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Understanding the Socio-Economic Challenges of Cotton Growers in the Middle Gujarat

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Abstract – Cotton farming is a key source of livelihood for farmers in Middle Gujarat, but they face multiple socio-economic and production-related challenges. This study explores the cotton value chain by examining farmers' landholdings, labor practices, marketing channels, yields, income, and awareness of government schemes, with a focus on factors affecting productivity and access to the Minimum Support Price (MSP). Primary data were collected from 340 cotton farmers. Results indicate that most farmers have small to medium landholdings and rely primarily on hired and family labor. The majority sell cotton through commission agents and local markets, with limited use of cooperatives or direct ginner channels. Cotton yields are mostly moderate, and incomes vary widely, with many earning either below ₹50,000 or above ₹1,50,000 annually. Awareness of MSP and government schemes is fairly high, though consistent access and utilization remain a challenge. Statistical analysis shows that larger landholdings enhance MSP access, labor shortages reduce productivity, and higher-income farmers are more aware of government schemes. The study highlights the importance of better market access, adequate labor support, adoption of modern farming techniques, and effective awareness programs to boost productivity, increase income, and improve the overall well-being of cotton farmers in the region.

Keywords: Cotton Value Chain, Cotton Farmers, MSP Access, Labor Availability, Productivity, Farmer Income

I. INTRODUCTION

Gujarat is India's leading cotton producer, and the Middle Gujarat region, covering Vadodara, Panchmahal, and Chhota Udepur, is an important cotton belt. Fertile soils, canal irrigation, and a favorable climate support production, but most farmers here are smallholders with limited land. For them, cotton is not only a cash crop but also the backbone of rural livelihoods. Despite its importance, cotton cultivation faces serious challenges. Rising costs of seeds, fertilizers, and pesticides, along with heavy dependence on agro-input dealers, strain farmers' finances. Bt cotton improved yields initially but increased reliance on private companies, while pests such as whitefly and bollworms continue to threaten crops. Market conditions add further pressure: although the government declares a Minimum Support Price (MSP), small farmers often sell at lower rates due to urgent cash needs, storage issues, and delays in procurement. Price fluctuations and high labor and transport costs worsen income insecurity.

Climatic variability, especially in rainfed areas of Panchmahal and Chhota Udepur, introduces additional risks. Erratic rainfall, droughts, and unseasonal rains lower yields, while soil fertility has deteriorated due to the imbalanced use of fertilizers. In this setting, agro-input dealers play a vital role by providing inputs and advice, though farmers' reliance on them sometimes results in overuse of expensive products and dependence on credit.
Social factors also shape cotton farming. Women contribute heavily to farm labor but lack access to land, finance, and decision-making. Migration of youth has reduced the availability of farm workers, increasing labor costs. Community networks provide support, but cannot overcome structural challenges. Government schemes like crop insurance, subsidies, and MSP aim to protect farmers, but their implementation is uneven and often fails to reach smallholders. Vadodara farmers benefit somewhat from better irrigation and markets, while tribal farmers in Panchmahal and Chhota Udepur remain more vulnerable.
In short, cotton cultivation in Middle Gujarat sustains rural communities but is constrained by economic, environmental, and social challenges. Addressing these requires context-specific solutions, sustainable farming practices, stronger marketing systems, effective policies, and greater social inclusion—to secure the long-term resilience of cotton growers.

II. OBJECTIVES OF THE STUDY

- To study the socio-economic profile of cotton farmers in Middle Gujarat.
- To analyze the link between landholding size and access to MSP/markets.
- To assess the effect of labor availability on cotton productivity.

III. LITERATURE REVIEW

Singh et al. (2022) reported that the Cotton Development Programme in Punjab significantly improved adoption of recommended Bt-cotton practices, including hybrids, fertilizers, and pest management, resulting in higher yields. Similarly, Singandhupe et al. (2022) highlighted the role of supplemental irrigation in enhancing cotton water-use efficiency in Gujarat. Matloob et al. (2020) emphasized global variations in cotton systems, stressing the need for

eco-efficient and climate-smart practices. Kamal et al. (2024) found flonicamide highly effective against sucking pests, boosting seed cotton yield.

Kavitha et al. (2023) observed issues with MSP operations in Telangana, such as short procurement periods and delayed payments, recommending reforms for farmer welfare. Devi et al. (2023) identified major challenges for cotton processing industries, including high costs, power shortages, and a lack of marketing cooperatives. Ramkrushna et al. (2023) underscored the potential of organic cotton, though constrained by seed quality and GM contamination risks.

Pande et al. (2022) demonstrated that Dashparni extract had strong larvicidal effects on bollworms. Najork et al. (2021, 2022) revealed socioeconomic vulnerabilities from pink bollworm resurgence, questioning Bt cotton's pro-poor claims. Reddy et al. (2021) and Singh (2021) examined labor dynamics in cotton, noting gender disparities and continued dependence on household labor. Ghori et al. (2022) assessed the Better Cotton Initiative, finding higher incomes but little improvement in labor conditions. Murali and Khan (2022) linked cotton area growth to MSP and irrigation, while Saraf et al. (2022) and Sethi (2021) highlighted policy and market challenges for smallholders. Vinay (2023) reported growth trends and strong market integration in Haryana. Beyond cotton, Zainol et al. (2023) discussed Malaysia's coconut value chain challenges, while Tröster and Gunter (2022) examined how lead firms shape global commodity prices.

IV. RESEARCH METHODOLOGY

This chapter explains the methodological framework adopted to study the challenges and prospects of cotton farmers. It outlines the design of the study, the area selected, sampling methods, data collection procedures, techniques of analysis, and limitations encountered during the research.

Research Design

The study follows a descriptive research design, as it aims to provide a clear picture of the existing situation of cotton farmers. The descriptive approach helped in identifying major problems and exploring opportunities, while hypothesis testing was used to examine the relationship between selected variables.

Area of Study

The research was carried out in three cotton-growing districts of Middle Gujarat—Vadodara, Panchmahal, and Chhotaudepur. These districts were chosen as they represent a significant share of the cotton belt in Gujarat, with diverse farming conditions and farmer categories.

Sampling Method and Sample Size

A combination of cluster sampling and random sampling was used. Villages were first selected from each district to form clusters, and farmers were then chosen randomly from these clusters. In total, 340 cotton farmers were selected, representing small, marginal, medium, and large landholders.

Tools of Data Collection

Primary Data: Gathered through a structured questionnaire, designed with four alternative responses for each question. The questionnaire covered aspects such as cropping practices, pest and disease management, marketing challenges, use of government schemes, and farmer perceptions about prospects.

Secondary Data: Collected from government publications, Cotton Corporation of India (CCI) reports, ICAR studies, research journals, and other relevant sources.

Data Analysis

The collected data were classified, coded, and processed using statistical tools. The methods applied include: Descriptive statistics, such as frequency, percentage, and average, are used to summarize farmer characteristics and responses.

Chi-square test for hypothesis testing, to determine whether there is a significant association between socio-economic variables (e.g., education, landholding, income) and adoption or awareness levels. Ranking techniques to identify and prioritize the key constraints faced by farmers.

Hypotheses Testing

The study tested hypotheses such as:

- Research Question: Does the size of a farmer's land influence their access to Minimum Support Price (MSP)?
- Alternative Hypothesis (H1): Farmers with larger landholdings are more likely to have better access to MSP.
- Null Hypothesis (H0): There is no relationship between landholding size and access to MSP.
- Research Question: How does the availability of agricultural labor impact cotton productivity?
- Alternative Hypothesis (H1): Reduced availability of labor negatively affects cotton productivity.
- Null Hypothesis (H0): Labor availability has no significant impact on cotton productivity.
- Research Question: Does a farmer's income level affect their awareness of government schemes related to cotton cultivation?

Alternative Hypothesis (H1): Farmers with higher income are more likely to be aware of government schemes for cotton cultivation.

Null Hypothesis (H0): A farmer's income level has no significant influence on awareness of government schemes.

The Chi-square test was applied at appropriate significance levels to evaluate these hypotheses.

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Limitations of the Study

The study was limited to three districts, Vadodara, Panchmahal, and Chhotaudepur, and may not fully reflect the situation in other cotton-growing areas of Gujarat.

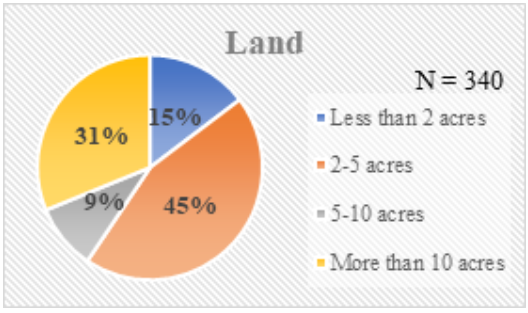
The responses were based on farmers' recall and perceptions, which may include personal bias. Time and resource constraints restricted the possibility of expanding the study area and sample size.

Summary of research methodology

The adopted methodology, combining descriptive research, random and cluster sampling, structured questionnaires, and chi-square analysis, ensures a systematic and reliable framework for assessing the problems and prospects of cotton farmers in Middle Gujarat.

V. DATA ANALYSIS AND INTERPRETATION

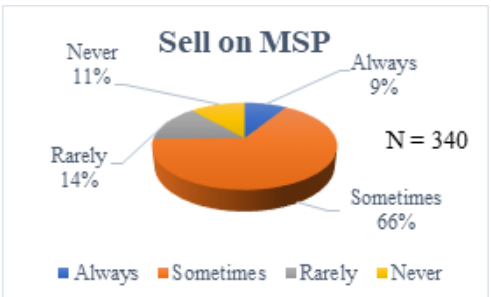
Land of Sample Farmer



Source: Primary data)

Among 340 cotton farmers, 14.7% cultivate less than 2 acres, 44.7% have 2–5 acres, 9.4% farm 5–10 acres, and 31.2% possess more than 10 acres. Small to medium farms, especially 2–5 acres, are most common in the region. Smaller farmers often face difficulties accessing inputs, labor, and markets, while larger landholders typically have better resources. Land size, therefore, plays a key role in cotton cultivation efficiency and income.

Selling of Cotton on MSP



(Source: Primary data)

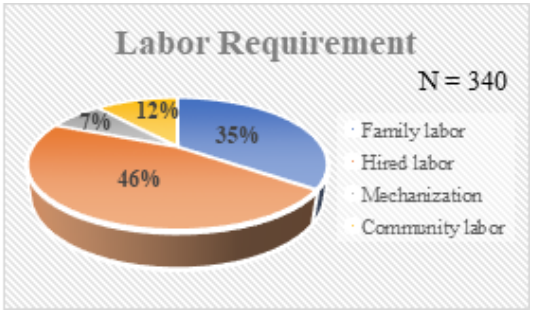
Out of 340 cotton farmers, 65.9% sell at MSP only sometimes, 8.8% always, 13.8% rarely, and 11.5% never. This shows that while most farmers benefit occasionally, very few can sell consistently at MSP, reflecting barriers like market access, intermediaries, and limited procurement facilities.

Selling of Cotton by Sample Farmers

(Source: Primary data)

Out of 340 cotton farmers, 47.6% sell through commission agents, 37.9% directly to markets, 8.8% to ginners, and only 5.6% via cooperatives. This shows most depend on agents and markets, while very few use cooperatives or direct ginner Sales.

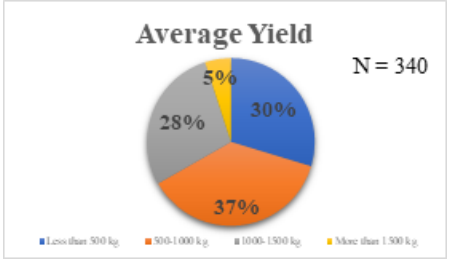
Handle Labor requirements



(Source: Primary data)

Out of 340 cotton farmers, 46.2% depend on hired labor, 35.0% use family labor, 11.5% rely on community labor, and only 7.4% adopt mechanization. This shows that cotton farming is still labor-intensive, with limited use of machines and community support, making hired and family labor the main sources of the workforce.

Average Yield



(Source: Primary data)

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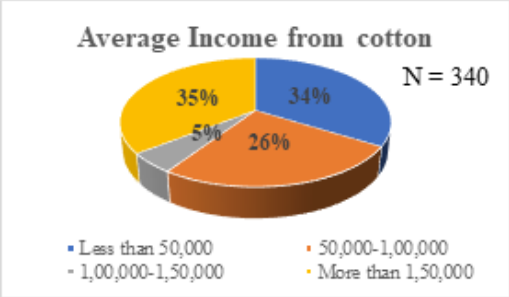
Out of 340 farmers, 37.1% (126) harvest between 500–1000 kg/acre, 29.7% (101) produce below 500 kg, 28.2% (96) record 1000–1500 kg, and just 5.0% (17) cross 1500 kg/acre. This indicates that the majority achieve moderate yields, while only a smaller share face very low or reach very high production levels.

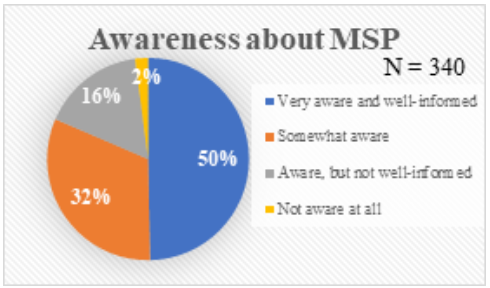
Average Income from Cotton



(Source: Primary data)

Among 340 cotton farmers, 35.6% (121) earn above ₹1,50,000 annually, while 33.8% (115) earn less than ₹50,000. Around 25.6% (87) fall in the ₹50,000-₹1,00,000 range, and only 5.0% (17) earn between ₹1,00,000-₹1,50,000. This shows a wide income gap, with many farmers concentrated at both the lowest and highest ends.

Awareness of MSP



(Source: Primary data)

Out of 340 farmers, 49.7% (169) are well-informed about MSP, 31.8% (108) are somewhat aware, 16.5% (56) know but lack details, and 2.1% (7) are unaware. This shows most farmers understand MSP, though a small share still has limited or no awareness, highlighting the need for better outreach.

Chi-Square Analysis Table

Association Between	Chi-Square Value	Df	Sig.	Results
Does the size of a farmer's land influence their access to the Minimum Support Price (MSP)?	102.472	9	0.000	The null hypothesis is rejected.
How does the availability of agricultural labor impact cotton productivity?	177.210	9	0.000	The null hypothesis is rejected.
Does a farmer's income level affect their awareness of government schemes related to cotton cultivation?	294.178	9	0.000	The null hypothesis is rejected.

(Source: Computed in SPSS by the Author)

Interpretation of Chi-Square Analysis

Does the size of a farmer's land influence their access to the Minimum Support Price (MSP)? The chi-square value of 102.472 with 9 degrees of freedom and a significance level of p = 0.000 indicates a highly significant relationship between landholding size and access to MSP. Since the null hypothesis is rejected, it can be concluded that farmers with larger landholdings are more likely to access MSP compared to those with smaller holdings. This suggests that farm size plays an important role in determining how effectively farmers can benefit from government price support mechanisms.

How does the availability of agricultural labor impact cotton productivity? The chi-square value of 177.210 with 9 degrees of freedom and a significance level of p = 0.000 shows a highly significant relationship between labor availability and cotton productivity. Since the null hypothesis is rejected, it can be concluded that reduced availability of agricultural labor negatively impacts cotton yields, highlighting the crucial role of timely and adequate labor in maintaining productivity.

Does a farmer's income level affect their awareness of government schemes related to cotton cultivation? The chi-square value of 294.178 with 9 degrees of freedom and a significance level of p = 0.000 indicates a highly significant relationship between farmers' income levels and their awareness of government schemes. Since the null hypothesis is rejected, it can be concluded that higher-income farmers are more likely to be aware of schemes related to cotton cultivation, suggesting that income plays a key role in accessing information and benefits provided by the government.

VI. FINDINGS

Landholding Size: Most cotton farmers in the region have small to medium-sized farms, with 2–5 acres being the most common. Selling at MSP: While the majority of farmers sell cotton at MSP occasionally, only a few can sell consistently, indicating challenges in market access and procurement.

Marketing Channels: Nearly half of the farmers rely on commission agents, and a significant portion sell directly to markets, while very few use cooperatives or sell directly to ginners. Labor Sources: Cotton farming remains labor-intensive, with hired and family labor being the main sources, and limited adoption of mechanization or community labor.

Average Yield: Most farmers achieve moderate cotton yields (500–1000 kg/acre), with fewer farmers experiencing very low or very high productivity. Average Income: Income among cotton farmers varies widely, with a large portion earning either below ₹50,000 or above ₹1,50,000 annually.

Awareness of MSP: Nearly half of the farmers are well-informed about MSP, while a smaller group has limited or no awareness, pointing to the need for better information dissemination.

Chi-Square analysis findings

Landholding and MSP: Farmers with larger landholdings have better access to the Minimum Support Price (MSP) than smaller farmers.

Labor Availability and Productivity: Reduced availability of agricultural labor negatively affects cotton productivity.

Income and Awareness of Government Schemes: Higher-income farmers are more aware of government schemes related to cotton cultivation.

Suggestions

Improve MSP Access: Strengthen government procurement systems and reduce dependence on intermediaries so that more farmers can consistently sell at MSP.

Promote Cooperative Marketing: Encourage the use of cooperatives and direct ginner linkages to ensure fair prices and reduce exploitation by agents.

Labor Management: Support affordable mechanization and community labor initiatives to ease labor shortages and improve productivity.

Enhance Productivity: Provide training on modern cultivation practices, pest management, and the use of high-yielding seeds to increase cotton yields. Income Support: Offer targeted financial assistance or subsidies to low-income farmers to reduce the income gap and enhance investment capacity.

Awareness Programs: Conduct regular awareness campaigns about MSP, government schemes, and market facilities to ensure equitable access to information.

Extension Services: Strengthen agricultural extension services to guide farmers on efficient resource use, crop management, and market opportunities.

VII. CONCLUSION

The study of cotton farmers in Middle Gujarat reveals that most farmers operate on small to medium landholdings and rely heavily on hired and family labor. Cotton productivity is generally moderate, and income levels vary widely, with many farmers at both the low and high ends. While awareness of MSP and government schemes is relatively high, consistent access to MSP and effective utilization of schemes remain challenges. Farmers largely depend on commission agents and market sales, with minimal use of cooperatives or direct ginner channels. Addressing labor

shortages, improving access to MSP, promoting modern farming practices, and enhancing awareness programs are crucial for improving productivity, income, and overall socio-economic welfare of cotton farmers in the region.

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