agricultural marketing effectiveness and farmer livelihood improvement.

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