An Analysis of Marketing Status of *BT* Cotton Seed in Devbhumi Dwarka District, Gujarat, India

ABSTRACT

The main objectives of the study were to assess the company's distribution pattern of quality seed material their market share, marketing channels. Multistage sampling technique were adopted. The total 120 farmers and 20 dealers were selected from four taluka *i.e.,* Bhanvad, Khambhalia, Kalyanpur, Okhamandal (Dwarka) of Devbhumi Dwarka district of Gujarat state. The five wholesaler/distributors were selected from district headquarters. The primary data were collected through personal interview with farmers, dealers, wholesaler/distributors using well-structured questionnaires and interview scheduled. Results revealed that most of *Bt* cotton growers to be middle aged farmers. The pattern of land holding distribution shows that majority of the Bt cotton growers belonged to the small and marginal land holding category. Social participation of *Bt* cotton growers shows that they are not members of any organization. The well was found to be the main source of irrigation water and most of *Bt* cotton growers were reported to attained primary level of education From the study, it was found that Rasi seed (P) Ltd. Occupied major market share in Devbhumi Dwarka district. Among different marketing channels, it was observed that marketing channel-I (MC-I) (Company→ Wholesaler/Distributors→ Dealer→ *Bt* cotton grower) is the most prevalent channel in the sampling area.

Keywords: Bt cotton; marketing status; market share; marketing channel.

1. INTRODUCTION

Agriculture is the foundation of national prosperity, and India's economic development strategy is unlikely to succeed without a strong emphasis on rapid agricultural growth (Anonymous, 2021). Ensuring growth in this sector is essential for improving crop productivity (Datta et al., 2001, Kumar, 2005). Cotton, recognized as one of India's most crucial commercial crops, plays a pivotal role in both the industrial and agricultural economy, earning it titles like 'white gold' and 'fiber king' due to its substantial economic impact (Dalvi et al., 2013). Bt cotton, a genetically modified cotton variety, has been engineered with the *Bacillus thuringiensis* (Bt) gene, which produces a protein toxic to bollworm pests (Manjunath and Kiresur, 2011, Rajendra et al., 2007). This modification has made Bt cotton highly effective against lepidopteran pests, particularly in regions where bollworm infestations are prevalent (Kumar et al., 2017; Anonymous, 2005).

In the agricultural year 2020-21, India produced 371 lakh bales of cotton over an area of 129.57 lakh hectares, achieving a productivity level of 487 kg per hectare (Cotton Corporation of India, 2021). According to the latest data for 2023-24, Gujarat now has an estimated cotton cultivation area of 26.82 lakh hectares with productivity at approximately 589 kg per hectare. This increase over the past decades underscores Gujarat's emergence as a prominent cotton-producing state, supported by the development of hybrid cotton varieties and state-supported initiatives to boost productivity (Press Information Bureau, 2024; (International Cotton Advisory Committee, 2001). India's cotton-producing regions are divided into three primary zones based on climate, soil type, and geographic conditions, all of which

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influence the specifics of cotton cultivation: the North Zone (covering Punjab, Haryana, and Rajasthan), the Central Zone (including Maharashtra, Madhya Pradesh, and Gujarat), and the Southern Zone (comprising Andhra Pradesh, Karnataka, and Tamil Nadu). This classification reflects the distinct environmental and climatic conditions of each zone, affecting cotton varieties, planting seasons, and yield potential (Rana et al., 2019, Sivakumar et al., 2005; Arora & Bansal, 2012; Ministry of Agriculture and Farmers Welfare, 2021). Approximately 65 per cent of India's cotton crop is grown under rainfed conditions, with Maharashtra, Gujarat, Andhra Pradesh, and Telangana—collectively known as the Cotton Basket of India—contributing nearly two-thirds of the nation's total cotton production (Priyadarshini et al., 2022)."

2. MATERIALS AND METHODS

Multistage random sampling technique was used for study, four talukas were selected from Devbhumi Dwarka district. And three villages were selected from each talukas. The total thirty farmers were selected from three villages. Dealers were select from the taluka place only. The wholesaler/distributor were selected at a district level. A random sampling procedure was adopted in the selection of the respondents (USDA Agricultural Research Service, 2021). Accordingly, 30 *Bt* cotton growers were selected from three selected villages. From each selected taluka 30 farmers and 5 dealers were selected. So, the total sample size 120 farmers 20 dealers and 5 Wholesalers / Distributors. Descriptive statistics was used in the data analysis. Tools like Simple tabular method, Percentage method were used for the research study.

3. RESULTS AND DISCUSSION

3.1 Socio-economic Characteristics of the *Bt* Cotton Growers

The socio-economic characteristics of the respondents namely age, education, size of land holding, irrigation sources and social participation were captured and studied presented in Table 1. The *Bt* cotton growers were categorized into three groups based on their age. More than (47.50%) of the *Bt* cotton growers belonged to middle age followed by young age (30.00%) and old age (22.50%).

Table 1. Distribution of *Bt* cotton growers according to their age (n=120)

Sr. No.	Age	Frequency	Percentage
1.	Young (20 to 30 years)	36	30.00
2.	Middle (31 to 45 years)	57	47.50
3.	Old (More than 45 years)	27	22.50
Total		**120**	**100.00**

Table 2 showed that 30.83% of the *Bt* cotton growers attended primary education, 22.50% were found to be illiterate and 21.67% had attended secondary level. In addition, 19.17% of the *Bt* cotton growers studied up to HSC level and only 5.83% of the *Bt* cotton growers had studied up to UG/PG level. This may be due to the fact that in the study area, primary and secondary education were easily accessible,. Whereas the higher educational institutes are located at far distance.

The area of land possessed by the *Bt* cotton growers are presented in the Table 3. The *Bt* cotton growers are categorized into five groups based on their land holdings. Majority 39.17% of *Bt* cotton growers that belonged to the small land holding category. The marginal land holding category was fond to be (22.50%), semi medium land holding category (21.66%), medium land holding category (12.50%) and only few of them belonged to large land holding category (4.17%). This pattern of land holding distribution showed that majority of *Bt* cotton growers belonged to the small and marginal landholding categories.

Table 4 presents the source of irrigation water. Depicting the main source of irrigation water for the *Bt* cotton growers to be well *i.e.*, (49.17%) of the respondents. Whereas another important irrigation source available with *Bt* cotton growers was tube well *i.e.*, 40.83 % followed by river (08.33%) and Canal (01.67%).

The *Bt* cotton growers were categorized into four groups based on their social participation in Table 5. Majority 61.67 % of *Bt* cotton growers have no membership of any organization followed by membership in one organization (29.17%), membership in more than one organization (06.66%) and holding position (02.50%).

Table 2. Distribution of *Bt* cotton growers according to their education level (n=120)

Sr. No.	Educational status	Frequency	Percentage
1.	Illiterate	27	22.50
2.	Primary level	37	30.83
3.	Secondary level	26	21.67
4.	Higher secondary level	23	19.17
5.	Graduation/ Post Graduation	07	05.83
Total		**120**	**100.00**

Table 3. Distribution of *Bt* cotton growers according to their land holding (n=120)

Sr. No.	Land holding size	Frequency	Percentage
1.	Marginal (up to 1.00 hectare)	27	22.50
2.	Small (1.01 to 2.00 hectares)	47	39.17
3.	Semi medium (2.01 to 4.00 hectares)	26	21.66
4.	Medium (4.01 to 10.00 hectares)	15	12.50
5.	Large (more than 10 hectares)	05	04.17
Total		**120**	**100.00**

Table 4. Distribution of *Bt* cotton growers according to their irrigation facilities (n=120)

Sr. No.	Sources of Irrigation	Frequency	Percentage
1.	Tube well	49	40.83
2.	Canal	02	01.67
3.	Well	59	49.17
4.	River	10	08.33
Total		**120**	**100.00**

Table 5. Distribution of *Bt* cotton growers according to their social participation (n=120)

Sr. No.	Social participation	Frequency	Percentage
1.	No membership	74	61.67
2.	Membership in one organization	35	29.17
3.	Membership in more than one organization	08	06.66
4.	Holding position	03	02.50
Total		**120**	**100.00**

3.2 Market share of *Bt* Cotton Seed

3.2.1 Distribution of dealers according to various *Bt* cotton seeds companies based on availability

The data regarding *Bt* cotton seed availability in dealers' shop are presented in Table 6. This revealed that 100 % dealers sold Rasi Seed (P) Ltd. *Bt* cotton seed followed by Ajeet Seeds private Ltd. (80.00%), Western Agri Seeds Ltd. (70.00%), Akshay Seed Tech. (65.00%), Kaveri Seed company Ltd. (55.00%), Ankur Seeds Pvt. Ltd. (45.00%) and Sainath Seed corporation (45.00%).

3.2.2 Major companies preferred by the farmers while purchasing *Bt* cotton seeds

The data presented in Table 7 show that 23.33 % farmers used Rasi Seed (P) Ltd. *Bt* cotton seed while 15.84 % farmers used Western Agri Seeds Ltd. On the other hand, 15.00 % farmers used Ajeet Seeds private Ltd. (ASPL). while 12.50 %, 10.00 %, 09.17 %, 08.33 % and 05.83 % farmers used Nuziveedu Seed Ltd., Akshay Seed Tech., Kaveri Seed company Ltd., Ankur Seeds Pvt. Ltd. And Sainath Seed corporation *Bt* cotton Seed respectively. Majority farmers (23.33%) preferred the *Bt* cotton Seeds sold Rasi Seed (P) Ltd.

Table 6. Distribution of dealers according to various companies Bt cotton seed availability (n=20)

Sr. No.	Name of Company	Frequency	Percentage
1.	Rasi Seed (P) Ltd.	20	100.00
2.	Western Agri Seeds Ltd.	14	70.00

3.	Ajeet Seeds Private Ltd. (ASPL)	16	80.00
4.	Nuziveedu Seed Ltd.	10	50.00
5.	Akshay Seed Tech.	13	65.00
6.	Kaveri Seed company Ltd.	11	55.00
7.	Ankur Seeds Pvt. Ltd.	09	45.00
8.	Sainath Seed corporation	09	45.00

Table 7. Major companies preferred by farmers (n=120)

Sr. No.	Name of Company	Frequency	Percentage
1.	Rasi Seed (P) Ltd.	28	23.33
2.	Western Agri Seeds Ltd.	19	15.84
3.	Ajeet Seeds private Ltd. (ASPL)	18	15.00
4.	Nuziveedu Seed Ltd.	15	12.50
5.	Akshay Seed Tech.	12	10.00
6.	Kaveri Seed company Ltd.	11	09.17
7.	Ankur Seeds Pvt. Ltd.	10	08.33
8.	Sainath Seed corporation	07	05.83
Total		**120**	**100.00**

Table 8. Distribution of *Bt* cotton growers according to marketing channels (n=120)

Sr. No.	Marketing Channel	Frequency	Percentage
1.	*Bt* cotton grower - Dealer -Wholesaler/Distributor- Company	65	54.17
2.	*Bt* cotton grower-Dealer-Company	07	05.83
3.	*Bt* cotton grower -Wholesaler/Distributor- Company	19	15.83
4.	*Bt* cotton grower- Co-operative society- Wholesaler/Distributor- Company	24	20.00
5.	*Bt* cotton grower- Company	05	04.17
Total		**120**	**100.00**

3.3 Marketing channels of *Bt* cotton seed

Tabe 8 presents the marketing channels of Bt cotton in the study area.Therefore, the prevalent marketing channels for the *Bt* cotton seeds indentified in the study area were presented as follows:

- **MC-I:** *Bt* cotton grower – Dealer - Wholesaler/Distributor - Company
- **MC-II:** *Bt* cotton grower – Dealer - Company
- **MC-III:** *Bt* cotton grower - Wholesaler/Distributor - Company
- **MC-IV:** Bt cotton grower - Co-operative society - Wholesaler/Distributor - Company
- **MC-V:** *Bt* cotton grower – Company

The result of study revealed that Marketing Channel-I (MC-I) (54.17%) was most prominent channel prevalent in the study area for purchasing the *Bt* cotton seeds by *Bt* cotton growers followed by MC-IV (20%), MC-III (15.83%), MC-II (05.83%) and MC-V (04.17%) channels.

4. CONCLUSION

The patter of land holding distribution shows that majority *Bt* cotton growers belong to the Small and marginal land holding category. Social participation of *Bt* cotton grower shows that no membership in any organization and membership in one organization. The well is main source of irrigation water.

The result of the study reveals that Marketing channel-I (MC-I) (Company-Wholesaler/Distributors-Dealer-*Bt* cotton grower) was the most prominent channel for purchasing the *Bt* cotton seed by *Bt* cotton growers. The result of the study interpreted that 60.00 per cent *Bt* cotton growers purchased *Bt* cotton seed from dealer's shop. The highest proportion of *Bt* cotton growers were purchased the *Bt* cotton seed from dealer's shop may be because of easily

availability of *Bt* cotton seed in the proximity and may be credit given by dealers. The result indicates that the dealers were majorly purchased (45.00%) *Bt* cotton seed from Wholesaler/Distributor. In remaining cases purchases were made from company (35.00%) and company and wholesaler/distributor (20.00%). The result interpreted that all wholesaler/Distributor are purchased *Bt* cotton seed from the seed company directly.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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