

Supply Chain Analysis of Agricultural Produces - Study of Shegaon Region

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Abstract: *This study analyzes the agricultural supply chain in Shegaon and identifies the key factors affecting its efficiency and farmer income. It examines operational, infrastructural, institutional, and technological aspects of the supply chain, including the role of intermediaries, storage facilities, transportation, and market access. Data was collected from 130 respondents, including farmers, distributors, and logistics providers, using structured questionnaires and interviews. Statistical and qualitative techniques such as descriptive analysis and regression were used for evaluation. The findings reveal that despite strong agricultural production, inefficiencies in storage, logistics, and market systems reduce farmer profitability. The study also highlights that lack of awareness, weak infrastructure, and dependence on middlemen are major challenges. It concludes that improving infrastructure, promoting digital platforms, strengthening Farmer Producer Organizations (FPOs), and enhancing logistics can significantly improve supply chain efficiency and farmer income..*

Keywords: Agricultural Supply Chain, Farmers, Logistics, Market Efficiency, Shegaon

I. INTRODUCTION

1.1 Background and Significance of the Study

Agriculture has been the backbone of the Indian economy, supporting millions of livelihoods, especially in rural regions like Shegaon (FAO, 2022; Ministry of Agriculture & Farmers Welfare, 2023). It plays a vital role not only in food production but also in employment generation and economic stability. However, the benefits of agricultural production are often not fully realized by farmers due to inefficiencies in the supply chain, which significantly affect income and market efficiency (Agarwal, 2018; Gulati, 2018).

An effective agricultural supply chain ensures the smooth flow of produce from farms to markets through proper coordination of production, storage, transportation, and distribution while maintaining quality and reducing post-harvest losses (Christopher, 2016; Chopra & Meindl, 2021). In reality, farmers face several challenges such as inadequate storage facilities, weak transportation systems, lack of timely market information, and heavy dependence on intermediaries, which reduces their bargaining power and profitability (Lambert & Cooper, 2000; NABARD, 2023).

Traditionally, agricultural marketing in India has relied on APMC markets and local traders. Although reforms such as digital platforms and Farmer Producer Organizations (FPOs) have been introduced, their adoption in rural and semi-rural areas remains limited due to infrastructural and awareness constraints (Bhosale & Patil, 2022; FAO, 2022). As a result, the agricultural supply chain continues to operate in a fragmented and inefficient manner (Singh & Pandey, 2019).

This study focuses on analyzing the agricultural supply chain in Shegaon and highlights the need for improved infrastructure, technology adoption, and institutional strengthening to enhance efficiency and farmer income (World Bank, 2021; Kumar, 2023).



II. REVIEW OF LITERATURE

Birthal et al. (2017) stated that post-harvest losses in India remain significantly high due to inadequate storage, poor handling practices, and lack of infrastructure. Their study emphasized that inefficiencies in the supply chain directly affect farmers' income and market efficiency.

Gulati and Reardon (2008) discussed the transformation of agricultural markets in India and highlighted that modern supply chains can improve efficiency and farmer margins. However, they noted that such systems have limited reach in rural areas due to infrastructural and institutional constraints.

Sharma (2022) examined the role of Farmer Producer Organizations (FPOs) and found that they enhance collective bargaining, improve market access, and reduce dependency on intermediaries. However, the study also pointed out challenges like weak management and limited financial capacity.

Kumar (2023) analyzed the impact of digital platforms such as e-NAM and concluded that technology improves transparency, price discovery, and communication between farmers and markets. Despite these benefits, adoption remains low in rural areas due to lack of awareness and digital literacy.

III. RESEARCH METHODOLOGY

3.1 Research Objectives

1. To analyze the agriculture supply chain with a focus on distribution, grain distributors, and third-party networks (3PN).
2. To analyze the distribution of preferences of farmers.
3. To evaluate and compare the efficiency level of different grain distributors.
4. To analyze the role of third-party network (3PN) in the distribution chain of agriculture produces.
5. To study the existing marketing and distribution channels adopted by farmers.

Scope of the Study

The study focuses on farmers and supply chain stakeholders in Shegaon and nearby villages. It covers major crops like soybean, cotton, wheat, and pulses, along with activities from production to marketing. Data was collected during 2024–2025. Large agribusiness firms and regions outside Shegaon are excluded.

3.2 Hypotheses

- H_{01} : There is no significant difference in farmers' distribution preferences.
 H_{11} : There is a significant difference in farmers' distribution preferences.
 H_{02} : There is no significant difference in efficiency of grain distributors.
 H_{12} : There is a significant difference in efficiency of grain distributors.
 H_{03} : Third-party logistics (3PL) does not significantly affect supply chain efficiency.
 H_{13} : Third-party logistics (3PL) significantly affects supply chain efficiency.

3.3 Data Sources

The study uses both primary and secondary data. Primary data is collected from farmers, traders, and logistics providers through surveys and interviews. Secondary data is obtained from reports, journals, government publications, and agricultural databases.

3.4 Data Collection Methods

Data was collected using structured questionnaires, personal interviews, and field observations to understand real supply chain practices and challenges.

3.5 Sample Design

Sample Size: 130 respondents



Sample Unit: Farmers, distributors, and logistics providers in Shegaon region

3.6 Sampling Technique

A combination of stratified and purposive sampling was used to ensure representation of different farmer categories and supply chain stakeholders.

3.7 Data Analysis Tools

Data was analyzed using tools like percentage analysis, frequency tables, and cross-tabulation. Software such as MS Excel was used for descriptive and statistical analysis.

IV. DATA ANALYSIS AND INTERPRETATION

4.1 Descriptive Statistical Analysis

The variables included in the study were measured using a 5-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree. The collected responses from the datasets (Middleman, Farmer, and APMC officer) were statistically analyzed using descriptive measures. The following tables present the Mean (μ) and Standard Error (SE) for each variable, along with the Aggregate Mean and Standard Deviation (SD) for every research objective.

Table 1: Descriptive Statistics for Research Objectives

Objective	Question / Variable	Mean (μ)	Standard Error (SE)
Objective 1: Farmer Satisfaction Factors (Overall Mean: 3.80) (Overall SD: 0.94)	Q8: Timely Payment by Middleman	3.84	0.13
	Q9: Fair Price Received	3.62	0.14
	Q10: Ease of Selling Produce	4.02	0.12
	Q11: Trust on Buyer	3.71	0.13
Objective 2: Middleman Efficiency Factors (Overall Mean: 3.98) (Overall SD: 0.87)	Q12: Fast Product Movement	3.95	0.12
	Q13: Better Market Access	3.88	0.13
	Q14: Reduced Transportation Burden	4.11	0.11
Objective 3: Communication Effectiveness Factors (Overall Mean: 3.91) (Overall SD: 0.86)	Q15: Availability of Contact Details	4.06	0.10
	Q16: Easy Communication with Stakeholders	3.93	0.12
	Q17: Quick Response Time	3.74	0.13
	Q18: Satisfaction with Current System	3.68	0.13
Objective 4: Overall Performance Factors (Overall Mean: 3.78) (Overall SD: 0.89)	Q19: Willingness to Continue Current Channel	3.89	0.12
	Q20: Long-Term Trust and Reliability	3.76	0.11

4.2 Hypothesis Testing

To validate the research objectives, three null hypotheses were tested. One-Sample T-test and ANOVA methods were applied.

Table 2: Summary of Hypothesis Testing Results

Hypothesis	Statistical Test	Test Statistic	P-Value	Result
H ₀ 1: Middlemen do not significantly influence farmer satisfaction	One-Sample T-Test	t = 3.214	0.002	Rejected H ₀ (01)
H ₀ 2: Communication system has no	One-Sample T-Test	t = 4.106	0.001	Rejected



significant effect on performance				H_(02)
H ₀₃ : Satisfaction differs across respondent groups	ANOVA	F = 5.327	0.006	Rejected H_(03)

4.3 Interpretation and Discussion

4.3.1 Farmer Satisfaction and Middlemen Role (H₁)

The rejection of H₀₁ (p = 0.002) confirms that middlemen significantly affect farmer satisfaction. The highest mean score was observed for Ease of Selling Produce (4.02), indicating that farmers value convenience and immediate market access. However, the lower score for Fair Price Received (3.62) suggests concern regarding pricing transparency.

4.3.2 Communication Efficiency (H₂)

The rejection of H₀₂ (p = 0.001) proves that communication systems strongly influence operational efficiency. Availability of Contact Details (4.06) received the highest score, indicating that accessible communication channels are essential for better coordination.

4.3.3 Group Differences in Satisfaction (H₃)

ANOVA results rejected H₀₃ (p = 0.006), showing that satisfaction levels differ significantly among farmers, traders, and contact-network users. This suggests that each group experiences different benefits and challenges.

4.3.4 Strategic Implications

The findings indicate that strengthening direct communication, ensuring transparent pricing, and reducing dependency inefficiencies can improve agricultural marketing performance. Training, digital contact systems, and stronger market linkage models can further enhance stakeholder satisfaction.

V. CONCLUSION

The study concludes that the agricultural supply chain in Shegaon is constrained by poor storage, weak logistics, and dependence on intermediaries, which reduce farmer income and efficiency. High post-harvest losses and infrastructure gaps remain major issues, often forcing farmers into distress sales.

Improving storage facilities, strengthening logistics, promoting digital platforms, and empowering FPOs can significantly enhance market access, reduce losses, and increase farmer profitability.

REFERENCES

- [1]. Agarwal, N. R. (2018). *Supply Chain Management of Indian Agriculture Industry*. Global Journal of Enterprise Information System. <https://www.gjeis.com/index.php/GJEIS/article/view/271/265> (ResearchGate)
- [2]. Chopra, S., & Meindl, P. (2021). *Supply Chain Management: Strategy, Planning, and Operation*. Pearson Education. <https://www.pearson.com/en-us/subject-catalog/p/supply-chain-management/P200000007737> (ResearchGate)
- [3]. Christopher, M. (2016). *Logistics and Supply Chain Management*. Pearson Education. <https://www.pearson.com/en-us/subject-catalog/p/logistics-and-supply-chain-management/P200000006485> (ResearchGate)
- [4]. Food and Agriculture Organization (FAO). (2022). *The State of Agricultural Commodity Markets*. <https://www.fao.org/publications> (Agriculture Institute)
- [5]. Gulati, A. (2018). *Supply Chain Reforms in Indian Agriculture*. Indian Journal of Agricultural Economics.



- <https://ageconsearch.umn.edu/record/300518> (Agriculture Institute)
- [6]. Kothari, C. R. (2019). *Research Methodology: Methods and Techniques*. New Age International.
<https://www.newagepublishers.com> (ResearchGate)
- [7]. Ministry of Agriculture & Farmers Welfare (2023). *Agriculture Statistics at a Glance*. Government of India.
<https://agricoop.gov.in> (NABARD)
- [8]. NABARD (2023). *Agricultural Infrastructure and Rural Credit in India*.
<https://www.nabard.org> (NABARD)
- [9]. World Bank (2021). *Transforming Agri-Food Systems through Digital Innovation*.
<https://www.worldbank.org/en/topic/agriculture> (Agriculture Institute)

