Identification of Constraints in Cotton Cultivation: A Study of Jamnagar District

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ABSTRACT

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| Cotton serves a dual purpose as both a fibre crop for industries and a feed crop for livestock, playing a pivotal role in India's agrarian economy. This study examines the constraints faced by cotton growers in Jamnagar district, Gujarat, one of India's leading cotton-producing region. Primary data were collected from 120 cotton grower respondents of Jamnagar district through a structured questionnaire and analyzed using Garrett ranking to prioritize the constraints encountered by farmers. The findings reveal significant hurdles across production, input supply, economics, and marketing, including timely unavailability of seed, poor seed quality, high labor costs and inadequate storage facilities. These constraints collectively affect the profitability and sustainability of cotton cultivation. Addressing these challenges can achieve sustainable growth, improve farmers’ livelihoods, and enhance market competitiveness. |

*Keywords: Cotton cultivation; Garrett ranking;* *constraints*

1. INTRODUCTION

Cotton is among the most vital commercial and fiber crops worldwide. In India, it supplies nearly 60% of the raw materials required by textile mills and is essential for the livelihoods of cotton farmers. Notably, India stands out as the only nation to cultivate all four species of cotton. Cotton has a long history as a natural fabric in India, with evidence of its cultivation in the Indus Valley over 5,000 years ago. The country's exceptional spinning and weaving skills further emphasize its historical importance (Ramesh *et al*., 2020). During the 2021-22 period, global cotton production was estimated at 26.58 million tons, spanning an area of 32.91 million hectares. India led in both production and area, with 6.05 million metric tons and 13.48 million hectares, respectively, accounting for around 26% of global cotton production and 41% of the area. The primary cotton-producing states in India include Gujarat, Maharashtra, Telangana, Rajasthan, Haryana, Karnataka, Madhya Pradesh, Andhra Pradesh, Punjab, and Tamil Nadu. Additionally, cotton cultivation has extended to non-traditional regions such as Orissa, West Bengal, Bihar, Assam, Manipur, and Tripura. Production growth rate of cotton in India increased significantly by 3.5 percent annually, which is because the productivity rate increased significantly by 2.75 percent per annum, whereas the area also increased significantly at a rate of 0.72 percent annually (Gyan *et al.,* 2023; Oganja *et al.,* 2024). Cotton is high remunerative and rainfed crop cultivated by farmers, while on the other hand, there are many risks involved in it like shortage of water, lake of efficient water application techniques (Rohit *et al*., 2015; Prajapati *et al.,* 2018; Prajapati *et al.,* 2020; Parmar *et al.,* 2024). The cultivation of cotton also needs costly and quality inputs in terms of seeds, fertilizers and pesticides as well as partial adoption of standardized practices by farmers (Sathish *et al.*, 2019; Sathish *et al.*, 2022; Pithiya *et al.*, 2024; Oganja *et al.*, 2024; Kumar *et al*., 2024; Kumar *et al.,* 2024; Nariya *et al.,* 2024). If proper care is not taken, cotton cultivation can lead to financial instability. Cotton is highly susceptible to various diseases and pests, making it a challenging crop to manage. Additionally, it's considered a risky crop due to its vulnerability to natural hazards and the frequent fluctuations in the wholesale price index. These factors often result in farmers receiving lower prices for their marketable surplus (Kormla *et al.,* 2015; Katariya *et al.*, 2016; Sulthana *et al.,* 2019; Vasoya *et al.,* 2024; Nakum *et al.*, 2024; Nakum *et al.*, 2025). Identification of constraints and its management is the systematic attempt to avoid hurdles in production of cotton that do occur (Ghangale *et al.*, 2018; Vennila *et al.,* 2018; Singh & Patel, 2022; Shwetha *et al*., 2022; Pithiya *et al.*, 2024; Nakum *et al.,* 2024). Constraints management focuses on efforts to eliminate technological failures. It encompasses the skills and techniques necessary to assess, understand, and address serious situations from the moment they arise until recovery begins. As the significant challenges in agriculture, such as the need for increased productivity, equity, and balanced development, alongside sustainability and profitability concerns, there is a pressing need for efficient technology dissemination without any loss during transmission. This motivation led the investigator to study the various constraints faced by cotton growers in the Jamnagar district of Gujarat.

2. methodology

The present study, conducted in the year 2023-24, aimed to analyze the primary constraints faced by cotton growers. This research was carried out in the Jamnagar district of Gujarat state, as the Saurashtra region is a major cotton producer in the area. A multistage sampling technique was used to select the district, taluka, villages, and ultimately, the cotton farmers. A total of 120 farmers were randomly selected from the study area. Respondents were asked to rank the listed constraints related to purchasing inputs, economic, and marketing aspects. Rank one indicated the most important constraint, while the last rank indicated the least important. The study utilized Garrett's ranking method to identify the major constraints faced by the respondents during cotton production and marketing. The rank assigned to each constraint by each individual farmer was converted into percent position by using the following formula;

Percent position = $\frac{100\left(R\_{ij}-0.5\right)}{N\_{j}}$

Where,

Rij = rank given by the ith attribute by the jth individual

Nj = number of attributes ranked by the jth individual

 By referring to the Garrett’s table, the per cent position estimated was converted into scores. Thus, for each factor the various respondents were added and then mean value was estimated. The attribute with the highest value was considered as the most important one and the other followed in order (Vennila *et al.,* 2023).

3. RESULT AND DISCUSSION

**3.1 Purchasing Constraints Faced by Cotton Growers**

The purchasing constraints faced by cotton growers are presented in Table 1. The ranking was determined using Garret’s ranking method. According to the data in the table, the foremost constraint faced by cotton growers was the unavailability of seeds in a timely manner, followed by seed viability and germination losses. This suggests that delays in receiving these essential supplies can significantly impact their ability to grow and manage their cotton crops effectively, farmers need high-quality seeds that can produce strong, productive plants. Inadequate soil conditions or unfavourable weather also restrict the potential of higher crop production. Lack of scientific knowledge and technical guidance about crop production and pesticide of variety is least affecting constraint for purchasing of cotton seed.

**Table 1. Purchasing Constraints Faced by Cotton Growers**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr No.** | **Purchasing constraints** | **Garrett score** | **Rank** |
| 1 | Timely available | 59.89 | I |
| 2 | Recommended yield | 48.23 | IV |
| 3 | Seed viability | 54.32 | II |
| 4 | Germination loses | 50.21 | III |
| 5 | Lack of scientific knowledge and technical guidance about crop production and pesticide of variety | 45.77 | V |

**3.2 Input Constraints Faced by Cotton Growers**

The input constraints faced by cotton growers are presented in Table 2. According to the data in the table, the major constraint faced by cotton growers was the poor quality and high cost of seeds, lack of short-duration varieties, difficulty in obtaining improved seeds and lack of knowledge about the recommended seed rate. The most significant constraint perceived by cotton growers is the poor quality of seeds. This implies that substandard seeds can lead to reduced germination rates and lower crop yields, ultimately affecting the overall productivity and profitability of cotton farming. The second most critical constraint is the high cost of seeds. This indicates that the expense associated with purchasing quality seeds is a considerable burden for farmers, making it difficult for them to invest in the necessary inputs for their crops. The least affecting constraints were lack of knowledge about recommended seed rate.

**Table 2. Input Constraints Faced by Cotton Growers**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr No.** | **Purchasing constraints** | **Garrett score** | **Rank** |
| 1 | Lack of knowledge about recommended seed rate | 46.77 | V |
| 2 | Difficulty in getting improved seed | 47.09 | IV |
| 3 | Lack of short duration variety | 50.05 | III |
| 4 | High cost of seed | 52.24 | II |
| 5 | Poor quality of seed | 53.44 | I |

**3.3 Economic Constraints Faced by Cotton Growers**

The economic constraints faced by cotton growers are presented in Table 3. According to the data in the table, the most significant constraint for cotton growers is the high cost of labor. This indicates that the expenses associated with hiring workers for planting, tending, and harvesting cotton are substantial, making it difficult for farmers to manage their production costs effectively. The second most critical constraint is the lack of access to crop insurance. Without insurance, farmers are at a higher risk of financial loss due to adverse weather conditions, pests, or other unforeseen events that can damage their crops, and farmers in Jamnagar district are facing a lot of issues to settle their claim. Farmers face challenges in obtaining sufficient credit to purchase necessary inputs like seeds, fertilizers, and pesticides. This constraint can hinder their ability to invest in essential resources for optimal crop production.

**Table 3. Economic Constraints Faced by Cotton Growers**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr No.** | **Purchasing constraints** | **Garrett score** | **Rank** |
| 1 | Lack of input subsidy | 47.65 | IV |
| 2 | Inadequate credit to purchase inputs | 49.12 | III |
| 3 | High labour cost | 52.72 | I |
| 4 | High rate of interest for credit | 46.08 | V |
| 5 | Non availability of crop insurance | 50.77 | II |

**3.4 Marketing Constraints Faced by Cotton Growers**

 The marketing constraints faced by cotton growers are presented in Table 4. According to the data in the table, storage has the highest Garret score because the farmers do not have proper storage facilities, and inadequate or improper storage facilities can lead to quality deterioration, pest infestations, and other issues that negatively impact the marketability and value of their produce. Trade manipulation is still a concern for farmers. This suggests that unfair trading practices, such as price manipulation by middlemen or lack of transparency in market transactions, can affect farmers' earnings and overall market fairness. Farmers are also facing the unavailability of timely and accurate market information.

**Table 4. Marketing Constraints Faced by Cotton Growers**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr No.** | **Purchasing constraints** | **Garrett score** | **Rank** |
| 1 | Trade manipulation | 50.17 | II |
| 2 | Storage | 51.60 | I |
| 3 | Transportation | 48.85 | IV |
| 4 | Packaging | 49.01 | V |
| 5 | Lack of market information | 49.29 | III |

4. CONCLUSION

This study identifies some key constraints faced by cotton growers in Jamnagar district, Gujarat, affecting their productivity and profitability. The major constraints include the timely unavailability of inputs, poor seed quality, high labor costs, storage and Trade manipulation, which collectively hinder the sustainability of cotton cultivation. Addressing these issues requires a holistic approach involving policymakers, researchers, and industry stakeholders to ensure access to quality inputs, financial support, improved seed varieties, and better market infrastructure. By implementing targeted interventions, the cotton sector can achieve sustainable growth, enhance farmers’ livelihoods, and strengthen market competitiveness.

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